



## Data Article

## Dataset for the analysis of TV viewer response to live sport broadcasts and sponsor messages



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## ABSTRACT

This paper presents data for the estimation of TV viewers' response to sponsor messages embedded in live sports broadcasts. The data were obtained from 11 participants who each watched a full live broadcast of a 2018 soccer World Cup group stage match in a laboratory. Viewer-related data include participants' heart rate, galvanic skin response, and visual attention to sponsor signage visible on screen throughout the entire game. The data additionally include game-related variables such as the minute of play and live betting odds over the course of the game. The data are structured longitudinally along 11 clusters, with 62,380 observations in total. Given the scarcity of real-time measures in the research of sport sponsorship effectiveness, these data can be used to investigate TV viewers' physiological response to live sports broadcasts in different stages of a game and improve the timing and targeting of commercial messages. For discussion and further information, please refer to the full-length article "Message personalization and real-time adaptation as next innovations in sport sponsorship management? How run-of-play and team affiliation affect viewer response" [1].

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## Specifications Table

Subject	Marketing
Specific subject area	Viewer response to live sport broadcasts and sponsor messages
Type of data	.csv-file and table
How data were acquired	The data were acquired employing a Shimmer 3 GSR+ ear clip device with Bluetooth 4.0 connection and a SMI REDn scientific 60Hz with a USB 3.0 connection to a Windows 8 computer with i5 core and 16 GB RAM. iMotions and SMI iViewRED served as operating softwares for the biometric sensors. Live betting data were obtained from online bookmaker Bet365.com. Data aggregation and analysis took place in IBM SPSS Statistics 27. A pre-questionnaire was used to gather participant-related data.
Data format	Mixed: Raw and analyzed
Parameters for data collection	Viewer response and live betting data are synchronized based on playing time. Each data point represents one second of a game as watched by one participant.
Description of data collection	Viewer response data were collected during broadcasts of the 2018 soccer World Cup. Viewer-related data were gathered from highly involved sports fans as they watched live broadcasts of a game involving their favorite national team in a laboratory setting. Betting odds were automatically requested second-by-second from an online betting provider.
Data source location	Institution: German Sport University City: Cologne Country: Germany
Data accessibility	Repository name: Mendeley Data Data identification number: <a href="https://data.mendeley.com/datasets/b49ht85b33">10.17632/b49ht85b33</a> Direct URL to data: <a href="https://data.mendeley.com/datasets/b49ht85b33/1">https://data.mendeley.com/datasets/b49ht85b33/1</a>
Related research article	Breuer, C., C. Rumpf, F. Boronczyk, Message personalization and real-time adaptation as next innovations in sport sponsorship management? How run-of-play and team affiliation affect viewer response and sponsor signage efficiency, <i>Journal of Business Research</i> , 133 (2021), doi: <a href="https://doi.org/10.1016/j.jbusres.2021.05.003">10.1016/j.jbusres.2021.05.003</a> .

## Value of the Data

- These data are useful as they include real-time biometric measures of viewer response from a controlled lab environment involving live sports broadcasts, which are scarce in sponsorship research.
- The dataset can be used to research phenomena such as viewers' emotional reaction elicited by different game situations and over the course of an entire game, or visual attention toward sponsor signage embedded in sport broadcasts and the influence of game events and viewer emotions on attention.
- Researchers can reuse the dataset to validate findings from field experiments and studies employing recorded stimuli and compare the results against their own.
- Practitioners can use these data to optimize the delivery of sponsor messages throughout broadcasts to increase their effectiveness.
- The data can be used to build software tools for optimal utilization of scarce sponsor signage and real-time adjustments of sponsor messages displayed on digital LED signage or digital overlays.

## 1. Data Description

This paper contains data for the estimation of viewer response to live sport broadcasts and sponsor messages embedded within them. Data were obtained through between June 15 and June 27, 2018, which involved participants watching full live broadcasts of soccer matches played in the soccer World Cup in a laboratory setting. In this way, data were obtained from 11 par-

**Table 1**

Participants and games.

