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The Effect of Sports Fan Identification on the Cognitive Processing of Sports News

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An experiment investigates the impact of fan identification on the cognitive and emotional processing of sports-related news media. Two coaches were featured; one conceptualized as negatively valenced the other positively. Participants completed a fan identification scale before stimuli presentation. While watching the press conferences, heart rate, skin conductance, and corrugator muscle activity were recorded as indices of cognitive resource allocation, emotional arousal, and aversive motivation activation respectively. Self-report measures were collected after each stimulus. Results show that highly identified fans process sports-related news content differently than moderate fans, allocating more cognitive resources and exhibiting greater aversive reactions to the negatively valenced coach. Comparisons between the self-report and psychophysiology data suggest that the latter may be less susceptible to social desirability response bias when emotional reaction to sports messages are concerned.

Keywords: fan identification, sports, attention, emotion, cognition, experiment

The American public has a love affair with team spectator sports. Sports fans invest great amounts of time, money, attention, and emotion on teams with which they identify. The proliferation of sports-specific television networks, radio stations, and magazines provides an illustration of the demand sports fans generate for relevant, specific coverage of their favorite sports and teams. The financial investment by national advertisers seeking to link products with the strong loyalty consumers have with teams is another example.

This national obsession with sports and teams has led to a number of avenues for scholarly research. Most focus on how and why people watch sports, often exploring it from a uses and gratifications perspective and sometimes focusing on differences related to gender (Gantz & Wenner, 1991; Gantz, Wenner, Carrico, & Knorr, 1995). Other scholars have viewed sports spectatorship from the perspective of entertainment theory (for a discussion of the relationship between entertainment and sports, see Bryant & Raney, 2000). Bryant, Brown, Comisky, and Zillmann (1982), for example, looked at the relationship between spectatorship and enjoyment. Hocking (1982) and Eastman and Land (1997) explored how people watch sports—whether

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alone, in groups, or at the event venue. More recently, Gantz, Wang, Paul, and Potter (2006) discussed how the habits surrounding television viewing differ between sports fans and fans of other programming genres—not only during the shows themselves but also in preparatory and reactionary behaviors. For an overview of the various motivations that underlie sports spectatorship, see Raney (2006).

Another productive line of research focuses on developing theories about why and how we establish and maintain associations with our favorite teams. Wann and colleagues, for example, have conceptually defined fan identification as psychological attachment or oneness with a sports team and formalized a scale that identifies individual differences in identification among followers of a certain team. The Sports Spectator Identification Scale (SSIS) is a 7-item questionnaire that asks respondents the extent to which, for example, they follow their team's performance through the media, how often they wear the team's clothing, and the extent to which they dislike their team's greatest rival. A fan's level of identification is quantified using the SSIS and often subsequently categorized as low, moderate, or high (Wann & Branscombe, 1993).

The SSIS score has been paired with many diverse outcome variables—everything from age and sports participation, to the likelihood of college-aged fans living in a university dormitory. Still, despite the extensive work linking the SSIS to a variety of other variables via survey research, little attention focuses on experimental work comparing differences in the cognitive processing of mediated sports information between fans that are highly identified with their favorite sports team and those who are not. This is a curious absence in the literature, considering that one of the major theoretical motivations uncovered for closely identifying with a sports team is *eustress,* or the amount of positive arousal acquired by the experience of being closely connected to a team (Gantz, 1981; Gantz & Wenner, 1991 Sloan, 1989). In other words, many highly identified fans become involved in watching team sports "because they enjoy the excitement and arousal they experience watching sport" (Wann et al., 2001, p. 38). Thus, arousal can be positive (e.g., when your team wins) or negative (e.g., when your team loses).

The construct of eustress motivation seems to lend itself to experimental investigation because strongly arousing episodes of both positively- and negatively-valenced media have been shown to impact the human cognitive processing system (Bradley, 1994; Lang, Newhagen, & Reeves, 1996; Bolls, Lang, & Potter, 2001). So, if fan identification can provide an index of the affective connection an individual has to a particular team, then predictions presumably follow concerning the cognitive and emotional responses to valenced news clips focusing on the team. The current study begins filling this literature gap, examining how sports viewers who are highly identified with a particular team cognitively process sports news stories differently than those who are not.

Team Identification

A great deal of work has been conducted to better understand team identification as a form of social identity (Fink, Trail, & Anderson, 2002; Madrigal, 2001; Wann, 2000; Wann, 1993; Wann, Brewer, & Royalty, 1999). Identification extends beyond being a general fan in that highly identified fans feel like the team is a representation of themselves and they are, in turn, a representative of the team. The relationship of

the highly identified fan is emotional in nature, with their social identity depending, in part, on the team's performance. When the team wins, the highly identified fan wins; if the team loses, the fan loses. Therefore, fan investment extends beyond spectatorship.

A decade of research involving team identification reveals its potential significance in relation to many social and psychological phenomena (Wann, Melnick, Russell, & Pease, 2001). Specifically, significant amounts of research have examined its relationship to aggression (Banscombe & Wann, 1991; Wann, 1993; Wann, Haynes, McLean, & Pullen, 2003), alcohol consumption (Wann, 1998), attributions of glory or shame (Hirt, Zillmann, Erickson, & Kennedy, 1992; Wann, 2000; Wann & Dolan, 2001), legal and illegal support of teams by fans (Laverie & Arnett, 2000; Madrigal, 2001; Wann, Hunter, Ryan, & Wright, 2002), emotion (Hillman, Cuthbert, Bradley, & Lang, 2004; Hillman et al., 2000; Wann, Brewer et al., 1999), and overall psychological well-being (Wann, Dimmock, & Grove, 2003; Wann, Inman, Ensor, Gates, & Caldwell, 1999).

