Television-Mediated Conversation: Coherence in Italian iTV SMS Chat

Asta Zelenkauskaite
Susan C. Herring
Indiana University, Bloomington

Abstract

Text messaging on interactive television in Italy is a media convergence phenomenon involving short message service, traditional television, and the World Wide Web. This study investigates the frequency and coherence of viewer-to-viewer textual exchanges on an Italian iTV SMS program, employing methods of interaction analysis and the visualization tool VisualDTA to represent interactional coherence. The findings show that despite numerous factors that discourage it, some users more-or-less successfully adapt the medium to engage in interpersonal exchanges. Design recommendations are advanced for fostering more coherent viewer-to-viewer interaction via iTV SMS.

1. Introduction

Convergent media, in which traditional media combine with the Internet, the World Wide Web, and/or mobile technologies, represent the newest trend in computer-mediated communication (CMC) [11]. Entertainment is often the primary purpose in convergent media systems, and message exchange is secondary; this is reflected in interfaces that do not promote optimal *interactional coherence*, defined as sustained, topic-focused, person-to-person exchanges [9]. Despite this, many users text chat while playing multiplayer online games, interact through comments posted to video websites, and leave messages for each other on social network sites. As yet, however, such CMC phenomena have been little investigated.

Text messaging on interactive television (henceforth, iTV SMS) is a media convergence phenomenon involving three types of mediation. Short message service (SMS) supported by Global System for Mobile Communications (GSM) enables text messages to be directed to television programs, and a traditional television and programming infrastructure broadcasts messages. Finally, the World Wide Web enables digitized television content to be streamed on the Internet and serves as a storage place for iTV SMS archives. Thus far, iTV SMS service has been mostly implemented in Europe, but it is also found in Asia and to a lesser extent in the U.S. in music and reality TV programs in which viewers can cast votes via SMS [2].

iTV is a public broadcast forum, while SMS is an interactive, dyadic mode of CMC. Thus one might ask: How interactive is iTV SMS chat, in terms of user-user interaction, or in this case, viewer-to-viewer message exchange? Prima facie, a number of norms and design features associated with iTV SMS discourage one-to-one interaction compared with traditional SMS. Sending an SMS to an iTV program involves an extra charge,[1] and people using the service are required to register and follow instructions in order to submit their SMS. Moreover, iTV SMS programs are moderated, which imposes content and quantity limitations, in keeping with the regulations and resources of the television channel. As a consequence, only a subset of SMS messages that are received are broadcast. Finally, the time when accepted SMS will be broadcast is not known in advance to the senders or intended recipients, making it difficult to coordinate message exchange.

This study investigates to what extent and in what ways these factors affect viewer-to-viewer interaction via iTV SMS. Do viewer exchanges occur via iTV SMS, and if so, what properties do they exhibit? How does iTV SMS chat compare with other modes of computer-mediated chat? We address these questions by analyzing a corpus of iTV SMS messages archived over a period of six days (6,455 messages) on www.allmusic.tv, an Italian iTV music video channel that broadcasts simultaneously on television and through live streaming on the web .

In order to identify interactional patterns in the data, we analyzed all participation and response patterns over two consecutive days and classified the content of a sample of SMS. We then analyzed the interactional coherence of selected extended exchanges over the six-day period using VisualDTA [13], a tool that identifies and quantifies message interrelatedness over time and visually represents the flow and coherence of online conversations. To situate the results in a larger content, we compared the VisualDTA schemas with examples of Internet Relay Chat (IRC) and instant messaging (IM).

Our findings indicate that viewer exchanges occur in iTV SMS, albeit relatively rarely and with

---

[1] Whereas in Italy sending a private SMS costs between .1 and .15 Euros, depending on one's GSM provider, sending an iTV SMS involves an extra .5 Euro charge (as of 6/15/07).

considerably more fragmentation and disruption than in Internet-based chat [cf. 9]. Thus, despite numerous factors that discourage it, some users adapt the medium for interpersonal exchanges, at the same time that their options and choices are constrained by broad structural elements, consistent with the social construction of technology perspective [3]. In concluding, we propose that viewer-to-viewer exchanges are advantageous for iTV and advance design recommendations for fostering more coherent iTV SMS interaction.

2. Background

2.1. iTV SMS

Already at the beginning of the current millennium, researchers were predicting the advance of interactive television over traditional, "passive" TV [4, 16]. Jensen [15] distinguishes three forms of interactive TV: enhanced TV, where the context—typically text and graphics—is superimposed on the actual video content; customized or personalized TV, which is usually linked to a piece of hardware by way of a personal video recorder that offers the user control over the broadcast flow; and cross-media interaction. The most popular commercial service on iTV is a form of cross-media interaction, SMS chat [7, 15, 16].

SMS is a mode of asynchronous text communication via mobile phones in which users have a limited number of symbols—160 including spaces—to construct their message. Sending SMS text messages costs less than voice calls [5]; moreover, incoming SMS are free of charge. The low-cost criterion and the development of SMS service via the cellular network GSM, which established inter-operator agreements and flexible prepaid plans, made SMS a popular service in Europe. Accordingly, European countries were among the first to integrate SMS with interactive television. The service was especially targeted to young people, as research showed that the 18-24 year old age group included the most intense users of SMS [7], in contrast to other age groups that preferred telephone calls.

In Europe, iTV services first attracted attention in 2002, when SMS was used successfully in the UK in conjunction with the TV Show *Big Brother 3*. The implementation of SMS voting on iTV in Ireland in March 2003 was also highly successful. By 2003, a number of iTV services were offered in Portugal, with a multi-platform functionality embracing IRC, SMS, forums, and video games [18]. By 2004, iTV SMS was available in mutiple formats in several northern European countries: 'jukebox' (music video requests), hosted chat, journalistic debate, and text chat only [2].

