

# Second Screen Interaction Analysis for IRL Events

## Phase-Category Investigation of the Super Bowl 2015 Social Soundtrack

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**Abstract**—We evaluate the change in social media postings of Super Bowl 2015 on three social media platforms (Twitter, Instagram and Tumblr) for three categories (commercials, musicals and game) during three phrases (*Pre*, *During*, and *Post*). We perform statistical analysis on more than 3,000,000, 800,000 and 50,000 social media posts from Twitter, Instagram and Tumblr, respectively, identifying significant differences among categories. We identify the predominant category of conversations across the three social networks in phases. Findings show the volume of posts in the *During* phase is surprisingly less than the *Pre* and *Post* phases; however, the hourly mean in the *During* phase is considerably higher than that in other two phases. We then explore the significance of phase-wide change in second screen conversations across the Super Bowl categories for all three social media platforms. We identify the game category is prominent in Twitter, and Instagram for all phases, but not Tumblr. There are dominant peaks for musicals and/or commercials relative to game in all three phases. No category is predominant on Twitter in *During* phase. These results are important in identifying the interplay of technology has on social interactions for information sharing via second screen especially across disparate social platforms.

**Keywords**— *Super Bowl 2015; Twitter; Instagram; Tumblr; social soundtrack; second screens*

### I. INTRODUCTION

With the emergence of online social networks and mobile devices, the interactional possibilities of broadcast media has greatly expanded, as the merging of technologies allows for social activities and interactions via social. The social networking and mobile technologies have embedded themselves alongside the media broadcast, facilitating the creation of a social soundtrack for broadcast events and associated content, such as advertising.

This social interactivity can be both real time (i.e., during the live broadcast) and non-real time (i.e., before or after) based on the period of broadcast shows. The social media exchange for such events can happen on different social networks. The integration of these networks as the interactive medium with televised broadcasts marks the emergence of a phenomenon, augmenting the prior limited social aspects of programming medium. This emergence is referred to as the second screen phenomenon, although there may be multiple (i.e., more than two) screens involved. With the second screen phenomenon, the broadcast media event is shown on the base device (i.e., typically the largest screen) where the

viewing occurs, while the use of secondary screens affords the creation of what we refer to as the social soundtrack, the online interaction with others regarding the particular broadcast program. Viewers exchange information related to the event via second screen devices in terms of posting of comments [1]. The exchange of information can happen live (i.e., *During* show time) or when the show is not transmitted live (i.e., *Pre* or *Post*, relative to the start and end of the event). TV broadcast of the events that happen In-Real-Life (IRL) (e.g. Super Bowl, Academy Awards, Music Video Awards, Grammys, etc.) are events anchored temporally that do not lend themselves to recordings for later viewing, unlike a seasonal TV show. These IRL events many times are associated with substantial social soundtracks.

The popularity of an event intuitively increases the volume of social soundtrack from the perspective of postings on social media platforms. In this research, we consider Super Bowl 2015 as one such IRL broadcast media event. The Super Bowl happens once a year and is a major happening, especially in the US. The Super Bowl involves multiple categories of interest. First, for the game itself, the teams, coaches and the players are important for viewer engagement. Second, the Super Bowl commercials hold pronounced appeal for many viewers. Lastly, the musical performances conducted at the halftime show are the third important facet of this most popular IRL event.

This research is important as the degree and manner of usage of secondary screens in conjunction with IRL broadcast media events can facilitate retailers, broadcasters, and artists to manage branding and awareness campaigns by understanding the relationship among phase-category pairs for information exchange of viewers, along with the effect of different social media platforms on social soundtrack conversations. Research findings also shed light on social communication in relationship to scheduled IRL broadcast media events and the social interaction in cross technology usage of second screens, including their effect on pop culture and information sharing.

### II. RELATED WORK

End users exchanging viewer generated content greatly enhances the social possibilities of TV [2, 3]; however, there has been limited research on second screen interactions and their impact. Leroy, Rocca, Mancus and Gosselin [4] analyzed users' second screen behavior concerning where

and when people look at their TV. Mukherjee and Jansen [5] analyzed second screen communication within groups regarding TV shows to find out the predominant pattern in the group communication. Zhao, Zhong, Wickramasuriya and Vasudevan [3] mined viewers' sentiments concerning US National Football League teams by analyzing the social media tweets. Neither of these research studies measures the interaction effects of social networks and second screens concerning IRL events temporally.

