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ORIGINAL ARTICLE

Influence of players' vocalisations on soccer referees' decisions

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Abstract

The influence of a potentially fouled player's vocalisations on the referee's decisions was investigated. Experienced soccer referees watched video clips of real-match situations that were presented either without sound or with sound where a player's vocalisations were clearly audible and made judgements regarding fouls, direction of play and personal penalties. The results revealed that players' vocalisations had no impact on the foul decisions of the referees. However, once a referee made a foul decision, the player's vocalisations led to an increased number of personal penalties (increase in yellow cards) for the foul-causing player. In addition to crowd noise, a player's vocalisations during a foul are used as a proximal cue in the referee's decision-making process.

Keywords: Behaviour, team sport, psychology

Imagine a soccer player lying on the ground after a tackle situation, holding his knee and crying out as if in great pain. There are several possible reasons for his vocalisation. He might have been injured due to a foul by an opponent; he might have injured himself accidentally while avoiding an opponent; or he might be simulating having been injured by an opponent, hoping to influence the referee to his own advantage.

Referees have the difficult task of judging situations involving fast movements, several players, many cues, possibly limited visibility and perhaps duplicitous players. Nonetheless, the referee needs to make the correct decision – according to the rule book – on whether to call a foul. The aim of this study was to examine if referees are influenced in their decisions by players' vocalisations.

A referee's decision-making process can be described as a sequence of social-information processing, since the referee is in constant social interaction with the players (Bless, Fiedler, & Strack, 2004; Plessner & Haar, 2006). Several information-processing steps link observable input, such as the situation described above, to a person's behavioural response, such as a referee's foul call. In soccer, for

example, the referee first observes the tackle and then categorises it as a foul play by taking into account information stored in memory and other external knowledge sources (e.g., the game's rule book, history of a player and the match characteristics) as well as integrating information associated with the tackle (i.e., cues). This exchange between memory, knowledge and cues leads to a behavioural response, such as the decision to give the player a yellow card. Since referees often need to make fast decisions with limited information, cues outside the tackle itself (cues regarding the tackle would be, for instance, temporal or ballistic contiguity; see Morris & Lewis, 2010, for an overview) are used as additional sources of information to make accurate judgements.

Sets of observable cues are the basis for social judgements on distal events, according to Brunswik's (1952) lens model approach. This means that otherwise inaccessible properties of objects are estimated by proximal, more easily accessible cues. The relation between these proximal cues and distal criteria can be acquired as part of cue-learning processes (Brunswik, 1957). For instance, to make judgements, decision-makers rely on environmental cues, which may not

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have equal relevance. They then use their memory of cue–outcome correlations from previous experiences. This lens model approach can be applied to judgements and decisions of referees, in that judging a distal criterion such as foul play might not be totally accessible (e.g., limited visual information due to poor viewing perspective) and therefore estimated by proximal cues such as crowd noise (see Plessner, Schweizer, Brand, & O’Hare, 2009, for an application of the lens model framework on refereeing). A study with soccer referees showed that referees, who were trained with visual cues based on feedback, were able to increase decision accuracy in contact situations (Schweizer, Plessner, Kahlert, & Brand, 2011).

The process is not limited to visual cues. Acoustic cues such as crowd noise have been shown to influence referees with regard to foul play decisions (Nevill, Balmer, & Williams, 2002). Referees who viewed one-on-one tackle situations with background crowd noise awarded significantly fewer fouls against the home team than referees who heard no background crowd noise. Unkelbach and Memmert (2010) showed similar results in two experiments. In a database analysis, the authors revealed that referees had awarded fewer yellow cards to the home team than to the away team. Higher home crowd density also led to significantly more cards against the away team. In their second experiment, referees were asked to judge tackle situations in a high- and a low-volume crowd noise condition. In line with the other experiments, referees awarded yellow cards with higher probability when scenes were presented with high volume compared with when the scenes were presented with low volume.