After the successful implementation of SMS on iTV elsewhere in Europe, Italian television adopted the concept for Italian audiences in 2004 [19]. Mobile telephony has been exceptionally successful in Italy [6], and iTV SMS has also been well received by Italian television viewers.

2.2. Interactional Coherence in CMC

Previous research has shown that CMC systems can influence, sometimes profoundly, the dynamics of person-to-person interaction that takes place via those systems. For instance, character-by-character transmission systems such as split-screen chat can obviate the need for turn taking, resulting in simultaneous, rather than alternating, message production [1].

In message-by-message transmission systems such as email and chat, turn adjacency is often disrupted by intervening messages. Especially in multiparticipant systems, conversations may be fragmented and digress topically [9]. These tendencies are exacerbated in synchronous CMC where there is time pressure on message processing [10] and in unmoderated CMC [14]. Lack of an easily accessible persistent record of the interaction (as in chat that scrolls up and off the screen quickly) can also contribute to interactional incoherence. Interactional incoherence, in turn, can lead to loosened relevance, whereby the normal conversational expectation that responses will be relevant to previous messages [8] is relaxed, resulting in apparent nonsequiturs [9, 10].

To the best of our knowledge, the present study is the first to analyze interactional coherence in iTV SMS, or in any convergent medium whose primary purpose is not message exchange. In the case of Italian iTV SMS, we predict that a number of factors will adversely affect the coherence of exchanges, including the ephemerality of messages displayed on the TV screen; temporal lag introduced by multiple layers of mediation; selective filtering of messages by TV programs; and a large number of participants. Moreover, unlike in IRC—another public, multi-participant chat mode popular among youth—iTV SMS do not automatically include userIDs, making it difficult to attribute multiple messages to a participant who does not sign his or her name. Indeed, given the numerous obstacles to be surmounted, it would be somewhat surprising to discover that people use iTV SMS to interact with each other to any significant extent.

3. Research Questions

Private SMS are frequently used for person-to-person communication [5, 17]. However, iTV SMS, in addition to being public, reach the television screen only through a burdensome process and cost more to send than private SMS. The primary goal of

this study is to investigate the extent to which Italians use iTV SMS chat in order to engage in text exchanges with other viewers on publicly broadcast television.

Specifically, this study addresses two research questions:

RQ1: Do viewer-to-viewer text exchanges occur via Italian iTV SMS, and if so, to what extent?

RQ2: How interactionally coherent are iTV SMS exchanges? How do they compare in this regard with exchanges in Internet chat modes?

We hypothesize that viewer-to-viewer exchanges, if they occur at all, will be infrequent and limited to a single day, despite the existence of archives on the web. That is, we assume that most users view and respond to iTV SMS synchronously, as suggested by the large number of iTV SMS in our corpus that ask senders of previous messages to repeat some content (such as phone numbers) that they did not catch. If users were accessing the web archives, presumably they would not need to make such requests.

We further hypothesize that iTV SMS exchanges, if they occur, will be less coherent than exchanges in other modes of CMC, as described, for example, in [9, 10] and [14]. That is, because of temporal lag, disrupted turn adjacency, and other system effects, iTV SMS exchanges should be highly fragmented and should display limited topic development.

4. Data

The data for this study are SMS messages drawn from the *Allmusic* channel web archive at www.allmusic.tv. The *Allmusic* channel broadcasts music videos; at the time of this study, it also provided an "Inbox" feature for four to six hours each afternoon and early evening during which SMS messages were received and displayed. During these times, viewers could send their comments in the form of a standard SMS (text) message to Inbox at a telephone number displayed on the TV screen and on the website. Broadcast SMS would appear on the bottom of the TV screen, superimposed over the music video, as illustrated in Figure 1. The SMS message typically remained on the TV screen only for a brief period of time—during the period of our data collection, roughly 12-17 seconds.

The *Allmusic* television channel has specific requirements and policy according to which submitted SMS are filtered. In order to send SMS to *Allmusic*'s Inbox, viewers must register with the provider by sending an SMS to the number provided. Moreover, *Allmusic* reserves the right to decide whether to broadcast a given SMS or filter it out. The policy posted on the website of the *Allmusic* channel indicates that in order for an SMS to be broadcast, it should be entertaining.
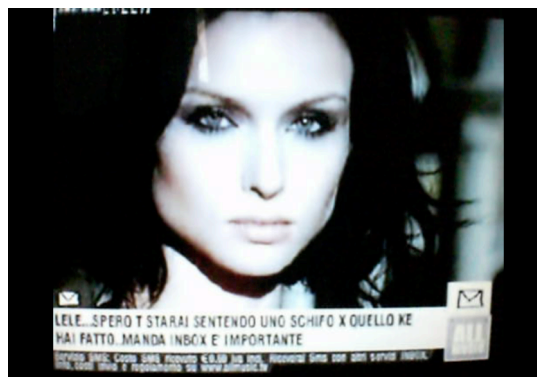

Figure 1. SMS text: Lele… Spero t starai sentendo uno schifo x quello ke hai fatto…Manda inbox e' importante [Translation: Lele, I hope you feel terrible for what you've done to me. Inbox, send this, it is important]

The *Allmusic* channel also provides viewers an opportunity to view each day's broadcast SMS in a web archive at www.allmusic.tv, where the SMS are stored. For the purposes of this study, given the inefficiency of recording a large corpus of SMS from the TV broadcast, we collected messages from the web archive, after observing both the TV broadcast and the archives over a period of several days and determining that the archives appeared to preserve all the SMS in the order in which they were broadcast.