For this research, the specific IRL broadcast media event we examine is Super Bowl 2015. Lee, Ham, Kim, and Kim [6] used Twitter as the social media platform to assess people's interest in car-related commercials during Super Bowl 2012. Shin, Byun and Lee [7] studied the second screen interaction on Twitter to address the creation of consumer interest in brands televised during Super Bowl 2014. While prior research examines the usage of social networks to analyze viewer interactions with the technology, it fails to investigate in a systemic manner the interplay among temporal phases of IRL event, various social media platforms, and the inherent categories of the social soundtrack.

Therefore, there are numerous unanswered questions concerning the second screen interaction about IRL events. *How is social media technology used during the live broadcast of an IRL event? How does the media broadcast of IRL events influence the social soundtracks? How does IRL event based social soundtrack influence temporal interaction on different aspects of the event?* These are some of the questions that motivate our research.

### III. RESEARCH QUESTION

Human information behavior is influenced and shaped by the social environment [8]. Making broadcast media events more social therefore influences human communication in a socially mediated way that affects human thoughts and actions. The viewers of an IRL event use online social networks via second screens as the medium of conversation by posting messages concerning the broadcasted event to build social relationships. Therefore, the social soundtrack can influence and shape the social environment.

For clarity, we define three of our key constructs:

- **Second screen** – the computing device used for posting content to the social soundtrack.
- **Social soundtrack** – the collection of social media posts from second screens about an event.
- **IRL broadcast media event** – a happening that is televised and anchored temporally, thereby not lending itself for delayed viewing.

Social media sites allow for information about broadcast media events to be shared and commented on by viewers in a variety of ways. Due to the second screen phenomenon, being a viewer is no longer a passive role, as viewers can now interact with other viewers who are also participating in the social soundtrack. Viewers can join in discussions while watching the event and have their postings observed and

responded to by other members engaging in the social soundtrack. The second screen technologies, such as smartphones, tablets, laptops, and even desktops, greatly facilitate these social interactions to occur anytime, including during the telecast of the broadcast media event.

Within the umbrella of US broadcast media events, there are certain ones that are associated with substantial social soundtrack attention. The Oscars award ceremony, music video awards shows, the Grammys award show, and sport games are such events. Among these, we consider Super Bowl 2015 in our research, as it was the most-watched American television program in history at the time of the study, with an average audience of 114.4 million viewers [9]. Due to the high degree of viewership, companies purchase expensive ads televised during the Super Bowl broadcast (e.g., Budweiser, Nationwide, McDonalds etc. for Super Bowl 2015). Super Bowl commercials, an integral aspect of Super Bowl event, have become a cultural phenomenon of its own, alongside the game. A considerable number of people watch the game primarily to see and discuss the commercials. In addition to the game and ads, popular and iconic performers and musicians (e.g., Katy Perry, Lenny Kravitz, etc. for Super Bowl 2015) take part in half time shows on game day, also being a draw for viewers.

In our research, we classify second screen interactions appearing in the social soundtrack into three Super Bowl second screen categories: 1) Super Bowl commercials, 2) Super Bowl musicals and 3) Super Bowl game.

There is considerable discussion in the social soundtrack on three aforementioned categories not only throughout but before and after the Super Bowl event. We label these temporal phases of Super Bowl social soundtrack as: 1) *Pre* phase, 2) *During* phase and 3) *Post* phase. The *Pre* phase is the audience interaction beginning sometime weeks ahead of the event and continuing until the event start, for our research the kick-off of Super Bowl 2015. The *During* phase is the period of the live broadcast of the event, from kick off to the final second of the game. The *Post* phase is the social soundtrack beginning the moment the event is over until the end of data collection.

For clarity, we again define our key variables:

- **Event Category:** classification of posts within the social sound track concerning an event sub-topics.
- **Event Phase:** a distinct period of an event for temporal classification of social sounds track posts.

In this research, we selected three social network platforms for data collection: Instagram, Tumblr, and Twitter. Twitter is one of the most popular micro-blogging sites and commonly used as the platform of communication for the social soundtrack. Most micro-blogging services share commonalities [10]. Instagram is a medium of communication where users share online images and videos [11]. Tumblr is second largest microblogging service after Twitter, supporting eight types of posts such as 1) images, 2) videos, 3) audios, 4) text, 5) answer, 6) links, 7) quotes, and 8) chat [12].