Possible explanations of why acoustic cues can influence judgements can be found in the literature on heuristic cues (cues that are processed by simple decision rules) in persuasion. Spectators who support a certain team or an individual player may try to persuade the referee that a tackle situation was illegal or unfair and thus should result in a foul call or even a yellow or red card. Audience reactions or players’ vocalisations act as peripheral cues or heuristic triggers and as such are important elements of persuasive messages (Nabi & Hendriks, 2003). According to the heuristic model of persuasion (Chaiken, 1987), persuasion cues are processed by means of simple schemas or decision rules. Recent research has supported the usefulness of the heuristic model for explaining the persuasive impact of communicator and message variables. Studies have shown that recipients of persuasive speeches are more convinced if the message is supported by an enthusiastic overheard audience (Axson, Yates, & Chaiken, 1987). However, this was evident only for recipients with low involvement (issue content of low relevance for their own community). Comparably, people have been found to judge video clips as funnier when they

watch the clips with another person who is laughing (Deveureux & Ginsburg, 2001). Applying the heuristic model of persuasion to Brunswik’s (1952, 1957) lens model, one could argue that auditory cues provided by an audience or a companion acted as proximal cues for judgements on the persuasiveness of a message or humour in a video clip.

Similarly, players’ vocalisations can act as auditory cues that are comparable to the noise of a crowd or audience to support the decision-making process of a referee. From the perspective of Brunswik’s (1952, 1957) lens model and the heuristic model of persuasion (Chaiken, 1987), referees might learn that a player’s vocalisation is associated with pain and that pain is mostly the consequence of a foul. After several experiences with this cue–outcome correlation, the referee might be persuaded have learned that this cue is valid and helpful for making accurate judgements on fouls.

So far, only crowd noise has been examined as an auditory cue influencing refereeing decisions. However, referees are faced with several other auditory cues on the pitch, such as the shouting of other players, the sounds of body contact in tackle situations and microphone communication with assistant referees. The aim of the current study was to examine for the first time, if referees are influenced by a player’s vocalisations when judging if a foul has been committed or when judging the severity of a foul. Based on Brunswik’s (1952, 1957) lens model and the effect of crowd noise on soccer referees’ card decisions (Unkelbach & Memmert, 2010), we predicted that soccer referees would give more yellow cards when they heard a potentially fouled player’s vocalisations. However, as referees are able to learn from previous experience that not every vocalisation is the result of a foul play, especially in and as they might have learned to block their empathy in less severe tackle situations where guidelines on when to call a foul might be more straightforward (also seen in surgeons, Halpern, 2001, and in counsellors and legal professionals, Madeira, 2006), we did not expect an effect on the general foul play decision.

Methods

Participants

Fifty participants provided written consent prior to the experiment; they received no financial compensation for their participation. The study was conducted in accordance to the ethical principles stated in the declaration of Helsinki from 1964. In addition, the study design was approved and granted by the university’s ethics committee. All participants were female referees and on average 26.62 (SD = 5.19) years old. The data were acquired at a female referees’ workshop organised by the DFB (German Football

Association) during the winter break. They had refereed across various levels of DFB leagues, such as men's (fourth to ninth league) and women's (first to third league) soccer or acted as assistant referees in men's (third to seventh league) and women's (first league) soccer. On average, their refereeing experience was 9.88 (SD = 4.48) years and their own soccer-playing expertise was 9.98 (SD = 5.88) years.

Task and procedure

We chose 52 match situations from real soccer matches in the men's fourth league in Germany. The match situations were taken from match videos filmed from an elevated position located at the midline of the pitch to ensure the optimal view. The videos were chosen with regard to five criteria. First, the video scene had to show a questionable situation where two players got in conflict with each other while competing for the ball. This criterion was evaluated by a FIFA-approved referee. Second, the referees on the pitch decided for foul in all situations but did not show any yellow or red cards. Third, the referees' decisions were unknown to our referee population (i.e., the blowing of the whistle was not perceivable and there was no view of the referee). Fourth, the situation was presented in a way that all relevant parameters were visible to our participant referees. Fifth, and most important, the vocalisation of the player assumed to be fouled was clearly audible. In addition, match situations were chosen in which no sound of body or shin guard contact was perceivable.

The referees were divided into two homogeneous groups according to age (i.e., assuming different amounts of life experience) and refereeing experience, since this has been shown to be a predictor for skill in refereeing (Catteuw, Helsen, Gillis, & Wagemans, 2009). The matched groups were investigated in two parallel sessions conducted at the same time in two separate rooms. The experimenters in both rooms followed a standardised experimental protocol in the realisation of the experiment. Thus, both groups were shown all match situations in an identical randomised order. The only difference was related to the sound condition. If a match situation was presented with sound in Group 1, then it was presented without sound in Group 2, and vice versa. This procedure ensured that all match situations got judged by every referee. The presentation of all match situations was standardised in both groups. At first, the referees familiarised themselves with the questionnaire and the presentation of the match situations without specific instructions regarding the sound condition in two practice trials (one with and one without sound).