Some research has explored the connection between fan identification and emotional response to a live or mediated sporting event. This research has been conducted under two experimental paradigms. In the first, participants complete the SSIS and then are exposed to a sporting event where they are instructed to view it as they normally would. Following exposure they complete another questionnaire related to the dependent variable of interest.

The other type of experiment, employed much less frequently, consists of participants taking the SSIS and then being individually exposed to some sort of mediated sports stimuli and having psychophysiological measures collected. For example, Hillman et al. (2000) examined team identification using heart rate and electroencephalography (EEG). College-aged participants completed the SSIS and were shown still pictures either of the football team at the university where the data were collected or an in-state rival. Results show that highly identified fans of the local team had greater heart rate deceleration during sports-related pictures, regardless of which team was featured in them, suggesting greater allocation of cognitive resources to processing all sports-related information.

Branscombe and Wann (1992) also used psychophysiological dependent measures in a study related to sports identification. Six weeks before their experiment, a large group of students completed a number of self-reported questionnaires. One of the indices measured the respondent's pride associated with their social identity as an American. Two groups of subjects ($N = 41$) were then selected from this larger group to be significantly different in their level of in-group identification with being American. These subjects individually watched a boxing match from the film *Rocky IV*, which all had reported in the pretest questionnaire never having seen. The boxing match was manipulated so that either the Russian boxer or the US boxer won the event. Blood pressure readings were taken from the subjects pre- and postfilm. Results showed a significant Identification Level X Time interaction in both diastolic and systolic blood pressure with greater pre-to-post increases among those reporting high levels of pride in being American. Physiological results were not reported on the three-way interaction between identification, fight outcome, and time.

Both of these studies demonstrate the utility of psychophysiological methods in addressing the impact of team identification. However, while one (Hillman et al., 2000) used several physiological correlates collected over time to represent cognitive

and emotional processing, it focused only on still images of sporting events. And, while the other study (Branscombe & Wann, 1992 included full-motion video as a stimulus, physiological measures were only collected pre- and postexposure rather than dynamically. Furthermore, the measure of identification used by Branscombe and Wann (1992) was arguably more an indication of identification with a Cold War political ideology than sports fan identification. The current study is designed to measure the dynamic physiological response to full-motion video news clips about a sports team to see if there are differences in these responses according to level of fan identification with that team.

Theoretical Perspective

The Limited Capacity Model for Motivated Mediated Message Processing

The major question guiding the current study is: "How does the valence of sports news impact the way highly identified sports fans cognitively process the stories?" This specific question may have received little scholarly attention, but cognitive processing of media messages themselves has been extensively studied over the past decade (Lang, Bradley, Chung, & Lee, 2003; Lang, 2009; Potter & Bolls, 2011). Much of this work is guided by a specific model of information processing where the human cognitive system is described as containing limited resources that can be applied to any task of processing media messages (Lang, 2000; Lang, 2006). In the Limited Capacity Model of Motivated, Mediated Message Processing (LC4MP, Lang, 2006), the application of resources is done both automatically and through the conscious application of the individual—guided by interest (Schneider, Dumais, & Shiffrin, 1984; Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977), instruction (Lang, Potter, & Bolls, 1999), or motivation (Lang & Yegiyan, 2009). Within the LC4MP, processing is defined as three simultaneous subprocesses that people perform on mental representations of external stimuli: encoding, storage, and retrieval. Encoding allows information to be developed into a mental representation of the stimulus—presumably into a short-term memory store. Past information is retrieved from long-term memory stores to make sense of this newly encoded information. Retrieval, in other words, is the activation of previously learned information to have it available for use during short-term memory manipulations. The subprocess of storage is the task of saving information of relevance into long-term memory networks for subsequent retrieval. The three subprocesses are driven by the allocation of cognitive resources over time. Deceleration of heart rate is a psychological correlate of resource allocation to intake of stimuli from the external environment (Andreassi, 2007; Lacey & Lacey, 1970), a phenomenon applied to cognitive processing of media messages by the LC4MP (Lang, 1994; Potter & Bolls, 2011).

In the model emotion is conceptualized as being comprised of two primary underlying dimensions: valence and arousal (Bradley, 1994; Lang, Greenwald, Bradley, & Hamm, 1993; Lang, Shin, & Lee, 2005; Osgood, Suci, & Tannenbaum, 1957). Valence relates to the positivity and negativity of an experience and/or message and can be measured using self-report indices and physiological response (Bradley & Lang, 2000a). Arousal is conceptually viewed as the level of one's

excitement, and is operationally captured through self-report and/or the activation of the general physiological state as measured by skin conductance (Potter & Bolls, 2011). Each of the three cognitive subprocesses—encoding, storage, and retrieval—are affected by the presence of arousing and valenced media. For example, studies have shown that more resources are allocated to the processing of mediated messages with negatively-valenced content (Bolls et al., 2001; Lang, Potter, & Bolls, 1999; Lang, Newhagen, & Reeves, 1996). Similarly, research has shown that as arousal elicited by a mediated message increases, so does cognitive resource allocation (Lang, Park, Sanders-Jackson, Wilson, & Wang, 2007), and the subsequent memory for the message content (Lang, 1989; Lang, et al., 1996; Lang, Bolls, Potter, & Kawahara, 1999; Lang, Potter, & Grabe, 2003; Potter & Callison, 2000; Bolls, et al., 2001).