All messages were collected from the archive for a period of six days between March 10th and 15th, 2006. The total number of messages archived during this period was 6,445 SMS. The distribution of SMS each day is shown in Figure 2. The largest number of SMS was broadcast during the weekend, on Sunday in particular, when more people were presumably watching iTV during the afternoon and early evening.
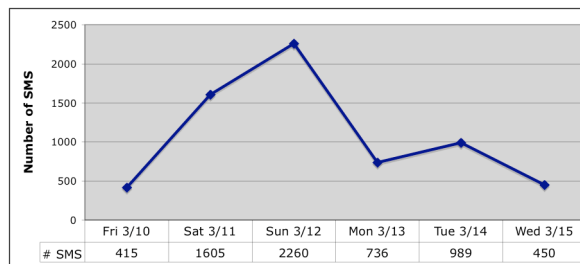

	Fri 3/10	Sat 3/11	Sun 3/12	Mon 3/13	Tue 3/14	Wed 3/15
# SMS	415	1605	2260	736	989	450

Figure 2. Distribution of SMS by day

In what follows, we distinguish between a subset corpus and the full corpus. Unless otherwise

indicated, the subset corpus is all messages archived on Monday and Tuesday; these two days were chosen because they are consecutive, do not include a weekend day (both of which appear to be unusually active), and leave at least one day on either side in the larger corpus in which antecedents and continuations of interactions can be traced. The full corpus comprises messages archived on all six days.

5. Methods

This study employs two methods for analyzing online conversational interaction. *Participation analysis* [12] was applied to all messages in a subset of the corpus in order to address the first research question, and *analysis of interactional coherence* [9] was applied to all messages in selected extended exchanges during the six-day period in order to address the second research question.

Participation analysis, with a focus on initiations and responses, was used to generate an overall picture of how much person-to-person interaction takes place in the corpus. Initiation types were first identified according to the intended addressee—iTV program, group of viewers, individual viewer, or indeterminable—and the frequency of each type was counted for one day (Monday).

In order to determine what the viewers were interacting about, the content of each message on the same day was analyzed and classified into one of the following categories: personal affairs, personal ad/request, (viewer) community-related, comment on the video/music, or apparent nonsequitur (nonsense). If a message was directed at more than one type of addressee or contained more than one type of content, the primary addressee/content was coded. Thus the message in Figure 1 would be coded as individual-directed, personal affairs.

The response was considered the minimal unit of analysis for the purpose of identifying exchanges. Responses were first identified by scanning all messages for two consecutive days (Monday and Tuesday) for those that appeared to be responding to an earlier message, based on their content, regardless of whether the initiating message was present in the sample or not. We considered all responses to be indicative of some kind of interaction.

Responses that could be traced back to initiations within the two-day sample (closed exchanges) were then distinguished from responses with no identifiable antecedents (open exchanges), and measurements of the distance between initiations and responses were made for all closed exchanges.

We then considered the individual message sender, calculating the average number of initiations and responses sent by each individual who had provided a nickname when registering with the iTV SMS service (messages from these individuals had the nickname automatically attached) in the subset corpus. We excluded all other messages from this analysis, because even though they were sometimes signed by the sender, we could not be sure that Anna (for example) in one message was the same as Anna in another, or that Anna had not sent other messages that did not include her name. Since most users involved in exchanges had registered with a nickname, this procedure allowed us to identify the most interactive participants in the sub-corpus.

For the last stage of the analysis, we considered only the most interactive participants and their conversation partners. Dyadic exchanges involving 20 or more messages (an arbitrary number) in the sub-corpus were selected for this procedure, and earlier and later messages were traced backwards and forwards through the full corpus in order to reconstruct extended conversations. At this stage, measures of conversation length were calculated.

Finally, selected iTV SMS chat samples were analyzed for interactional coherence using VisualDTA. These samples were of two types: all messages on part of a single day, in order to illustrate interaction in context; and only messages exchanged within dyads across all six days, in order to reveal the coherence of extended iTV SMS conversations with the background "noise" of non-interactive messages filtered out.

Dynamic Topic Analysis (DTA) is a method for coding, quantifying, and visually representing interactional aspects of online discourse, including topic development [14]. The DTA coding scheme was applied to quantify the relatedness of messages to previous messages, and a visualization based on the coding was created to display the flow of the messages over time, using VisualDTA, a tool for automatically creating visualizations of data coded according to the DTA method [13]. An advantage of VisualDTA is that it allows interaction samples to be compared visually. In this study, in order to address the second research question, we compare iTV SMS exchanges with public, multiparticipant IRC and with a private, dyadic instant messaging exchange.

6. Findings

6.1. Apparent Addressee and Message Content

Surprisingly, only 8% of the 737 messages posted on Monday, March 13th, 2006 appeared to be directed at the iTV program. An example is given in (1) below. In this and the following examples, English translations follow in square brackets.

1 All MUSIC MANDATE IL VIDEO KILLING
  LONELINES DEGLI H.I.M HO 19AN!
  [Allmusic, play the video Killing Loneliness by the
  H.I.M. I'm 19 years old!]

This use recalls the 'jukebox' function described by [2]. The fact that the Inbox program displays only music videos and does not employ a visible human moderator may account for why so few messages were directed to the program itself.

A larger proportion of messages (20%) took advantage of the broadcast nature of iTV SMS to target a group of people in the viewing audience. An example of a message directed to all female viewers is given in (2) below. Example (3) is directed to an unnamed but (presumably) specific group of viewers.

2 Un lupo solitario cerca una lupacchiotta per sentirsi meno
  solo. Ci sei?
  [A lonely wolf is looking for a she-wolf to feel less
  lonely. Are you there?]
3 piccolini miei vi penso sempre e siete sempre nel mio
  cuore vi adoro baci pikkolina.....
  [my beloved ones, I am always thinking about you and
  you are always in my heart, I adore you, kisses, your little
  one]

However, the overwhelming majority—66%—of the SMS posted on the same day were directed to specific persons, as in the message in Figure 1 above and in example (4) below.

