Fast Talking, Fast Shooting: Text Chat in an Online First-Person Game

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Abstract

How actively do users chat, with whom, about what, and how coherently, when they are shooting enemies and dodging bullets in a fast-paced virtual gaming environment? This paper reports on a study of public text chat in BZFlag, an open source capture-the-flag game in which user avatars are tanks. Chat data were analyzed using methods of content and discourse analysis, including analyzing the coherence of extended conversations. The findings reveal that public chat is used actively in BZFlag, primarily to react to and negotiate game play, and that extended conversations occur intermittently and are surprisingly coherent. Implications are discussed for multitasking, classifying multiplayer online games, and enhancing the chatability*, or chat usability, of first-person shooter game designs.*

1. Introduction

In recent years, multiplayer online games (MOGs) have generated much popular and scholarly interest [3, 15, 18, 19, 22]. MOGs often allow users to chat during play, either via voice or, more commonly, synchronous text. However, while a number of studies have commented on this phenomenon, it has rarely been their focus, with the result that the uses and characteristics of MOG chat remain largely unexplored.

MOG chat deserves study for a number of reasons. First, it is a type of *convergent media computer-mediated communication*—computer-mediated communication (CMC) that takes place in a convergent media format in which it is secondary, by design, to other information or entertainment-related activities [23]. In the case of MOG chat, the primary activity is game play; MOGs are designed first and foremost with that in mind. Focusing squarely on the chat aspect rather than game design or game play can provide a revealing lens through which to understand CMC more generally, as well as suggesting design improvements from a CMC perspective that may be less obvious from a game design perspective.

Relatedly, playing a game and chatting at the same time involves multitasking, or *media coactivity* [21], in which two or more synchronized or coordinated media are used simultaneously or in alternation. How users distribute their attention across media content, especially in MOGs in which game play is fast-paced and continuous, can shed light on how multitasking works and what devices and platforms best facilitate it.

These considerations are especially relevant for text chat that takes place in first-person online multiplayer games of the type commonly called "first-person shooters" (FPS). This game type can be distinguished from massively multiplayer online role-playing games (MMORPGs) along a number of dimensions, one of which, we propose, is the nature of the chat that takes place in them. While chatting in MMORPGs has attracted some scholarly attention [3, 15, 16, 19], the uses and characteristics of chat in first-person online multiplayer games are less well understood. How actively do users chat, with whom, about what, and how coherently, when they are shooting enemies and dodging bullets in a fast-paced virtual gaming environment?

To begin to address these questions, we report on an analysis of public text chat conversations in BZFlag, an open source capture-the-flag type game in which user avatars are tanks and text chat is the only in-game communication option. Methods of textual content and discourse analysis, supplemented with reference to game play in the 3D graphical environment, are used to analyze chat logs from two kinds of league play.

The results reveal that public chat is used actively in BZFlag, primarily to react to and negotiate game play. These uses of chat reflect the fast pace of the first-person shooter, which requires players to focus on the game at all times. As such, they contrast with the findings of previous studies of MMORPGs, in which chat was reportedly used for creating and maintaining social relationships [15, 20], advertising or negotiating services [3], or event-driven learning [16]. Yet although most BZFlag chat is not interactive, it is social in nature, and extended chat exchanges occur intermittently that are surprisingly coherent, especially in active games with larger numbers of players. These findings show that sociability can be achieved even when attentional resources are severely taxed, and suggest that socializing can be a motivation for multitasking.

In concluding, the implications of these findings for situating FPS chat in relation to other modes of convergent media CMC and for multitasking research are considered. We advance several design recommendations for enhancing the *chatability*, or chat usability, of MOGs such as BZFlag, arguing that the traditional CMC design desideratum of persistence is less useful for fast-paced environments than interface designs that optimize the efficient management of attention across multiple, dynamically-changing content areas.

2. Background

2.1. BZFlag game overview

BZFlag (short for Battle Zone capture the Flag) is a multiplayer online first-person shooter game in which players navigate tanks, from a first-person person perspective, across a playing field, referred to as a map. A map can support up to 200 players and four separate teams; however, games usually involve around 30 players divided between two teams. Game play broadly consists of eliminating players from the opposing team, a task that is typically part of an overarching game objective, such as capturing an opposing team's flag and returning it to one's own team. To assist in this goal, players can pick up "superflags"—flags that are scattered across the map and provide special powers, such as better weapons or faster movement speed.