Context of the Current Study

The experiment was completed at a large university known for its rich tradition in college football—a winner of multiple national championships and well known for its large and loyal fans within the student body and alumni. In the last 25 years the university has won multiple national championships under eight coaches. However, during a single football season at the time data were collected the program went through several tumultuous months. It all began with a coach quitting.

The coach who quit (Coach 1) had been on the sidelines at the school for two years. He had followed the coach with the worst season record at the school in 44 years and inherited a team on NCAA probation. Still, fortified by a personal ethical credo of "loyalty," he convinced players who could have transferred schools and played under better circumstances to stay at the university. Fans were ecstatic when he posted a 10–3 record in his second season. However, shortly after that successful season, Coach 1 abruptly accepted a head coaching position at another university. He announced his decision during a press conference held at the new university, never returning to the campus on which the study was conducted to say goodbye to his student athletes. His departure left many angry fans dealing with feelings of betrayal.[1]

The second coach in this study (Coach 2) was a former star quarterback at the university. Although he had no head coaching experience, he had worked as an assistant coach in the National Football League for 15 years. Plus, he seemed to have a desirable pedigree, being the son of a legendary professional football coach. Coach 2 was described by several news reports as "a return to the family" and a "savior" of a football program that had been enmeshed in controversy for years.

Stimuli and Hypotheses

The stimuli for this experiment were portions of 4 recorded press conferences held by these coaches. Two of the stimuli were the prepared press statements made by each coach. The other two messages were exchanges between the coaches and reporters during a Q&A period after the prepared statement. The duration of the stimuli ranged from 45–71 s and three orders of presentation were created, to which the participants were randomly assigned before their arrival.[2] To get subjects acclimated to the laboratory environment and the experimental procedures, a nonrelated, nonsports news story was given before all stimuli as a practice message.

Theories of ingroup/outgroup perception among sports fans (Cialdini et al., 1976) and attitude salience (Ajzen, 2001) led to a prediction that the recent betrayal of the team and its fans by Coach 1 would be viewed negatively while Coach 2 would be viewed as positively valenced due to his familiar history as a past quarterback for the university and his symbol as a stabilizing force during a difficult time.

We therefore made the following predictions about participant responses to the press conferences:

H1a: Self-reported valence for Coach 1 will be significantly more negative than Coach 2

H1b: There will be significantly greater activation of the corrugator muscle group during the press conferences for Coach 1 than for Coach 2.

We predicted that this effect would then be potentiated for highly identified fans due to the strong emotional connection that they had toward the university football program. Therefore, the following interactions were also hypothesized:

H1c: There will be a Fan Identification × Coach interaction such that self-reported valence will be more reactive for highly identified fans than moderately-identified fans

H1d: There will be a Fan Identification × Coach interaction such that the difference in corrugator activation during the press conferences for Coach 1 and Coach 2 will be greater for highly identified fans than moderately-identified fans.

It is plausible that the sense of betrayal fans experienced as a result of Coach 1's abandoning the team was more severe than the sense of relief or closure felt following Coach 2's hiring. This severity was hypothesized to manifest itself not only in valence responses, but also in both the self-reported and physiological arousal measures:

H2a: Coach 1's press conferences will elicit greater self-reported arousal than those for Coach 2

H2b: There will be significantly greater skin conductance levels during the press conferences for Coach 1 than for Coach 2.

As with the first hypotheses, fan identification was also predicted to interact with the featured coach on both arousal variables:

H2c: There will be a Fan Identification × Coach interaction such that the difference in self-reported arousal following the press conferences for Coach 1 and Coach 2 will be greater for highly identified fans than moderately-identified fans

H2d: There will be a Fan Identification × Coach interaction such that the difference in physiological arousal during the press conferences for Coach 1 and Coach 2 will be greater for highly identified fans than moderate fans.

Cardiac reaction to emotional stimuli is complex. As mentioned above, deceleration of heart rate is accepted as an indication of increased resource allocation within LC4MP (Potter & Bolls, 2011). It is also the case that the heart accelerates if negative environmental content is so arousing that subjects want to block continued processing (Lacey & Lacey, 1970; Graham, 1979). Nevertheless, several examples in the literature can be found where highly negative and

arousing televised subject matter (e.g., murders, house fires, protests, disgusting antismoking PSAs) failed to activate the defense-response cascade necessary for cardiac acceleration to occur. Instead the arousal led to cardiac deceleration indicative of increases in cognitive processing (Leshner, Bolls, & Thomas, 2009; Leshner, Bolls, & Wise; 2011; Grabe, Zhou, Lang, & Bolls, 2000). The predicted negative valence and high arousal expected in response to viewing Coach 1 at the press conferences is similarly not expected to rise to such a level of aversion that would cause subjects to actively block cognitive processing. Instead, the negatively arousing valence associated with Coach 1 compared with Coach 2 leads to the following predications:

H3a: The press conferences for Coach 1 will elicit greater cognitive resource allocation than the press conferences for Coach 2.