4 Ciao alessandoro...Anche io sono di firenze...ti va di
  conoscerci..?Rx Giuly w inbox...4e..
  [Hi Alessandoro…I'm from Florence, too…would you
  like to meet…? Reply, Giuly long live inbox…4ever..]

Sometimes the addressee appears to be someone known only via Inbox, as in (4), while other messages hint at a relationship that exists outside of iTV SMS (as in Figure 1).

In the remaining 6% of messages, the addressee was unspecified and could not be determined from the message content. An example is (5).

5 Anche se nevica...il sole riscaldera' sempre la sua stellina.
  [Even though it's snowing, the sun will always warm up
  its little star.]

The addressee analysis is supported by the results of the content analysis of the same messages, as summarized in Table 1.

	Personal	Ads/Requests	Community	Video/Music	Nonsequitur	Total
%	73	15	6	5	1	100
N	536	111	47	34	9	737

Table 1. SMS content on one day (Monday)

The overwhelming majority of the SMS, 73%, concerned personal matters, typically involving love and romance. Another 15% were worded like personal ads or otherwise requested contact, as illustrated by example (2). Another 6% appeared to have a community-promoting function, as in (6).

6 Buongiorno e buon inizio sett a tutti vecchi nuovi
  inboxiani baci scorpioncina
  [Goodday and happy start of the week to all old and new
  Inboxers kisses scorpioncina]

Only 5% focused on a video or music related to the MTV programming, as in example (1). Example (5) illustrates the 1% of SMS coded as nonsequiturs.

The high degree of personal usage is surprising, given that other modes of communication, such as private SMS, could presumably have been used instead to communicate such messages. One possible explanation is that addressees of iTV SMS need not have mobile phones in order to receive messages—they need only be watching a television set, and thus a broader range of people might be reached. A more likely explanation, since almost all adult Italians have mobile phones, is that Italian iTV SMS users derive enjoyment from sending private messages via a public broadcast medium. They may take pleasure in including, in game-like fashion, just enough identifying detail in the message that the intended addressee will recognize whom it is for and whom it is from. The enjoyment is presumably enhanced when two or more people play this game together.

6.2. Responses and Exchanges

On Monday, March 13th, 9.5% of the 737 SMS posted to the *Allmusic* program appeared to respond to a previous message, and on Tuesday, March 14th, 12.8% of the 988 SMS posted were responses. This percentage represents all responses—that is, messages that respond to initiating SMS found in the sample and those for which the initiation could not be traced (e.g., because it was posted earlier or sent privately). This measure thus provides a very general indication of the interactivity of the sample. The 9.5-13% figure is quite low.

The degree of interactivity diminishes further when only closed exchanges are considered— exchanges in which both initiation and response SMS were posted to the *Allmusic* channel within the same consecutive two-day period. Only 120 messages (Monday: 24, Tuesday: 96) responded to initiations that were posted in the two-day period. These responses constitute 3.3% on Monday and 9.7% on Tuesday, or 7% of messages in the combined two-day sample. On Monday, 15 messages (an additional 2%) responded to messages posted on Sunday.

Thus 120 closed exchanges took place during the two-day period; in these, the number of messages that intervened between the initiation and the response ranged from 3 to 1,107, with a median of 72 messages.

The *Allmusic* website archives did not include time stamps for the SMS, so we can only speculate as to how long interlocutors had to wait between sending a message and seeing the response (assuming that they did not miss it because they were looking away from the TV at that moment). Supposing that each SMS was displayed for 12 seconds and that one SMS immediately followed another (as we observed in some samples we videorecorded from the iTV broadcast around the time of our data collection), 72 messages would take 14.4 minutes. Alternatively, we might calculate that 826.5 messages on average were posted on each of the two days in the sub-corpus, and that the programming was scheduled to take place for four hours each day (we are not able to confirm this, however, since we did not watch the program all the time it was broadcast). By this measure, a new SMS would have been posted every 16.7 seconds, and a 72-message gap would correspond to 20 minutes. Taken together, these measures provide approximate indications of the pace at which the iTV SMS exchanges in our corpus take place. A multi-message exchange could easily involve the participants in monitoring the TV screen for hours.

6.3. Individual Participation

One hundred and fifty (20.3%) of the 737 SMS posted on Monday were from users who registered a nickname, These 150 messages were posted by 65 users, who averaged 2.3 messages per person. As noted above, it was not possible to determine precisely how many anonymous individuals were responsible for posting the remaining 580 messages, but it was our impression that they averaged fewer messages per person. This is further suggested by the distribution of participation in closed exchanges.

Fifty identifiable individuals participated in closed exchanges in the two-day sub-corpus, either by posting initiations, responses, or both, for a total of 157 messages. Only an additional 21 messages, or 12% of the total of 178 messages, were posted by anonymous individuals. This suggests that identifiable individuals interacted more than anonymous or semi-anonymous users (e.g., users who signed with a non-unique identifier, such as 'Anna') in our sample. This makes sense, in as much as providing a name when registering for the service and posting interactive messages can both be seen as indications of engagement with the iTV SMS service.

Participation by identifiable individuals in closed exchanges is summarized by day (Monday or Tuesday) and participation type (initiation or response) in Table 2.

	No. SMS	No. Individuals	Avg. SMS per indiv.
Mon: Init	23	13	1.77
Mon: Resp	20	12	1.67
Tue: Init	55	23	2.39
Tue: Resp	59	30	1.97
Initiations	78	27	2.89
Responses	79	37	2.14
Combined	157	50	3.14

Table 2. Participation by identifiable individuals in closed exchanges

Initiators posted more SMS each day per person than did responders. Stated differently, the exchanges involved more responders than initiators. However, the numbers of initiating and responding messages were roughly equal. This is consistent with our observation that most exchanges were dyadic.