We have an intuition that social soundtrack conversation regarding the specific Super Bowl phases changes for different Super Bowl categories. Based on this perception, we formulate our research question to test the social soundtrack change among the Super Bowl categories for each Super Bowl phase.

*RQ1. Whether second screen conversation w.r.t Super Bowl phases in the social soundtrack significantly differs among Super Bowl categories?*

The research question highlights multiple perspectives. The social soundtrack conversations related to the categories via social networks enlighten the commercial opportunities at the intersection of the social networks, the broadcast media events, and second screens. Communication via second screens identifies the adoption of social networks as the driver of interaction from the perspective of the participating audience, whilst the event is (is not) broadcast live. We examine our first research question by forming three research hypotheses.

*Hypothesis 01: There is a significant difference in social soundtrack second screen conversation in the Pre phase among Super Bowl categories.*

*Hypothesis 02: There is a significant difference in social soundtrack second screen conversation in the During phase among Super Bowl categories.*

*Hypothesis 03: There is a significant difference in social soundtrack second screen conversation in the Post phase among Super Bowl categories.*

The three aforementioned hypotheses address *Pre*, *During* and *Post*-Super Bowl phases separately for Super Bowl commercials, musicals and game second screen interactions in three social media platforms.

#### IV. DATA COLLECTION AND RESEARCH DESIGN

Super Bowl 2015 took place on the 1<sup>st</sup> of February (Sunday) in University of Phoenix Stadium, Arizona, USA. The kick-off time was 6:30 PM Eastern. The NBC channel aired the event. Super Bowl 2015 is considered the most watched program in American television history [13], at the time of the research. The average number of watchers was 114.5 million, reaching 118 million during the half time show [9].

##### A. Data Collection in Super Bowl Phases.

As shown in Table 1, we collected data related to Super Bowl 2015 from the 10<sup>th</sup> of January 2015 and continued till the 24<sup>th</sup> of February 2015 on each of the three social media platforms. To collect data from each platform, we utilized the respective APIs and tokens for Twitter, Instagram and Tumblr in corresponding scripts with search queries.

TABLE I. SUPER BOWL 2015 DATA BY SOCIAL MEDIA PLATFORMS

	Twitter	Instagram	Twitter
Vol.	3,112,789	811,262	51,569

The queries that we used that includes: ‘superbowl’, ‘superbowl llix’, ‘superbowl 49’, ‘superbowl commercial’, ‘superbowl Ad’, ‘halftime show’, ‘superbowl halftime’, ‘sb49’ and ‘football’. The aim of forming this list of queries was to collect data for this research using each term as a search query on all three social media platforms.

The query list included the terms that occurred most frequently as social media tags (e.g., #superbowlcommercial, #superbowlxlix, #halftimeshow etc.) in a collection of sample data for all social media platforms collected against the seed query named “superbowl”. We collected the sample data for 48 hours (i.e. from 01/06/2015-16:00:00 to 01/08/2015-16:00:00) to identify the potential search queries for this research, and that sample data was not included in the data set used in this research.

TABLE II. START AND END DATES AND TIMES FOR SUPER BOWL PHASES

	Start Date Time	End Date Time
Pre Super Bowl	1/10/2015- 00:00:00	2/1/2015-18:29:59
During Super Bowl	2/1/2015-18:30:00	2/1/2015-22:30:00
Post Super Bowl	2/1/2015-22:30:01	2/24/2015-00:00:00

The data collection period is divided into three temporal phases, as discussed above. Table 2 shows the date and time of each Super Bowl phase.

We further show the distribution of the posts collected during the three Super Bowl phases on the three social media platforms in Table 3 and Table 4. Table 3 shows the data collected during each Super Bowl phase, while Table 4 shows the mean per hour during each phase. We know that people use social media at specific times of a day but here consider overall hourly means in *Pre* and *Post* phases that spans several weeks.

TABLE III. SUPER BOWL 2015 DATA PRE, DURING AND POST BY SOCIAL MEDIA PLATFORMS

	Pre Super Bowl	During Super Bowl	Post-Super Bowl
Twitter	1,753,458	35,525	1,323,806
Instagram	452,761	16,459	342,042
Tumblr	24,695	6,544	20,330

TABLE IV. HOURLY MEAN VOLUME OF SUPER BOWL 2015 DATA PRE, DURING AND POST BY SOCIAL MEDIA PLATFORMS

	Pre Super Bowl	During Super Bowl	Post-Super Bowl
Twitter	3211.46	8881.25	2500.76
Instagram	829.23	4114.75	630.86
Tumblr	45.23	1636	38.39

In Table 3, one notices that though the volume of posts for *Pre* and *Post*-Super Bowl phases are higher than that *During* phase, the rate of second screen interaction is lower than the *During* Super Bowl phase (see Table 4).