This prediction is also modified by an expected interaction with fan identification:

H3b: There will be a Fan Identification × Coach interaction such that the difference in resource allocation during the press conferences for Coach 1 and Coach 2 will be greater for highly identified fans than fans that aren't highly identified.

Method

Design

To test these hypotheses, a 2 (Fan Identification) × 2 (Coach) × 2 (Message Type) × 3 (Order) mixed factor experiment was designed. Coach was a within subject variable with two levels corresponding to the two coaches featured in the focal press conferences. Fan level was a between subjects variable based upon each participant's score on the SSIS administered before stimulus presentation. The two levels were determined via a median split. Message Type was also within subjects and had two levels corresponding to the coaches' prepared statements or their answers to questions from members of the press. Subjects were randomly assigned to order, with each beginning with the identical practice message. This was followed in one order by the series of press conference segments in chronological order, another order in reverse chronology, and in the final order the press conference segments were arranged randomly.

Participants

Fifty undergraduate students (28 females) participated in the experiment individually. All were enrolled in an introductory communication course at the university in question and provided their time and responses in exchange for extra credit. All provided informed consent before data collection, and were told that they could withdraw from the study without penalty.

Dependent Variables

All three variables of interest—arousal, valence, and resource allocation—were operationally defined using psychophysiological measures. Arousal and valence

were also measured using SAM, the Self-Assessment Manikin, which is a 9-point pictorial scale that has been validated as a measure of arousal, valence, and dominance (Lang et al., 1993). SAM has been used as a measure of self-reported emotional response using a variety of stimuli, including still slides (Lang et al., 1993); 6-s audio clips (Bradley & Lang, 2000b); radio messages (Bolls et al., 2001); 6-s television messages (Detenber, Simons, & Bennet, 1998); and television messages of longer duration (Lang et al., 1999), including sports messages (Cummins, Keene, & Nutting, 2012).

Arousal was operationalized physiologically by measuring the participant's skin conductance activity. Skin conductance is a measure of autonomic arousal levels recognized as indexing participant emotional state while processing media (Potter & Bolls, 2011; Hopkins & Fletcher, 1994). Electromyographic (EMG) measures were used to physiologically operationalize valence. Measuring facial EMG is the process of quantifying the summative amplitude of electrical firings by a particular skeletal muscle group (Stern, Ray, & Quigley, 2001). It is through the muscles in the face, particularly, that emotional valence is communicated using the zygomatic (smile) and corrugator (frown) muscle groupings (Potter & Bolls, 2011; Tassinary & Cacioppo, 2000; Eckman, 1993). Psychophysiologists have validated the measure of facial muscles using various stimuli such as still picture slides (Lang et al., 1993), positive and negative spoken words (Wexler, Warrenburg, Schwartz, & Janner, 1992), and television messages (Potter, LaTour, Braun-LaTour, & Reichert, 2006; Leshner et al., 2011).

Resource allocation was operationalized by measuring heart rate. Deceleration in cardiac activity over time is an indication of an increase in resource allocation to an externally focused phenomenon (Potter & Bolls, 2011; Lang, 2009). Heart rate has been used as a valid and reliable index of attention to media messages in a large number of published studies (Wise, Bolls, Myers, & Sternadori, 2009; Lang et al., 1999; Potter, 2000; Bolls et al., 2001; Reeves, Lang, Kim, & Tatar, 1999).

Procedure

After providing informed consent, subjects first completed the written questionnaire. Then they were relocated to another room, seated in a comfortable chair and explained the procedure for attaching psychophysiological sensors. Two were placed on the participant's nondominant hand to measure skin conductance, three on the arms to measure heart rate, and two above the participant's eyebrow to collect corrugator EMG.

The arousal and valence dimensions of the SAM scale were explained to the subject. Then a practice video message was shown and the subject and filled out the SAM scale in response to it. Questions were addressed by the experimenter before continuing. During each press conference stimuli physiological data were collected from the subject. After each press conference the videotape was paused and participants completed the SAM scales in response to that stimulus message. They were also asked to write down "all the thoughts they had while viewing the press conference," but those data are not reported here. When the experimenter could see that the participant had stopped writing, the next press conference was played. This continued until all the stimuli had been viewed. After a short debriefing, the participant was thanked and dismissed.

Apparatus

The three orders of presentation were recorded onto VHS videotape and played back on a 31-inch color television set placed approximately five feet from the subject, who was seated in a comfortable chair.

Heart rate data were collected using three standard sized AG/AGCL electrodes attached to the forearms. Signals from the electrodes were transmitted to a Coulbourn S-75–01 bioamplifier, and then to the data collection computer via a Scientific Solutions AD/DA board. The physiological data collection program was VPM (Cook, 1999), which determined the milliseconds between heartbeats and stored it for later cleaning and analysis. Skin conductance data were collected using a Coulbourn S-71–22 skin conductance coupler sampling 20 times per second from two standard AG/AGCL electrodes. Corrugator data were sent from two mini AG/AGCL electrodes to a Coulbourn bioamplifier and then bandpassed filtered and integrated online.