Considerable individual variation in participation was also evident in the sub-corpus. Out of the 50 participants in Table 2, while the majority posted only once, 22 people posted twice or more (13 people posted on both days), and 10 posted five times or more; of those 10, six people both initiated and responded on both days. The total number of interactive messages posted per person ranges from 1 to 23, with an average of 3.14 messages. Thus it appears that a small core of *Allmusic* viewers regularly use iTV SMS to interact with other viewers. The following section examines the interactions of these core users more closely.

6.4. Extended Conversations

The six users who posted the highest numbers of interactive messages in the two-day sub-corpus comprise three dyads, each with one male and one female. These are: DARK83 (23) and PICC86 (20); totti4 (11) and medusa (7); and maciste (8) and gitana (11) (males are listed first; numbers of messages posted are in parentheses). The content of their exchanges can best be characterized as heterosexual flirtation. A portion of an extended exchange between DARK83 (Danyel) and PICC86 (Nunzy) is reproduced below. The numbers on the left indicate the order of the messages in the corpus:

5145 DARK83 volevo dire a baghy... ke nn t dimentiker mai.... ma nn ti amo pi ... addio baghina..
[I wanted to say to baghy… that I will never forget you… But I don't love you anymore… bye baghina..]

5249   PICC86 Uffaaaa dany mi fai sempr incavolare ti
        divert a farmi ingelosire eh?ok allor lo faro' ank io e
        poi vedremo by nunzy
        [Ooof Dany, you always make me mad you enjoy
        making me jealous, don't you? All right, I will do the
        same to you and then we'll see from Nunzy]
5250   DARK83 Nunzy sei un tesoro... mi piaci quando fai
        la gelosa.. by danyel
        [Nunzy you are precious… I like it when you are
        jealous... from danyel]
5364   PICC86 Dany dv 6 finito? tanti bacioni x te ora ti
        facc uno squillo ti vogliooooo beneeeee by tua dolce
        nunzy
        [Dany where are you? Many kisses to you now I 'm
        giving you a call I loooove you from your sweet
        nunzy]
5405   DARK83 nunzy, nn preoccuparti sn tanto paziente...
        poi tvb... by danyel da pavia..
        [nunzy, don't worry I'm very patient… and I love
        you… from danyel of pavia]
5487   PICC86 Lo so dany e' ke sn tanto gelosa e sn
        esagerata e mi disp ci rest male quand litighiamo xke
        ti voglio bene by nunzy
        [I know, dany it's just that I'm so jealous and I
        exaggerate and I don't like it it's bad when we fight
        because I love you from nunzy]
5528   DARK83 nunzy piccola mia, xdonami... sai ke mi
        interexi solo tu!! nn litighiamo...
        [my little nunzy, forgive me... you know that I am
        interested only in you!! Let us not fight…]
5676   PICC86 Danyel 6 dolcissimo lo so ke 6 a lavor scusa
        se ti facc tt questi squill ti penso nn vd l ora di sentirt
        spero stasera bacini x te by nunzy
        [Danyel, you are so sweet I know that you are at
        work, sorry to make all these calls to you I am
        thinking of you and I am looking forward to hearing
        from you I hope tonight. Kisses to you from nunzy.]

Danyel and Nunzy met via the iTV *Allmusic*
program (we know this because in other messages,
Nunzy thanks Inbox for providing the service that
allowed her to meet Danyel). In message 5145,
Danyel—who has been maintaining an ongoing
romance with Nunzy, including warning other guys
to stay away from her—posts an SMS to another
female, Baghina, whom he also met via iTV. Even
though he tells Baghina that he "doesn't love her
anymore," Nunzy responds in message 5249 by
saying she is "jealous." However, in the exchange of
iTV SMS that follows, Nunzy and Danyel make up
and reaffirm their mutual affection.

We used VisualDTA to represent the extended
conversations of the three core dyads in the full six-
day sample, first in the context of the overall SMS
activity and then in isolation. Figure 3 shows a
segment of 54 consecutive SMS posted to the
Allmusic program that includes three messages
exchanged between Danyel and Nunzy. In

VisualDTA diagrams, message numbers are indicated
in sequence descending along the y-axis, and
cumulative semantic distance (the degree of
relatedness of a message to the message it is
responding to) is indicated on the x-axis. In Figures 3
and 4, messages from females are shaded in yellow.

The VisualDTA representation in Figure 3 has a
strong vertical orientation. It is comprised almost
entirely of Breaks (B)—that is, of messages that do
not respond to any other messages. The few non-
Breaks stick close to the topic (On-topic, or T) of the
messages they are responding to, rather than
developing the topic rightward. Messages 5064,
5088, and 5114, which form the vertical line in
Figure 3, are part of the extended exchange between
Nunzy and Danyel. This diagram illustrates that their
exchanges take place in an environment that is
textually noisy. In addition to the audio and video
distractions of the music video TV program, Danyel
and Nunzy's messages are surrounded by SMS that
are largely irrelevant to their conversation.

Interpretating VisualDTA representations of new
phenomena such as iTV SMS can be further
enhanced by comparing them with representations of
online interaction for which the nature of
participation is well understood. Figure 4 shows a
VisualDTA diagram of 47 consecutive messages
posted to the Internet Relay Chat channel #yakyak
[14]. The #yakyak channel is public, multiparticipant,
and recreational, like the *Allmusic* Inbox program,
yet the interactional profiles of the two forums, as
revealed by VisualDTA, are very different.