Unlike FPSs such as *Doom*, *Counter-Strike*, *Jedi Knight II*, and *Quake*, BZFlag is open source. Players can not only download and play the game for free, they can also view and submit changes to the source code. The maps on which game play takes place are also developed by players; they vary in thematic content from traditional venues (such as a forest) to whimsical venues such as outer space or a person's home. Upon logging into the game, one can choose from hundreds of servers and maps, but participants tend to congregate around a handful of servers that contain maps that have become player favorites over time.

BZFlag was first released publicly in 1993 and has been continuously updated since. Currently, there are more than 11,000 registered players on forums and more than 200 servers running continuously, although most interaction takes place on 10 to 20 servers. Some dedicated players have formed leagues with established game play rules and maps. Play in leagues emphasizes the use of skills and map knowledge, usually identified through strategic positioning and the use of "ricochet shots," which rely on the geometry of objects on the playing field to direct bullets around obstacles to predictable destinations.

Game play requires the player to divide his attention (most BZFlag players are male) among six differ-

ent dynamic areas of the screen. These are circled and numbered in Figure 1, which shows a screenshot of the playing field on one map. Navigation is accomplished by moving one's mouse within the square central "mousebox" (#4), whose outer edges are scales indicating the player's current position and orientation. In the lower left corner, a radar screen (#6) gives a bird's-eye overview of the map and the positions of teammates and opponents. Chat appears at the bottom center of the screen (#5), along with game play status messages (such as recent kills and flags grabbed). The most recent chat and important status messages also appear briefly at the top center of the screen (#1). On the top left (#3), individual player scores are listed (the player's userID and email are on the right, and various scores in different columns are on the left), while team scores (flag captures) appear near the top right (#2).

Figure 1. BZFlag game interface

The BZFlag game design results in a hectic, fast-paced gaming experience. New players find themselves quickly targeted and eliminated in one or two shots by more experienced players. However, player death does not result in elimination for the duration of the game. Instead, one only needs to press a mouse button in order to "respawn" at a randomized starting location with a new tank, ready to re-engage in battle.

2.2. Literature review

2.2.1. MMORPGs

Research on chat in online games has focused primarily on massively multiplayer online role-playing games (MMORPGs) such as *Everquest*, *Ultima Online*, and *World of Warcraft*. These are computer-generated graphical virtual environments in which a player creates a digital avatar (called a character), with which s/he interacts with other players' characters in a shared space. Content is usually rendered in a third person

view, and the environment presents a distinctive theme (for example, fantasy or science fiction). Progression or advancement in the game is driven by receiving upgrades, items, and new powers on one's characters; these upgrades accumulate over game play sessions.

The attraction of participating in a MMORPG, for many players, is its social nature. Steinkuehler and Williams [20], evoking Oldenburg's [17] characteristics of "third places," argue that MMORPG environments serve as bridging mechanisms supporting informal sociability, similar to traditional social venues such as bars and coffee shops. Game play in these environments is structured to promote collaboration by providing incentives to work with other participants. By participating in brief or extended collaborations, players engage in a process of socialization and learning [15]. Solo players may also choose to participate in online gaming, drawn to the idea of being "alone together," as opposed to simply being alone [4].

Although MMORPGs are visually and auditorily rich environments, the dominant form of player-to-player communication is text. Steinkuehler [19] observed that chat utterances in *Lineage Online* are cryptic and filled with contextual abbreviations. Nardi, Ly, and Harris [16] characterized chat in *World of Warcraft* as playful and enlivened by positive emotional interaction. The scope, quality, and attributes of textual communication in MMORPGs also vary depending on the environment. For example, Ducheneaut and Moore [3] observed that in *Star Wars Galaxies*, player chat ranged from advertising, short interactions, and the exchange of services to longer meaningful exchanges, depending on the location within the game.

The above research suggests that the features that unite textual communication in the various MMORPG environments are its promotion of socializing and the creation and maintenance of social ties through ongoing textual communication among participants.

2.2.2. First-person shooters

In contrast, the first person shooter (FPS) genre is characterized by direct competition with other players. In each game session, players start out on an equal footing; it is play skill, awareness of the environment, and effective teamwork that primarily distinguish experienced players from rookies.

FPS environments are less persistent than MMORPGs. Once game play in an FPS has finished, the world is reset to the state it was in at the start of play, or a new environment (e.g., playing field) is made available. In contrast, MMORPG worlds are persistent, meaning that there is only one environment in which players participate, and this environment can evolve over time based on player actions or other environ-

mental factors programmed by the game designers. This evolution can proceed in phases, by continuously following a game narrative or by responding to player input. In FPSs, in contrast, game play tends to be active, continuous, and focused on a single overall goal.