Given that we considered Twitter, Instagram and Tumblr, we explore the posting data types on Instagram and Tumblr. Table 5 and Table 6 present the different types of posting supported by Tumblr and Instagram respectively and the number of postings in our data set of each type. In Table 5, we observe that among the three phases, there are three major types of postings on Tumblr. Blogs containing images hold the first position, followed by texts and videos. ‘Audio’ has the least volume in the During phase, while for Pre and Post-Super Bowl phases, “answer” is the least common. In Table 6, on Instagram, we collected two types of media posts. It is noted that community members post images more than videos.

TABLE V. VOLUME OF TYPE OF POSTS IN PRE, DURING AND POST PHASES ON TUMBLR

	Pre Super Bowl	During Super Bowl	Post-Super Bowl
<b>Answer</b>	15	10	17
<b>Audio</b>	112	2	53
<b>Chat</b>	32	30	47
<b>Link</b>	526	22	334
<b>Image</b>	18,112	3662	14,027
<b>Quote</b>	74	44	79
<b>Text</b>	3975	2426	4262
<b>Video</b>	1849	348	1511

TABLE VI. VOLUME OF TYPE OF POSTS IN PRE, DURING AND POST PHASES ON INSTAGRAM

	Pre Super Bowl	During Super Bowl	Post-Super Bowl
<b>Image</b>	424,384	15,049	313,644
<b>Video</b>	28,377	1,410	28,398

### B. Super Bowl Interaction Categories

Once we had collected the data from the three social media sites, we classified the data into the three categories of second screen interactions on each social media platform. The categories are identified by means of the keywords collected from the relevant websites. The keywords are in lower case letters and are extracted from websites regarding Super Bowl commercials [14, 15], Super Bowl halftime show [16] and Super Bowl game [17].

The query list of Super Bowl commercial keywords contains the ad titles (e.g., ‘mercedes’, ‘coca cola’, ‘wix’ etc.), titles of the themes / videos for the ads (e.g., ‘real strength’, ‘like a girl’ etc.), the popular name of the brands (e.g., coke, burrito etc.), hashtags associated with the spots (e.g., '#realstrength', '#likeagirl', '#itsthateasy' etc.) and the first and last names of actors participated in Super Bowl commercial videos (e.g., ‘liam’, ‘dafoe’, ‘braylon’, ‘o neil’, ‘o-neil’ etc.).

The query list of Super Bowl halftime keywords contains the first name and last name of the performers of the halftime and the pre-game show (e.g., ‘lenny’, ‘kravitz’, ‘katy’, ‘perry’ etc.), terms that describes the half time show (e.g., ‘shark’, ‘palm’, ‘beach’, ‘flames’ etc.) and the songs (e.g., ‘teenage dream’, ‘california gurls’ etc.).

The query list of keywords related to Super Bowl game contains the first name and last name of the players, coaches, umpires, referees, commentators (e.g., ‘brady’, ‘julian’, ‘edelman’ etc.), the field positions (e.g., rusher, ‘quarter back’, ‘quarter-back’, ‘red zone’ etc.), teams (‘patriot’, ‘seahawks’, ‘hawks’ etc.) and other key terms related to game (e.g., ‘punt’, ‘fumble’, ‘tackle’, ‘intercept’, ‘etc.’).

We then assigned the posts on each social media platform in Super Bowl commercials, in Super Bowl halftime show, or in Super Bowl game category, depending on the presence of terms from the respective keywords lists.

We did not assign the posts to any category that has terms from more than one keyword lists. For Twitter and Tumblr, we check the presence of the terms in tweets and blogs, while for Instagram the terms are checked in the caption of the posts. We have 190,410 Twitter postings, 70,305 Instagram postings and 9,705 Tumblr postings that belong to more than one category. We did not incorporate these mixed category postings in this research as we considered Super Bowl commercials, Super Bowl halftime show and Super Bowl game category as mutually exclusive variables. Apart from that, there are 99523 tweets; not included in the analysis; that don’t belong to any category, such as soccer related tweets as “football” is used as the search query for data collection. In Asia, Europe and South American countries “football” is synonymous to soccer, unlike USA and Canada.