The IRC channel—the primary purpose of which
is to host text chat—contains multiple, complex
interactions, as shown in Figure 4. Successive
contributions from different participants (Parallel
shifts, indicated by the letter P) move the topic
rightward over time (from 'trashy people who appear
on daytime talk shows,' to 'people who live in
trailers,' to 'features of house trailers'). In contrast, the
Allmusic Inbox sample in Figure 3—in which posting
SMS is encouraged by the TV channel, but viewer-
to-viewer chatting is not the primary activity—shows
no appreciable rightward development. This suggests
that not only do users interact with each other less
often via iTV SMS, as would be expected, but that
their exchanges, when they occur, are less developed
and coherent. Given that multiparticipant IRC has
itself been characterized as relatively shallow and
fragmented [9], this comparison makes iTV SMS
chat appear highly interactionally incoherent.

If this is so, one might wonder why core
participants such as Danyel and Nunzy invest so
much time and effort (to say nothing of money)
engaging with other viewers through iTV SMS.

Figure 3. iTV SMS (all messages)

Not only do core participants exchange more SMS, but they exchange them more rapidly. The median distance between messages was shorter for the extended conversations than for the briefer interactions in the sub-corpus: The core participants waited only 38 messages, or between 8 and 11 minutes on average, for the next message in the exchange to appear (the shortest gap was 9 messages and the longest was 1,689). This faster message exchange reflects a high level of engagement.

It could be that these highly-engaged participants are focusing their attention selectively on their dyadic exchanges and attending only secondarily to the environment of the *Allmusic* Inbox program as a whole.
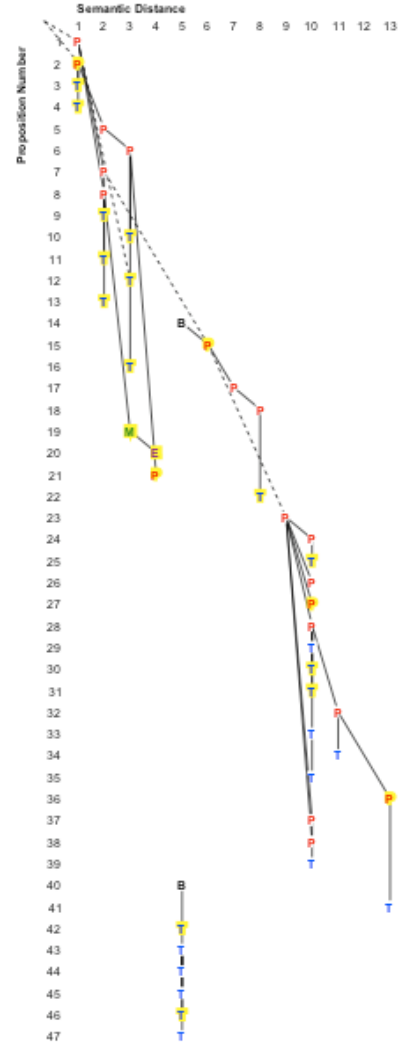

Figure 4. Multiparticipant Internet Relay Chat

In that case, the coherence of their conversations might better be revealed by considering only the messages that they exchange with each other, filtering out the "noise" in the channel.

Figure 5 is a VisualDTA representation of all the iTV SMS exchanged between Danyel and Nunzy in the 6-day corpus. To provide an indication of scale, the three messages from Nunzy and Danyel in Figure 3 are circled in Figure 5. That exchange took place on one day over a span of 50 messages. The entire interaction between Nunzy and Danyel took place over six days and a span of 5,897 messages.

Figure 5 shows more topical development (rightward movement) than Figure 3, and a greater number of messages are connected to one another, although their semantic relatedness is sometimes tenuous (as represented by dotted lines). In these respects, Figure 5 resembles a coherent conversation.
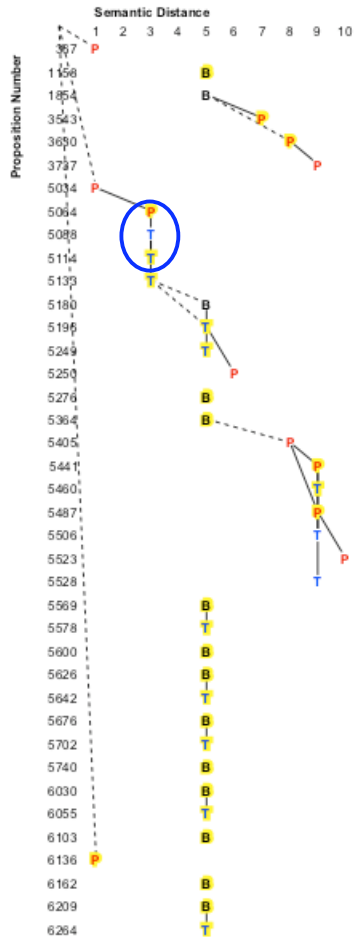
Figure 5. iTV SMS (Danyel and Nunzy only)

The coherence of Figure 5 can be assessed further by comparing it with instant messaging, which is also typically dyadic. While IM is private and iTV SMS is public, it is plausible that iTV SMS participants deeply engaged in interpersonal interaction perceive their exchanges to be private, precisely because the media environment is noisy and emphemeral, and other viewers are unlikely to expend the effort to follow their conversation. Figure 6 is a VisualDTA representation of an IM conversation between two friends in the U.S. In Figures 5 and 6, the SMS of one participant in each dyad are shaded in yellow in order to show turn alternation.