Physiology Data Cleaning and Processing

Skin conductance and corrugator EMG activity was aggregated for each second of the stimuli using VPM Anlog (Cook, 1999). Change scores were then computed for each subject by subtracting the physiological measure at each second from the baseline measure taken one second before the coach speaking.

Heart rate data editing was done using VPM Event (Cook, 1999), which also calculated beats-per-minute for each second of the stimuli presentation. Once again, change scores were computed using the same baseline point as the skin conductance and corrugator data.

Statistical Design

The self-reported data were submitted to a 2 (Coach) × 2 (Fan Identification) × 2 (Message Type) × 3 (Order) repeated-measures ANOVA. To allow for comparisons across messages in the physiology data only the first 30 s of each press conference clip was used. Therefore the statistical analyses of the skin conductance and the EMG data were a 2 (Fan Level) × 2 (Coach) × 30 (Seconds) × 3 (Order) repeated measure ANOVA. No main or interaction effects for Order were found (all $p > .56$) and therefore it was dropped from the model and the data reanalyzed and reported here. In addition, since it was believed that the purest impact of the Coach on attention would be observed initially, since cognitive resource allocation later in the press conference is arguably confounded by message content, the first 10 s of cardiac data were submitted to a 2 (Fan Level) × 2 (Coach) × 10 (Seconds) repeated-measures ANOVA. All statistical tests for physiology data were adjusted by a Greenhouse-Geisser coefficient to correct for violations of the sphericity assumption.

Experimenter error or equipment malfunction resulted in less than full data being collected from some subjects. The final number of subjects included in each analysis are self-report ($n = 42$), cardiac activity ($n = 45$), skin conductance activity ($n = 48$), and corrugator EMG activity ($n = 43$).

Results

Effects of Coach and Fan Identification on Emotional Valence

It was predicted that Coach 1, who quit unexpectedly, would be viewed as significantly more negative than his replacement, Coach 2. Furthermore, an interaction was expected with highly identified fans predicted to react more strongly about both coaches than moderately identified fans. Results show a significant main effect of Coach, $F(1, 40) = 49.859$, $p < .001$, Partial-Eta Squared = .555. As predicted, Coach 1 was rated more negatively than Coach 2 ($M = 5.92$, $SD = 1.35$; $M = 3.56$, $SD = 1.57$; respectively).

The interaction effect on the self-reported valence data between fan identification and coach was also significant, $F(1, 40) = 5.54$, $p = .024$, partial-eta squared = .122. As can be seen in Figure 1, the level of self-reported negativity increased for highly identified fans to a greater extent than for moderate fans from Coach 1 compared with Coach 2.

It was also predicted that corrugator (frown) muscle activity during the press conference conducted by Coach 1 would be greater than the activity during the Coach 2 conference. Neither the main effect of Coach nor the Coach x Time interaction was significant. Therefore, hypothesis 1b was not supported. However, there was a significant Coach × Time × Fan Identification interaction $F(30, 1230) = 1.62$, $p = .019$, partial-eta squared = .038. Visual inspection of the interaction suggested that the primary driver behind the significance was a large initial negative response to the negatively-valenced coach (Coach 1) by highly identified fans. This can be seen in Figure 2.

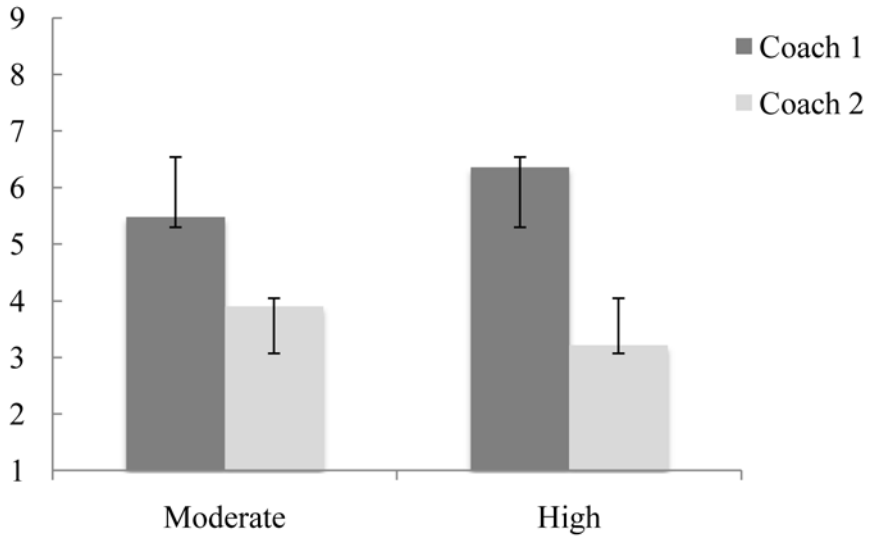

Figure 1 — Mean Valence for Coach × Fan Identification (1 = Positive, 9 = Negative).