ID	Gender	Age	Sport Involvement	Team Identification	Favorite Team	Opponent Team	Date	Final Score
1	male	28	6.50	5.75	Morocco	Iran	June 15, 2018	0:1
2	male	28	5.70	4.63	South Korea	Sweden	June 18, 2018	0:1
3	male	25	6.50	5.63	Tunisia	England	June 18, 2018	1:2
4	female	25	3.60	4.25	Russia	Egypt	June 19, 2018	3:1
5	male	27	4.20	4.50	Iran	Spain	June 20, 2018	0:1
6	male	27	6.50	5.25	Brazil	Costa Rica	June 22, 2018	2:0
7	male	32	6.70	5.25	Nigeria	Iceland	June 22, 2018	2:0
8	female	24	6.20	5.00	Russia	Uruguay	June 25, 2018	0:3
9	male	18	4.50	6.00	Iran	Portugal	June 25, 2018	1:1
10	male	30	5.70	4.00	Argentina	Nigeria	June 26, 2018	2:1
11	male	24	6.60	5.75	Germany	South Korea	June 27, 2018	0:2

ticipants aged 18-32, nine male and two female. Participant characteristics and the games they watched are summarized in [Table 1](#).

The database consists of two .csv-files. 'Participant\_data.csv' comprises participant-related data such as their gender, age, and the game they watched. 'WC\_data.csv' comprises second-by-second measurements acquired from different sources, as detailed in [Table 2](#). These data are clustered longitudinally along the 11 individual participants with one observation per second, which results in 62,380 observations overall. Descriptive statistics are presented in [Table 3](#) and [Table 4](#).

## 2. Experimental Design, Materials and Methods

### 2.1. Participants

Participants were invited to watch a game of their favorite national soccer team during the group stage of the 2018 soccer World Cup. Inclusion criteria required participants to be over 18 years and report normal or corrected to normal vision. Participants took part voluntarily and signed an informed consent form. Soccer involvement and identification with one of the teams involved in the presented game as measured in the pre-questionnaire had to be high in order for participants to be included.

### 2.2. Questionnaire

Participant-related data were gathered through a questionnaire. The questionnaire included questions regarding the participants' age, gender, and their preferred national team competing in the 2018 soccer World Cup. Soccer involvement and level of identification with the national team in question were measured using the 9-item Sport Involvement Inventory (Beaton et al., 2011) and the 7-item Sports Spectator Identification Scale (Wann & Branscombe, 1993), respectively. Items in both scales were measured on 7-point scales, with a higher score indicating a high level of involvement or identification, respectively. Mean values for soccer involvement and team identification are provided in [Table 1](#).

### 2.3. Biometric data and sponsor visibility

A Shimmer 3 GSR+ device and a SMI REDn infrared eye tracking device were employed to measure viewer response in real-time while participants watched the live broadcasts. The Shim-

**Table 2**  
Variables

Variable	Type	Description	Source
subject	categorical	Unique Participant ID	
date	date	Date of data collection	
timestamp	integer	Second-by-second timestamp	
play_min	integer	Minute of play	Betting data
score_string	categorical	Score line	Betting data
home_odds	numeric	Second-by-second odds of home team win	Betting data
draw_odds	numeric	Second-by-second odds of draw	Betting data
away_odds	numeric	Second-by-second odds of away team win	Betting data
odds_differential	numeric	Difference between teams' winning odds	Betting data; Calculated as the absolute difference between home team odds and away team odds
favteam_odds	numeric	Second-by-second winning odds of participant's favorite team	Betting data; determined by participant's favorite team and current winning odds
goal_differential	integer	Difference between goals scored by teams	Betting data; derived from score line
signage_slot	integer	Code for the position in the sequence of brand visibility on LED boards during regular playing time	Exposure analysis
brand_exposure	categorical	ID of sponsor brand visible on signage	Exposure analysis
brand_clutter	integer	Number of additionally visible sponsor brands	Exposure analysis
gaze_hit	integer	Value indicating if gaze hit sponsor signage (1) or not (0)	SMI REDn eye tracking data
gaze_duration	numeric	Duration of gaze hit in milliseconds	SMI REDn eye tracking data
gaze_brand	categorical	ID of sponsor brand hit by gaze	SMI REDn eye tracking data and exposure analysis
GSR_resistance	numeric	Skin resistance in kilo Ohm	Shimmer 3 GSR+ data
GSR_conductance	numeric	Skin conductance in micro Siemens	Shimmer 3 GSR+ data
HR_BpM	numeric	Heart rate in beats per minute	Shimmer 3 GSR+ data

**Table 3**  
Descriptive statistics – categorical variables

Variable	Valid	Top Counts
subject	62,380	11: 6,129; 9: 6,009; 6: 5,914
score_string	62,380	0-0: 33,142; 0-1: 9,180; 2-0: 6,028
brand_exposure	62,380	0: 18,178; 1: 4,580; 5: 4,551
gaze_brand	62,380	0: 43,167; 15: 157; 1: 149

mer 3 GSR+ device allowed measuring participants' galvanic skin response using two finger electrodes and heart rate via an optical ear clip at 128 Hz. Data were transferred to a Windows 8 computer (i5, 16 GB RAM) via a Bluetooth 4.0 link. The output produced by the software iMotions contained second-by-second aggregated data on skin resistance ('GSR\_resistance'), skin conductance ('GSR\_conductance'), and the heart rate ('HR\_BpM').