Figures 5 and 6 resemble each other more closely than do Figures 3 and 4, supporting the interpretation that the iTV SMS exchange has dyadic conversational qualities. At the same time, whereas the IM conversation moves in a continuous flow and achieves a cumulative semantic distance of 16, the iTV SMS chat is fragmented, has a cumulative semantic distance of only 10, and ends with a long series of appeals by Nunzy to Danyel that receive no
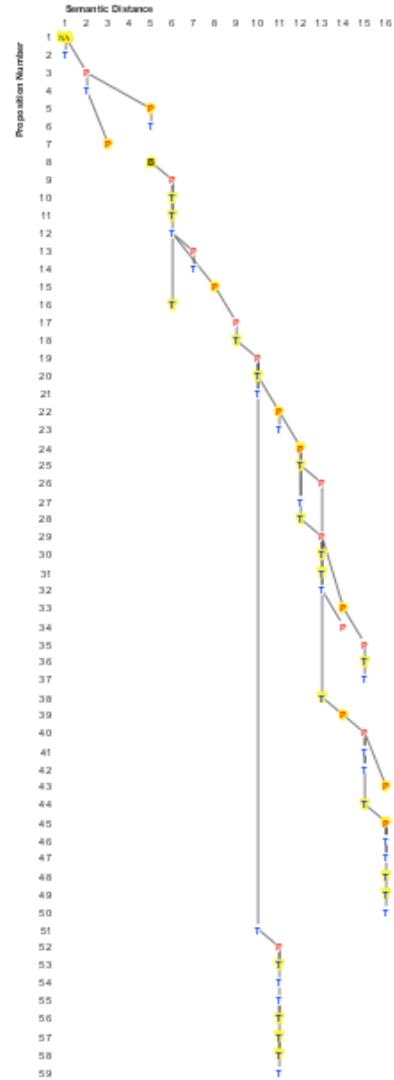

Figure 6. Dyadic instant messaging

response (perhaps because Danyel is not watching iTV at the time). Thus even extended exchanges between core iTV SMS users, considered with messages from other viewers filtered out, do not achieve optimal interactional coherence.

7. Discussion

This study asked to what extent viewer-to-viewer text exchanges occur via Italian iTV SMS. As hypothesized, viewer-to-viewer exchanges in the *Allmusic* corpus were found to be relatively infrequent and tended to occur within a single day, with responses generally posted 15-20 minutes after initiations. The time window for responding appears to be limited in iTV SMS chat, consistent with the synchronous, ephemeral nature of television

broadcasting. There was little, if any, evidence that users of the *Allmusic* Inbox service were aware of the website that archives the broadcast SMS.

At the same time, our analysis revealed some active users of the service who posted multiple SMS each day. Most of their messages were person-(rather than program-)directed, even though many received no response. When interaction occurred, it tended to be dyadic rather than multiparticipant, and several exchanges extended over the six-day period of our sample. A small core of active Italian users apparently spends a great deal of time on iTV SMS.

Our second question asked about the degree of interactional coherence of the iTV SMS exchanges and how it compares with exchanges in Internet-based chat modes. Analysis and visualization of several extended conversations revealed them to be less coherent and exhibit less topical development than analogous IRC and instant messaging conversations, as reported in previous research [9, 10, 14]. Turn adjacency is seriously disrupted by intervening messages (the multiparticipant environment is noisy), and there are many breaks in the communication occasioned by messages that do not relate to any messages that came before.

When exchanges between active users are isolated from other SMS, however, they appear appreciably more coherent. We suggested that highly engaged participants may orient to their interactions as dyadic and even, in a sense, private, due to the high activity level and ephemerality of the iTV SMS context. Such an orientation would plausibly help participants make sense and keep track of their conversations in a noisy media environment.

Other strategies were also employed by users to optimize their iTV SMS communication. About 12% of SMS posted in the sub-corpus were repetitions; repetition increases the likelihood that an important message will make it past the filters and be broadcast. Moreover, some messages that we coded as part of interactions were only loosely relevant to what came before [10]. Perhaps because users cannot count on viewers having seen any previous messages, they tend to write messages that stand on their own; in our corpus, these often took the form of greetings, self-descriptions, and requests. Ironically, while these strategies help to get one's message across in a noisy environment, they reduce interactional coherence.

An analogy can be drawn with conversation in a noisy bar, where it is necessary to shout, repeat oneself, and sometimes reduce the complexity and dependency of one's utterances in order to communicate. As with bar conversations, despite (or perhaps because of) the noise, some people apparently enjoy the challenge of attempting to converse textually via iTV.

7.1. Design Recommendations

The design of the *Allmusic* Inbox program does not favor person-to-person interaction; users wishing to use the cross-media platform in truly interactive ways must develop strategies to compensate for its limitations and even then, can achieve only imperfect coherence. This, we believe, accounts for the limited person-to-person interactivity found in our corpus.

While viewer-to-viewer conversation may not be a primary goal of iTV program designers (who may intend the service to be used for voting on and/or discussing televised content), any popular use of iTV SMS, provided it entertains viewers, is financially profitable under the pay-per-message model. The apparent appeal of person-to-person interaction, as indicated by this and other studies [2], therefore suggests that it could be advantageous for iTV designers to design for such interaction.

A number of changes could be implemented to make iTV SMS more interactive. First, the TV interface could be made more persistent by presenting each message for a longer time (as is done, for an extra charge, in some northern European countries [2]) or by presenting more than one SMS at a time, with previously-presented messages moving to a less salient position or fading gradually over time. Another simple modification that could enhance the persistence of messages would be to point viewers to the web archive—for example, by displaying the URL on the TV screen, or by describing it as a potential resource for interaction to users when they register for the iTV SMS service.