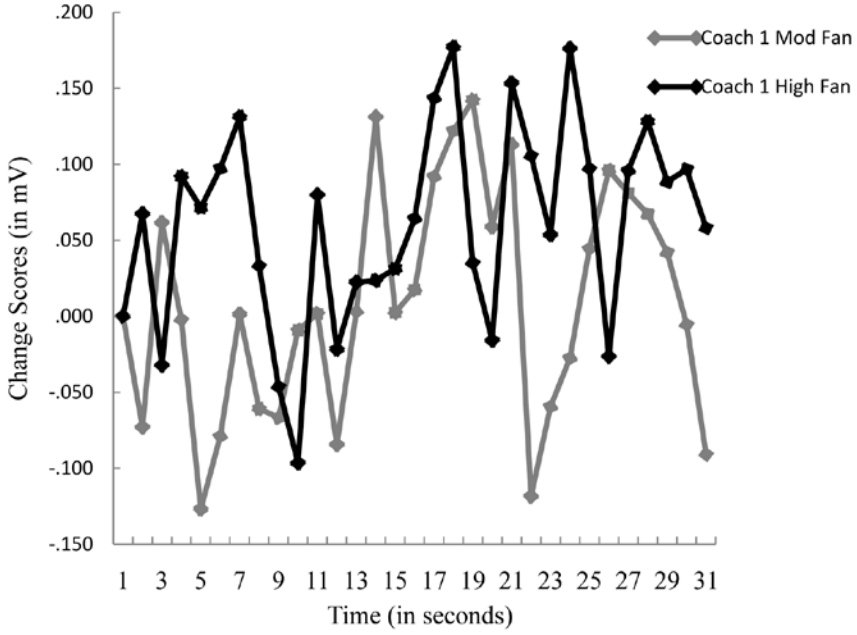

Figure 2 — Mean Corrugator Change Scores × Fan Identification for Coach 1.

Effect of Coach and Fan Identification on Arousal

We predicted a main effect of coach on arousal—with Coach 1 evoking more arousal than Coach 2. Once again, an interaction was also predicted—highly identified fans would feel more aroused about Coach 1 than moderately identified fans.

Results show a significant main effect for coach on the SAM arousal data, $F(1, 39) = 18.778$, $p < .001$, Partial-Eta Squared = .325. As predicted, self-reported arousal was higher in response to Coach 1 ($M = 5.292$, $SD = 2.14$) than in response to Coach 2 ($M = 3.757$, $SD = 1.82$). In addition, although it was not significant, the Coach × Fan Identification interaction was in the direction predicted however highly identified fans reported more arousal regardless of coach (Coach 1: $M = 5.83$, $SD = 2.14$; Coach 2: $M = 3.78$, $SD = 1.81$) than moderately-identified fans (Coach 1: $M = 4.75$, $SD = 2.14$; Coach 2: $M = 3.78$, $SD = 1.82$).

The predicted main effect of Coach was not significant in the skin conductance level data. There was, however, a Coach × Time × Fan Identification interaction ($F(30, 1380) = 1.842$, $p = .004$, partial-eta squared = .038; Figure 3). However, visual inspection of the data shows that the lack of a main effect was due to the predicted Fan Identification × Coach interaction (H2d). Highly identified fans showed higher physiological arousal levels to both coaches compared with moderately-identified fans.

There was also a significant Message Type × Fan Identification interaction, $F(1, 46) = 23.24$, $p = .05$, partial-eta squared = .081. High fans had a greater mean

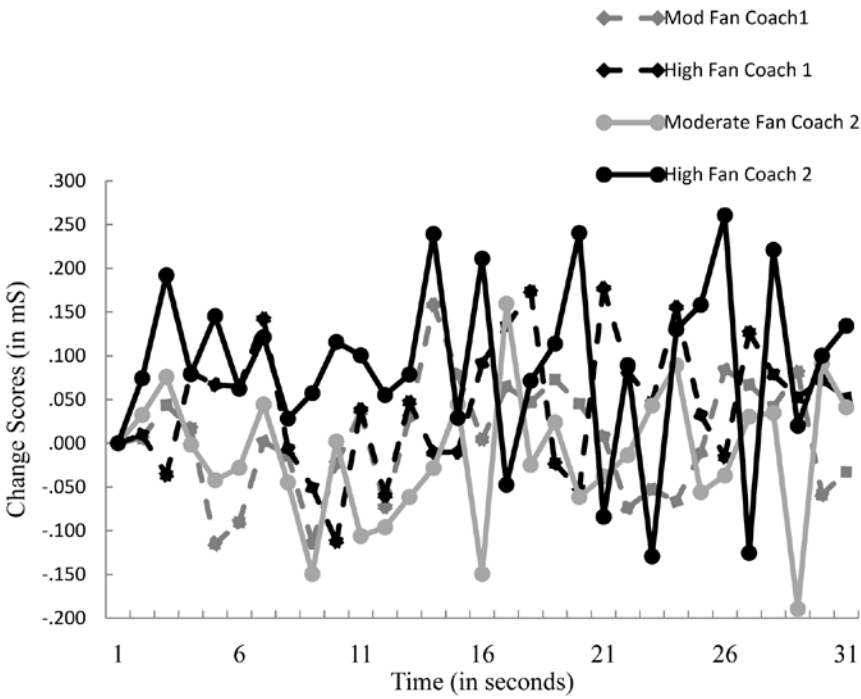

Figure 3 — Mean Skin Conductance Level Change Scores × Fan Identification × Coach.

change in skin conductance in response to the prepared statement than the question and answer time (M = .179, SD = .38; M = –.047, SD = .24), whereas moderately identified fans had a greater reaction to the question and answer time than the prepared statement (M = .008, SD = .24; M = –.016, SD = .38).