All match situations were presented once on a projector screen, and the referees were asked immediately afterwards to indicate if they would judge the

situation as foul or no foul. They were then asked to state the direction of play (i.e., which team would be in possession of the ball if they judged a foul). Finally, the referees were asked to indicate whether the foul-causing player received no personal penalty, a yellow card or a red card. All decisions were made spontaneously and in a comparable time frame to the situation on the pitch but without the match-specific knowledge of the referee on the pitch. The referees made their decisions silently and entered their answers on their own prepared questionnaire, where all match situations were listed in numerical order.

Data analysis

The database consisted of information about the referees' decisions regarding all match situations. We first performed a *t*-test (two-tailed) to analyse the referees' decisions regarding foul or no foul with respect to the factor *sound* (sound or no sound). Second, we ran a 2 (sound) \times 3 (personal penalty) analysis of variance (ANOVA) to evaluate all foul decisions of the referees. The factor *sound* was described by two levels (sound and no sound). The factor *personal penalty* was described by three levels (no penalty, yellow card and red card). The data in the ANOVA were analysed after running an arcsine transformation on the percentage values of referees' decisions for each particular match situation. If Mauchly's test revealed that the sphericity assumption was violated in the ANOVA, the degrees of freedom were corrected by estimation of sphericity according to the Greenhouse–Geisser correction.

Results

The referees decided more often on foul ($M = 62.5\%$, $SD = 9.5$) than no foul, but the *t*-test (two-tailed) delivered no evidence for an influence of the factor *sound* on foul decisions, $t(49) = -.246$, $p = .806$. The ANOVA revealed a significant main effect for the factor *penalty*, $F(2, 98) = 668.303$, $p < .001$, $\eta^2 = .935$. The referees decided more often on no penalty than on a yellow or red card. Moreover, a significant interaction between the factors *sound* and *penalty* was observed, $F(2, 98) = 7.613$, $p < .01$, $\eta^2 = .134$. Simple post hoc comparisons revealed that the decisions for every penalty ($p < .001$) differed significantly between each other. A bar plot summarises all results in [Figure 1](#), where it can be seen that the foul-causing players received a yellow card significantly more often when the players who got fouled produced audible vocalisations (30.8%) compared to when they did not (23.6%). The percentage values correspond to the number of situations in which the participating referees called foul ($N = 1624$).

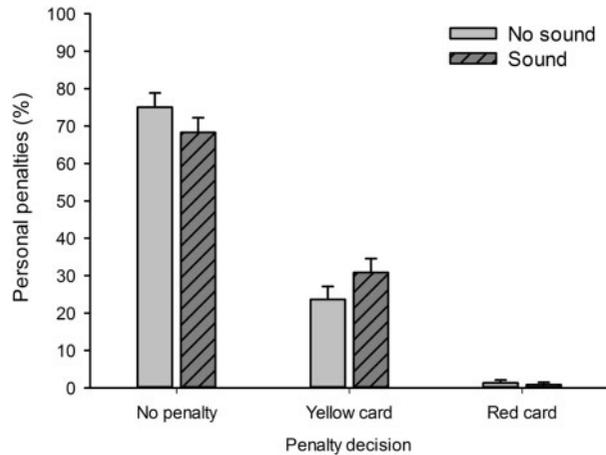


Figure 1. The distribution of personal penalties within the foul decisions by the referees, separately for the two conditions (sound and no sound). The values are depicted as percentages of referees' decisions. The error bars represent the 95% confidence interval.

Discussion

The aim of the current study was to examine if referees are influenced by players' vocalisations as sources of information with regard to foul play decisions and judgements of the severity of a foul. Expert soccer referees were asked to judge potential foul situations in a no-sound condition (no audible player vocalisations) and a sound condition (audible player vocalisations). In line with the main hypothesis, the results revealed that if a foul was called, referees awarded significantly more yellow cards in the sound condition than in the no-sound condition. However, the vocalisations of the players did not influence the general foul play decision.