A three-(phase x category) table can be constructed from the distribution of the categories for second screen Super Bowl interactions on Twitter, Instagram and Tumblr respectively, as shown in Table 7, where each cell  $C_{i,j}^k$  gives the observed frequency of second screen interaction in Super Bowl phase  $i$  for Super Bowl category  $j$  on social network platform  $k$

TABLE VII. 3X3 CONTINGENCY TABLES FOR TWITTER, INSTAGRAM AND TUMBLR

Super Bowl Phase	Twitter		
	Commercials	Musicals	Game
<b>Pre</b>	350,259	506,035	737,011
<b>During</b>	10,525	12,029	11,057
<b>Post</b>	253,745	362,113	580,082
Instagram			
Phase	Commercials	Musicals	Game
	92,864	136,431	185,784
	2,683	5,748	6,249
<b>Post</b>	71,464	109,458	130,276
Tumblr			
Phase	Commercials	Musicals	Game
	6,934	7,560	5,914
	2,594	1,834	1,889
<b>Post</b>	4,746	5,370	4,023

Once collected, we segregated the count of posts collected across the weeks for all three social media platforms across all three Super Bowl categories into five

minutes intervals. We then further segregate the categorical time-count data as Pre, During and Post- phases by annotating the time shown in Table 2. So, each social soundtrack has phase-interaction and category time counts (five min) that are used as the unit of analysis in testing the research hypotheses.

## V. METHODOLOGY

For examining the research questions, we use one way ANOVA. Before performing one way ANOVA, we need to normalize the data by means of Box-Cox transformation [18], as the count attributes of our data follows a power law distribution and hence are not normal. We transform the time-count data via the Box-Cox transformation using log transformation function  $\log(count + 1.0)$  for all three social network platforms. Using the log transformation, the data is successfully normalized. We apply the Games-Howell (GH) test as the post hoc analysis to identify the dominance of specific interaction category in the specific phase of phase-category space. We use the GH test as the data violates the homogeneity of variance (significance of Levene's statistic  $< 0.05$ ), but the date follows the equality of means assumption (significance of Welch's statistic  $< 0.05$ ).

In SPSS, we run ANOVA test to evaluate the hypotheses for the research question. The critical value of the  $F_{ANOVA}(2, > 120)$  is 2.996 at the 95% confidence interval ( $\alpha = 0.05$ ). The second screen interactions in five minute time intervals for each phase over three categories are used as the unit of analysis.

## VI. RESULTS

Table 8 displays ANOVA test results of three research hypotheses in terms of F statistic with the p-values for each of the social media platforms. The top portion of Table 8 displays the result for *Pre* phase while the middle and bottom portions exhibit that for *During* and *Post* phases respectively. It seems that all three hypotheses are supported except Twitter in the *During* phase as Twitter shows no significant difference in second screen conversation among Super Bowl categories in the *During* phase.

TABLE VIII. ANOVA TEST RESULT FOR TWITTER, INSTAGRAM AND TUMBLR

Pre Phase		
Social Media Platform	$F_{ANOVA}(2, 19668)$	p-value
Twitter	4164.58	0.00
Instagram	2200.65	0.00
Tumblr	121.81	0.00
During Phase		
Social Media Platform	$F_{ANOVA}(2, 144)$	p-value
Twitter	2.10	0.126
Instagram	95.28	0.00
Tumblr	46.84	0.00
Post Phase		
Social Media Platform	$F_{ANOVA}(2, 19059)$	p-value
Twitter	3084.85	0.00
Instagram	1472.68	0.00
Tumblr	69.76	0.00

We classify the category(s) as emerging Super Bowl category(s) if the mean(s) of that category(s) is (are) significantly more than that of the other category(s) over each of the phases. To test the emerging category(s) among the phases, the GH test is performed. Table 9 presents the combined results of post-hoc analysis for hypotheses.

For hypothesis 01, in the *Pre* phase (see top portion in Table 9), the second screen interaction game category is emergent on Instagram and Twitter, but musical is the emerging category on Tumblr. For hypothesis 02; no category is emergent on Twitter in the *During* phase. On Instagram and Tumblr, the game and commercials are emerging categories, respectively (see middle portion in Table 9). For hypothesis 03 identifies game as the emerging category on Twitter and Instagram while on Tumblr, postings for both musicals and commercials become emergent in the *Post* phase (see bottom portion in Table 9).