The *Allmusic.tv* web archives themselves could be made more useful by including an indication of user identity and a time stamp for each message. It would be a simple matter to require users to provide a userID (which could be a pseudonym, to preserve the advantages of anonymity for those who desire it) at the time of registration, that would then be appended to each of their broadcast messages. Enhanced accessiblity of the archives and traceability of messages, in turn, could reduce the need for multiple postings of the same message, since all messages would be preserved on the web archive; redundant SMS could then be filtered out to reduce the amount of noise in the channel.

While such modifications might reduce the appeal of the system to users who derive pleasure from overcoming the obstacles in the media environment or from hiding their personal messages in public view, our results suggest that such users are a minority, and that more widespread interactive use of

iTV SMS would occur if the system made exchanging messages with other users easier and more coherent. Moreover, the iTV SMS programs available in Norway [2] illustrate that different arrangements can co-exist; thus conversational designs need not preclude alternative formats.

8. Conclusions

Textual communication through convergent media is becoming increasingly popular and calls out for systematic research. This study analyzed interaction patterns in Italian iTV SMS chat and found that despite numerous design and social structural features that discourage its use, many people use the SMS feature in ways that seek—and surprisingly often, achieve—person-to-person interaction. This finding has implications for both convergent media theory and design.

From a theoretical perspective, the evidence that Italian viewers co-opt iTV for personal interaction, adopting strategies to compensate for noise in the system, supports the view that social uses shape the construction of technology [3] and further suggests that interpersonal uses may appeal more to users than the primary entertainment or other functions for which convergent media are intended. Given that this also generates revenue for the TV stations, more could be done from a design perspective to faciliate coherent person-to-person interaction via iTV, including, notably, increasing its persistence.

Future research should incorporate interviews with iTV producers and viewers to develop an in-depth understanding of how iTV SMS works and what interaction means for the different actors involved. We have speculated that engaged users selectively manage their attention in order to enhance the coherence of their interpersonal iTV SMS exchanges; this could potentially be confirmed through eye-tracking studies. Future studies should also investigate, separately and comparatively, text chat in other convergent media technologies such as online games, social networking sites, and amateur video sites, as a new locus for mediated conversation.

9. References

1. Anderson, J. F., Beard, F. K., & Walther, J. B. (forthcoming). The local management of computer-mediated conversation. In S.C. Herring (Ed.), *Computer-mediated conversation*. Cresskill, NJ: Hampton Press.
2. Beyer, Y., Enli, G. S., Maasø, A., & Ytreberg, E. (2007). Small talk makes a big difference: Recent developments in interactive, SMS-based television. *Television & New Media*, 8(3), 213-223.
3. Bijker, W., & Law, J. (Eds.). (1992). S*haping Technology/Building Society. Studies in Sociotechnical Change.* Cambridge, MA: MIT Press.
4. Cereijo Roibás, A. (2006). Fuelling the "coach potato:" Will passive TV viewers become a myth of the past? *Proc. Alpine Information Systems Seminar ALP-IS 2006*.
5. Eldridge, R. E., & Grinter, M. A. (2001). y do tngrs luv 2 txt msg. *Proc. ECSCW2001*, Bonn, Germany.
6. Fortunati, L. (2001). The mobile phone: An identity on the move. *Personal and Ubiquitous Computing, 5*, 85-98.
7. Gilligan, R., & Henizmann, P. (2004). Exploring how cultural factors could potentially influence ICT use. An analysis of European SMS and MMS use. *Ref. Cultural difference workgroup COST 269*.
8. Grice, H. P. (1975). Logic and conversation. In P. Cole & J. L. Morgan (Eds.), *Syntax and Semantics, Vol. 3: Speech Acts* (pp. 41-58). New York : Academic Press.
9. Herring, S. C. (1999). Interactional coherence in CMC. *Journal of Computer-Mediated Communication, 4*(4). http://jcmc.indiana.edu/vol4/issue4/herring.html
10. Herring, S. C. (2000). Norms of computer-mediated conversation: Whither relevance? *7th International Pragmatics Conference*, Budapest.
11. Herring, S. C. (2004a). Slouching toward the ordinary: Current trends in computer-mediated communication. *New Media & Society, 6*(1), 26-36.
12. Herring, S. C. (2004b). Computer-mediated discourse analysis: An approach to researching online behavior. In S. A. Barab, R. Kling, & J. H. Gray (Eds.), *Designing for Virtual Communities in the Service of Learning* (pp. 338-376). New York: Cambridge University Press.
13. Herring, S. C., & Kurtz, A. J. (2006). Visualizing Dynamic Topic Analysis. *Proc. CHI'06*.
14. Herring, S. C., & Nix, C. G. (1997, March). Is 'serious chat' an oxymoron? Academic vs. social uses of Internet Relay Chat. *Conference of the American Association of Applied Linguistics*, Orlando, FL.
15. Jensen, J. F. (2005). Interactive television: New genres, new format, new content. *Proc. Second Australasian Conference on Interactive Entertainment*, 89-96.
16. Kassavalis P., Batikas M., Sabalis H., Zamani, Th., & Eustathiou, Z. (2004). SMS Interactive TV: The convergence of television and mobile networks. *Information and Communication Technologies: From Theory to Applications,* 223-224.
17. Ling, R. (2005). The socio-linguistics of SMS: An analysis of SMS use by a random sample of Norwegians. In R. Ling & P. Pedersen (Eds.), *Mobile communications: Renegotiation of the social sphere* (pp. 335–349). London: Springer.
18. Quico, C. (2003). Are communication services the killer applications for Interactive TV? or "I left my wife because I am in love with the TV set." In J. Masthoff, R. Griffiths, & L. Pemberton (Eds.), *Proc. European Conference on Interactive Television: From Viewers to Actors?* Brighton.
19. RTV38. (2004). *1st Italian regional broadcaster to launch free-to-air interactive TV services*. http://www.digisoft.tv/eu/news/pressreleases/press13.html/