The SMI REDn eye tracking device was connected to the same computer via USB 3.0 that ran the operating software SMI iViewRED. Following a 9-point calibration with subsequent validation, the eye tracking device gathered eye movement data at 60 Hz that were sent to the iMotions screen-based eye tracking module.

**Table 4**  
Descriptive statistics – integer and numeric variables

Variable	Valid	M	SD	Min	Max
play_min	62,380	48.00	27.25	1.00	100.00
home_odds	62,380	26.43	83.75	1.00	501.00
draw_odds	62,380	8.82	11.75	1.08	51.00
away_odds	62,380	40.79	99.83	1.00	501.00
odds_differential	62,380	63.81	122.97	0.00	500.00
favteam_odds	62,380	41.02	101.77	1.00	501.00
goal_differential	62,380	0.51	0.74	0.00	3.00
signage_slot	57,761	45.23	25.91	1.00	90.00
brand_clutter	62,380	0.21	0.45	0.00	2.00
gaze_hit	44,600	0.03	0.18	0.00	1.00
gaze_duration	44,600	8.12	58.66	0.00	1000.00
gaze_brand	44,600	0.26	1.66	0.00	15.00
GSR_resistance	62,380	333.87	389.03	51.32	6956.82
GSR_conductance	62,380	6.68	5.02	0.42	19.49
HR_BpM	62,238	78.91	13.00	49.00	211.07

The same software was used for an exposure analysis, which identified sponsor logos that were visible on LED boards surrounding the field at a given point during the game ('brand\_exposure'), listed them based on the subsequent visibility slots throughout the game ('signage\_slot'), and determined the number of concurrently visible sponsor brands ('brand\_clutter'). All sponsor messages were marked as so-called Areas of Interest (AOIs) that could be matched with participants' gaze hits on the screen, employing a fixation filter of 100 ms. The algorithm automatically determined the duration of gaze hits ('gaze\_duration') and the sponsor brand they were directed at ('gaze\_brand'). Due to minor inaccuracies in the recording of eye movements, the number of valid observations for gaze data was lower at 44,600, as exhibited in Table 4.

#### 2.4. Betting data

Betting data were automatically requested on a second-by-second basis from an online bookmaker that provided decimal odds, also known as European odds. For every second of a game, these data included the odds for a home team win, a win by the away team, or a draw. Based on the odds at a given point during the game and the winning odds of the participant's preferred team, the variables 'odds\_differential' and 'favteam\_odds' were calculated. Betting data further included a second-by-second time stamp and the current scoreline of the game, from which the variable 'goal\_differential' was computed.

#### 2.5. Procedures

Upon arrival at the laboratory, participants were seated in an armchair and offered water or non-caffeinated soft drinks to create a close to realistic and relaxing atmosphere. The games were displayed on a 42" TV screen placed in front of participants. A briefing of the general procedure was followed by attachment of the Shimmer 3 GSR+ device and adjustment and calibration of the eye tracking device. Participants remained seated over the course of the playing time.

## Ethics Statement

The authors declare that the data were acquired with prior approval of the participants involved in this study. Prior to the collection of these data participants were given an informed consent document explaining the procedure to be carried out and were treated according to the ethical guidelines of the ethics committee at the German Sport University.

## CRedit Author Statement

**Felix Boronczyk:** Writing – original draft preparation, Investigation, Software; **Christoph Breuer:** Conceptualization, Supervision, Writing – reviewing & editing; **Christopher Rumpf:** Conceptualization, Methodology, Software, Data curation.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships, which have or could be perceived to have influenced the work reported in this article.

## Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:[10.1016/j.dib.2021.107281](https://doi.org/10.1016/j.dib.2021.107281).

## Reference

- [1] C. Breuer, C. Rumpf, F. Boronczyk, Message personalization and real-time adaptation as next innovations in sport sponsorship management? How run-of-play and team affiliation affect viewer response, *J. Bus. Res.* In Press.