As in MMORPGs, chat in FPSs tends to be textual. Wright et al. [22], in their examination of creative player action in *Counter-Strike*, identified and coded five general categories of discourse: creative game talk, game conflict talk, insult/distancing talk, performance talk, and game technical/external talk. The predominant categories were game conflict talk (banning of players, cheat accusations, camping accusations) and game performance talk (related to performance scores, recent kills, and game strategy) [22]. Manninen and Kujanpää [13] analyzed forms of interaction in *Battlefield 1942*, another FPS. They found that communication primarily takes place via predefined voice and text messages, with text chat used mostly to elaborate on these predefined utterances.

These studies' findings suggest that chatting in FPSs is closely tied to the game itself; the creation and maintenance of social ties and socializing is not as "incessant and ubiquitous" [19] as in MMORPGs. However, a study of another FPS, *Jedi Knight II*, found that socioemotional communication was more frequent than task-based communication [18]. Moreover, positive socioemotional communication, acting as a tension release, was three times more prevalent than negative socioemotional communication [18], suggesting that friendly socializing was taking place.

Relatedly, in a study of cooperation and disruptive behavior in *Counter-Strike*, Hahsler and Koch [5] found that 50% of the logged communication contained emotional content (either negative or positive). Gameplay communication, such as strategy coordination communicated via short utterances, was the second most popular category, making up 25% of the captured player communication.

One limitation of the available research is that it tends to consider chat utterances essentially as independent units, without analyzing their relation to one another or the overall coherence of chat exchanges. As a consequence, the *conversational* properties of MOG chat of either type—or even the extent to which chat utterances exchanged during game play should be considered 'conversation'—remain largely unknown.

3. Research question and hypotheses

The overall research question addressed in this study is the following:

RQ: How actively do players in a in a fast-paced virtual gaming environment chat, with whom, about what, and how coherently?

We hypothesize that time and attentional constraints will affect the nature of chat in BZFlag. Specifically:

H1: Messages will be short and abbreviated, moreso than in other modes of recreational chat.

H2: Participation in chat will be limited.

H3: Most messages will be on themes relating to game play.

H4: Most chat messages will not respond to any other message, and conversations will be short and fragmented, relative to other modes of recreational chat.

4. Methodology

4.1. Data

The data for this study are drawn from Games United (GU) League games played on servers hosted by a player named Quol and publicly posted to his server archive website. The GU league is a semi-formal association of BZFlag players who organize teams to play official and "fun" (i.e., unofficial) matches involving teams of 2 to 20 players on a specific map. GU league rules prohibit superflags, but make use of BZFlag's jumping and ricochet settings. Games are two- or four-team capture the flag mode games; only two-team games are analyzed in this study. Games are timed, lasting precisely 30 minutes of playing time, although the clock may be paused.

The GU league has an international player base, with especially large numbers of players in Europe and the United States. At the time of our data collection in November 2007, over 2,000 games were available in the archives, dating back to February, 2007. Since the game files are publicly posted, we needed only to set up a server configured to replay saved games in order to view them as many times as desired.

Use of these data also imposes certain limitations. We can only view the games as observers, which means we can only see public chat; admin(istrator), team, and private chat channels are inaccessible. Moreover, the data are all from a single game mode and a single map, and GU league games typically involve fewer players than are found on public servers. Thus the findings of this study may not generalize to BZFlag games on public servers.

Two samples of chat were constructed for the purposes of this study. To represent typical GU league game chat, we collected a random sample (~10%) of all games (N=378) in a two-month period in fall 2007, and extracted a systematic sub-sample of 25-message sequences from the resulting 37 random games, for a total of 900 messages. This is referred to henceforth as

the *random sample* or *random games*. To represent the most active chat, we collected an exhaustive sample of all active games with 15 or more participants (N=12); these are referred to henceforth as the *active games*.

4.2. Analytical methods

The chat data were analyzed using methods of content and discourse analysis that drew for their interpretation on game play in the 3D graphical environment. We replayed the video logs of the games multiple times, viewing them from different players' perspectives, in order to understand what chat utterances were responding to and how they should be interpreted.