Hypotheses 3: Effects of Coach and Fan Identification on Resource Allocation

Resource allocation was operationalized using heart rate, with decelerations in cardiac activity indicating increased attention to the external stimulus. It was predicted that more resources would be initially allocated (i.e., greater attention given) to processing Coach 1 than Coach 2, and that highly identified fans would allocate more resources than moderately identified fans regardless of coach.

Cardiac change scores were used in a 2 (Coach) × 10 (Time) × 2 (Message Type) × 2 (Fan Identification) repeated-measures ANOVA. The predicted interaction of Coach × Time approached significance (p = .08), and can be seen in Figure 4. Both reactions show an expected six to ten second cubic trend indicative of the orienting response to auditory stimuli such as voice onsets (Chase & Graham, 1967; Potter, Lang, & Bolls, 2008). However, the final level of deceleration was deeper in reaction to Coach 1 as predicted. The predicted greater impact of Coach on highly identified

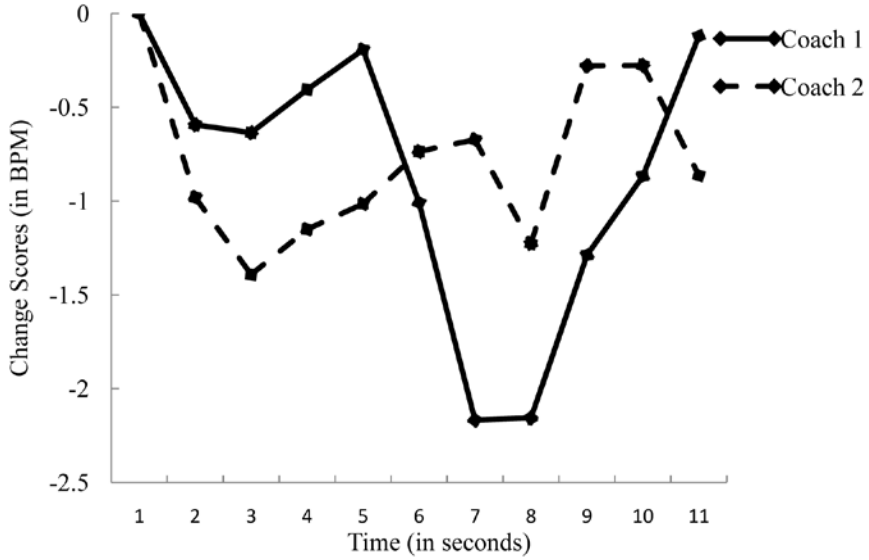

Figure 4 — Mean Heart Rate Change Scores × Coach.

fans compared with moderately-identified fans was not supported. However, there was an interesting Coach × Message Type × Time × Fan Identification, interaction $F(10, 430) = 1.977$, $p = .034$. partial-eta squared = .044. This complex interaction is represented in Figure 5 where the deepest deceleration of heart rate (indicative of greatest allocation of cognitive resources allocation) is with moderately identified fans in response to the prepared comments of the negatively valenced Coach 1.

Discussion

There is a substantial literature showing correlations between sports fans' feeling of connection to their favorite teams and other self-reported variables such as psychological well being, suspense, and emotional reactions to live or recorded competitions. However, to date studies using real-time measures to index emotional and cognitive responses to mediated sports have been absent, leaving us with only the ability to assume differences in cognition based on levels of fan affinity. The current study is the first to move beyond such assumptions. Using dynamically collected physiological measures—heart rate to index resource allocation, skin conductance operationalizing of autonomic arousal and corrugator EMG as a measure of emotional valence—this study shows that highly identified fans not only *say* they are more cognitively and emotionally responsive to media content about their favorite teams, they respond with physiological correlates suggesting as such.