Vocalisations of players seem to influence referees' decisions and to be considered indicators of the severity of a foul. Like crowd noise (Nevill et al., 2002; Unkelbach & Memmert, 2010), this auditory cue seems to be a proximal cue on which referees base their judgements concerning distal events such as rule violations in soccer. As referees proceed through their career, they learn which cue–outcome correlations are relevant and helpful for their decision-making process. Depending on the difficulty of the situation, they either are influenced by additional cues or block out any factors that could influence their decision. On the one hand, they might learn that players' vocalisations in less severe tackle situations might be the result of exaggerated theatrical behaviour and be able to block their empathy, as has been shown with surgeons or counsellors (Halpern, 2001; Madeira, 2006). This could also explain why the referees in our study were less influenced by the players' vocalisations with regard to general foul decisions (foul or no foul). On the other hand, the severity of a foul might be more difficult to judge in the sense that penalties can have severe consequences for the players and maybe even

the whole team, which causes referees to take into account additional cues. This was the case in a study with basketball referees, where a video-training programme was used to show that expert referees can learn to make decisions in ambiguous and difficult situations according to an established standard (Schweizer, Plessner, & Brand, 2013).

In more severe situations, in which players have actually been fouled and try to get out more from the referee to their own advantage (e.g., a yellow card for their opponent), the tackle may indeed look severe and painful. Here, empathy caused by pain-induced vocalisations could reinforce what the referee perceives and therefore might be the influential factor behind the effect found in this study. Although this has been shown in medical studies (e.g., Saarela et al., 2007), it awaits further investigation in sports officiating. As decision-making processes usually involve social interaction with others, empathising with a specific person might influence how one views and describes the behaviour of this person.

The basic model of three-person empathy applies to situations in which the decision of what side to take has not yet been made (Breithaupt, 2012a, 2012b). Essential elements of this model include free choice, judgement uncertainty and the actual decision. This model is easily applied to the sports-officiating context, such as the one explored here that features a referee and two combating players: The referee has a free choice of foul/no foul and card/no card, and there is judgement uncertainty due to fast movements, reduced visual information and/or deceptive actions by the players. The referee may also have already made a decision on the severity of the foul to be judged. One could postulate that a referee's empathy should influence how the tackle situation between two players is perceived. The addition of a pain perception cue is even more likely to trigger empathy (Saarela et al., 2007). Therefore, acoustic cues associated with pain may provoke empathy, which in turn influences perception and rational judgements. At this point, such relations between empathy and refereeing decisions with regard to acoustic cues are just speculations, which should be addressed in future studies.

In the current study, referees decided more often on foul than on no foul. This was expected, as video scenes were selected only if the actual referees on the pitch had also decided on a foul. However, the relatively low percentage of foul decisions (62.5%) is still surprising. This could be due to our laboratory design, since additional information such as match or player history was not available for our participants. With regard to methodological limitations, our paradigm included a sound condition and a no-sound condition. Since players on the field rarely make no noise at all in tackle situations, this should be further developed in future studies. For instance, the two

conditions could be distinguished by low and high volume of players' vocalisations, as has been done by Unkelbach and Memmert (2010) in their study on crowd noise. Concerning the stimulus material, the correct decision for the situations was not further evaluated. This was due to the already highest national level of refereeing of the participating referees, making it difficult to judge how much better or more correct the decision would be of an additional referee expert. In addition, the aim of the study was to examine the influence of sound on referees' decisions, independent of what the correct decision would have been.

Further studies are also needed to test under what conditions such cues are used and if their usage changes if, for example, visual information is limited or the difficulty of the task increases. In addition, generalisations of the results need to be examined with regard to male referees. Practical recommendations could then be made for the officiating boards of sports associations, suggesting that the role of auditory cues in decision-making should be addressed in professional training of referees. This is especially apparent if one considers that a soccer referee makes on average around 140 perceivable decisions per match (Helsen & Bultynck, 2004), of which 36% are foul decisions. Applied to the current study, up to 15 foul play decisions per match would be biased towards could result in a yellow card, assuming that the foul decisions are accompanied by audible player vocalisations.

To return to the example in the Introduction, correctly judging the situation in which a player is lying on the ground making audible vocalisations is a difficult task for referees. The current study revealed that in severe tackle situations and when the decision of a foul has already been made, referees' penalty judgements on the severity of the foul based on rule-book knowledge are additionally influenced by the player's vocalisations.

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