TABLE IX. EMERGING CATEGORIES AND T STATISTIC (\* DENOTES SIGNIFICANCE) FOR OTHER CATEGORIES WITH EMERGING CATEGORIES FOR ALL SUPER BOWL PHASES

Pre Phase			
Social Media Platform	Emerging category	<i>T</i> -values with other categories	
Twitter	Game	Commercials: 44.74*	Musicals: 48.61*
Instagram	Game	Commercials: 67.59*	Musicals: 31.09*
Tumblr	Musicals	Commercials: 3.66*	Game: 14.24*
During Phase			
Social Media Platform	Emerging category	<i>T</i> -values with other categories	
Twitter	None but mean of musical is higher	Commercials: 2.13	Game: 0.63
Instagram	Game	Commercials: 14.26*	Musicals: 6.45*
Tumblr	Commercials	Musicals: 8.96*	Game: 10.56*
Post Phase			
Social Media Platform	Emerging category	<i>T</i> -values with other categories	
Twitter	Game	Commercials: 81.19*	Musicals: 48.29*
Instagram	Game	Commercials: 54.77*	Musicals: 16.78*
Tumblr	Commercials and Musicals, mean of musical is higher	Commercials: 2.09	Game: 11.25*

## VII. DISCUSSION AND IMPLICATIONS

### A. Discussion of Results

In this research, we investigate research question pertaining to second screen conversations highlighting the use of three social networks in sharing information in the social soundtrack about Super Bowl 2015, in three phases, *Pre*, *During* and *Post*, of the live media event broadcast. Three categories (commercials, musicals and game)

concerning Super Bowl 2105 are formed for each phase. It is observed from Table 9, that for Instagram people indulge in second screen interactions (i.e., images and videos) concerning the Super Bowl game during all phases of the broadcast media event, while for Twitter, the game social soundtrack is prevalent in the *Pre* and *Post* phases. For Tumblr, the interactions related to Super Bowl commercials and musicals surpass that concerning the game.

### B. Implications

Concerning the implication of the findings, the increased rate of interaction via a second screen during live broadcast media events leads to the increased rate of potential diffusion of information about different event categories. This is done by sharing, publishing, and commenting via various types of posts or artifacts (e.g. audio, image, video, etc.) among users on social media platforms. Peoples' interest in events like Super Bowl is much higher than conventional broadcast media programing. So, the excitement and the curiosity of different aspects of Super Bowl (e.g. brands, songs, artists, teams. etc.), weeks before media events broadcast of the kickoff may drive the second screen interaction higher during the live broadcast. Those interested in such interests can monitor and/or participate in the social soundtrack.

In our research, the social communication via second screens among viewers concerning the Super Bowl game category dominates relative to the other categories in Instagram in all three phases of the social soundtrack (particularly on Tom Brady). This discussion on diverse facets of the game will inevitably help the players of the teams to appear center stage and create potential business opportunities. Different brands may compete to hire those players as their prospective ambassadors of their products or service [19]. Fans generally idolize sports stars and the artists. So, the logo of the brands that sponsor them will have a great impact on demography of masses [20]. In the *During* phase of Super Bowl, the rate of second screen interaction related to commercials (e.g., Budweiser, Doritos etc.) and musicals (e.g., Katy Perry songs) rise significantly on Twitter compared to *Pre* and *Post* phases as no category is significant in *During* phase. For Tumblr, the brands too remain the focus of the second screen communication in the *During* phase. So, technology has temporal influences on social soundtracks for media broadcast IRL events. This insight may increases the sales of the product indirectly and generates profit long terms for retailers. The integration of IRL broadcasted media events with the social soundtrack via social networks shrinks the virtual distance between brands and consumers. Thus, the social soundtrack highlights a rise in potential brand recall, boosting advertising campaigns, and enhancing sale possibilities via word-of-mouth advertising using perhaps advanced temporal analysis.

### VIII. CONCLUSION

In this research, we analyze second screen interactions concerning Super Bowl 2015 as presented in the social soundtrack around this IRL event. We examine our research question from the perspective of human information processing, both in terms of the volume and pace of comments posted. In sum, we believe that our research

provides valuable contribution concerning understanding user behavior and interaction while viewing mass media broadcast of IRL event in an emerging avenue of social soundtrack research. In future work, we aim to determine how different elements in the second screen conversation on diverse interaction categories change in Pre, During, and Post phases of the IRL event. References

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