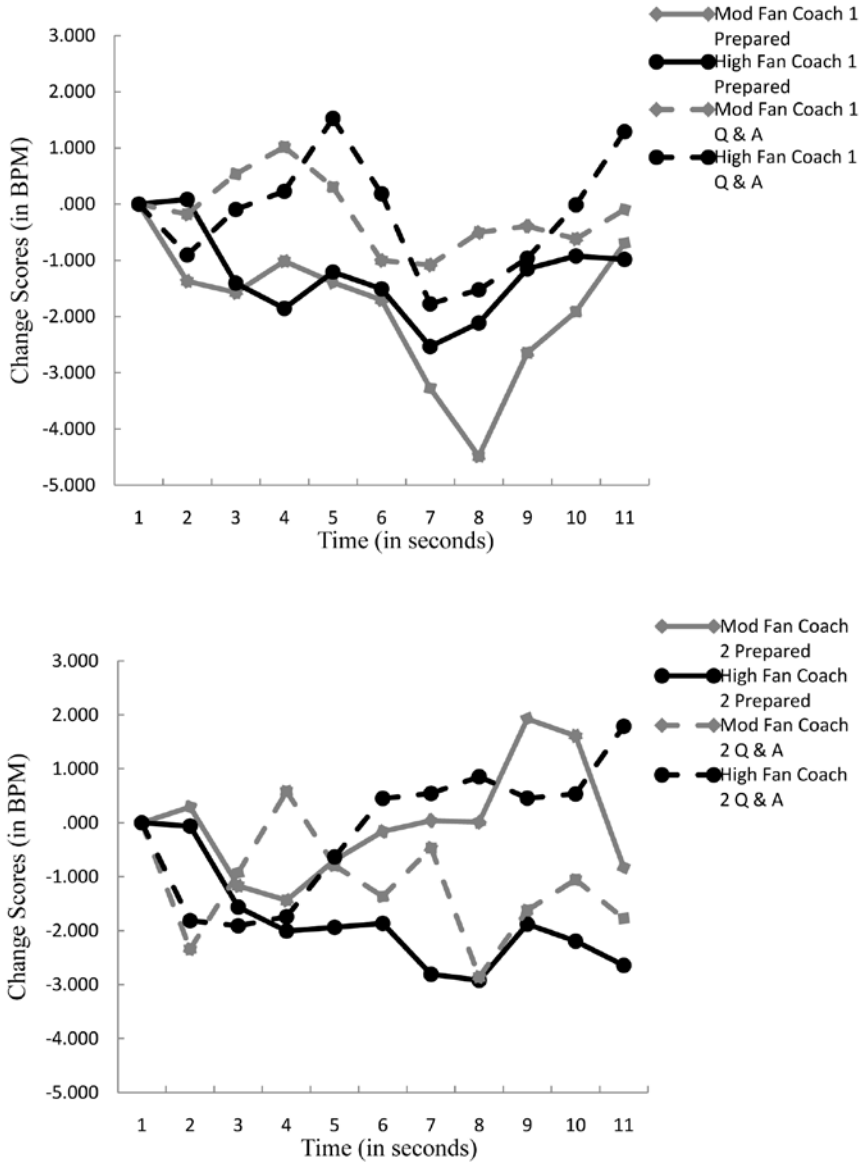

Figure 5 — Mean Heart Rate Change Scores × Coach by Fan Identification × Message-Type.

Participants who were highly identified with a university football team had greater self-reported arousal and negativity in response to a news conference given by a coach who had resigned from the team and left the state (literally) in the middle of the night to take a job at another university. Beyond that, however, the highly identified fans had greater activation in the frown muscle above the eyebrow during the first words spoken by that coach during the press conference than those who were only moderately identified with the team. Highly identified fans were also more aroused by the sports news content than moderately identified fans. Contrary to prediction, this was the case for both the negatively-valenced and the positively-valence coaches. In hindsight, this may have been due to the fact that Coach 2 was more coactive in valence and not viewed as mostly positive given his lack of experience as a head coach combined with the fact that he symbolized a very tumultuous time in the history of the program—albeit a supposed calming influence upon it.

The heart rate data also suggests that highly identified fans allocated more cognitive resources to the processing of sports-related news about their favorite teams than moderately identified fans. As can be expected, this finding raises more questions for further inquiry. For example, how does the fact that the stimuli in this experiment was historical in nature (e.g., not a live competitive event with unknown outcomes) impact the allocation of resources expected? What impact would fan-driven allocation of resources have on the memory for in-game sponsorship or network promotional messages? We leave these questions for future studies.

It is interesting to compare the physiological findings with the self-report data. Self-reported valence found the expected main effect of coach—Coach 1 viewed as more negative than Coach 2. However, there was not the expected interaction with fan identification. Even though the physiology data show that moderately identified fans were less active in the corrugator muscle group than highly identified fans while viewing Coach 1's conference, the self-report data were virtually identical—each group giving a very negative assessment. This could be an example of self-report measures being more susceptible to social response bias than physiological measures.

An even more characteristic example is found by comparing the self-reported valence measures collected in response to Coach 2 with the EMG data collected during processing. The self-report data show Coach 2 being judged as extremely positive. This was in line with our prediction, which we based on the belief that fans would be glad to have the whole coaching change merry-go-round over with. For both highly and moderately identified fans, however, corrugator response was highest during the press conferences for Coach 2. This perhaps suggests that fans were still worried the future of their team internally, but are answering more positively when asked.

To us, this difference between self-reported results and physiological results are grounds enough to continue investigating how fans respond to sports media using both measures. Certainly, this study extends the idea that sports are an interesting subpopulation for social science research (Gantz et al., 2006). Furthermore, they are suggestive of the need to continue exploring differences between fans of different identification levels. We would also encourage other researchers to continue exploring how fans view coaches of their favorite teams. Very little was found in the literature about how these central figures are viewed, conceptualized, or processed. This seems like an area where interesting work could be done intersecting theories of leadership, fan identification, and parasocial interaction.

Finally, we believe this study presents data that works as extension within the LC4MP theoretical paradigm. First, this study furthered the idea presented by Hillman et al. (2000) that sports-related messages can be used as emotional stimuli. In addition, the findings reported in this paper further the idea that fan-identification is an individual difference that affects dynamic cognition. This idea, taken in conjunction with recent findings about general fanship and perceptions (Keene & Cummins, 2009), and fanship and cognition (Cummins, Keene, & Nutting, 2012) works to extend our understanding of how general fan affinity and team-specific fanship affects an individual's interactions with sports messages.

Notes

[1] Coach 1 was replaced within a month by another coaching veteran. However, the replacement coach was fired before he was able to coach a game.

[2] Each order of presentation also contained portions of press conferences given by the initial replacement coach. However, because his tenure with the team was so brief, and the valence associated with him so ambiguous, they are not included in the analyses.

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