The first two methods involved straightforward structural measures. To determine the complexity of the chat, message and word lengths were measured in the random game sample. It was assumed that short words and short messages, relative to other modes of chat (such as Internet Relay Chat or social MUDs), would indicate a low degree of complexity. To answer the question of how actively players chat, we measured messages per player and per second and compared the results for random and active games.

To address the question of what players were chatting about, it was necessary to study the video logs of the games, since utterances often addressed game play actions. We employed thematic content analysis to classify and count the main theme of each chat message in a random portion of the random sample. The themes were allowed to emerge from the data. The themes that emerged were: react to game play; negotiate game play; off-game topic; greet; respond to a game play reaction; comment on a technical problem or the technical status of a player; and other.

The video logs also proved valuable in analyzing the interactivity and coherence of the chat, particularly for the information they provided about timing. Often the difference in coding an utterance as a response to another or not depended on how much time had elapsed between the two utterances: if more than a few seconds, given the fast pace of the game, the utterances were usually unrelated. The percentage of messages that responded to another chat message was first calculated and then compared for random and active games.

Finally, Dynamic Topic Analysis (DTA) [8] and VisualDTA [8] were employed to analyze and graphically display the coherence of the conversations that occurred during the active games. DTA is a method for identifying and quantifying message interrelatedness over time; it visually represents the flow and coherence of online conversations. VisualDTA is a tool that partially automates the generation of DTA diagrams. DTA has been used to visualize other modes of chat [8, 9, 23], allowing for comparisons with BZFlag chat.

5. Results

5.1. Complexity of chat

The chat *messages* in the random sample are very short: only 1.4 words on average. By way of comparison, in previous studies, recreational (multi-participant) Internet Relay Chat messages were found to average 4 to 6 words [7], and messages in a social MUD averaged 6 to 7 words in groups of three or more participants and 10 to 14 words in dyads [1].

Words in the random sample are also short, with an average of 3.5 characters. In previous English chat studies, words average around 4 characters [10]. This may seem like a small difference, but it is not, considering that English words tend to average less than 5 characters even in formal written (asynchronous) discourse [10].

Contributing to the brevity of BZFlag chat messages is the frequent use of cryptic abbreviations, many of which are specific to the game. Table 1 is an example of a joking exchange based on the use of game-specific abbreviations for superflags.[1]

Table 1. Example of a chat exchange

Time	PlayerID	Message
18:39:05	grand slam	who has OO?
18:39:27	menotume	i have sb
18:39:36	grand slam	get WG or T
18:39:50	menotume	would prefer st

In this example, *OO* stands for *oscillation overthruster* (a superflag that enables a tank to go through walls); *sb* stands for *superbullets* (a superflag that allows one to shoot through walls); *WG* means *wings* and *T* means *tiny* (both useful superflags to defend against superbullets); and *st* stands for *stealth* (a superflag that makes one invisible on radar).

A number of other game-specific abbreviations were noted in non-joking contexts, as well (see below), along with many common CMC abbreviations (such as lol, omg, brb, thx, afk, wtf):

gl hf - good luck have fun (used as a greeting)
fm - fun match
offi - official
ns - nice shot
cap - (flag) capture
tk - team kill
sk - self-kill
nr - not responding
obs, obsies - observers
gg - good game

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[1] Given that GU league games do not have superflags, this exchange is clearly intended to be humorous.

The use of abbreviation can be seen as an effective strategy to communicate under extreme time pressure using minimal keystrokes. Thus, while the chat is structurally very simple, it is simple in a strategic way.

5.2. Participation in chat

Surprisingly, most players engaged in public chat, despite the availability of other chat channels that might serve their teams more effectively (such as team chat) and the fact that typing chat messages necessarily takes time and effort away from shooting enemy tanks. In the random sample, which averaged 7.8 players per game, 90% of the players posted at least one public chat message. In the active sample, which averaged 16.3 players per game, 84% of the players chatted publicly. The average number of messages posted per chatter was similar in the two samples: 12.7 in the random sample (range: 1 to 47) and 12.9 in the active sample (range: 1 to 77 messages).

As regards the rate of chatting activity, in the random sample, a public chat message was posted every 14.8 seconds on average, whereas in the active sample, a public message was posted every 10.1 seconds. While this may seem slow, most players also chat with their teams and/or privately, in addition to playing the game. Thus, the level of activity in the public chat channel can be considered moderate, with more chatting taking place in games with more participants.

5.3. Chat message content

In order to analyze the content of the messages that were posted during game play, thematic analysis of the players' chat was conducted for part of the random sample. Table 2 summarizes the findings.

Table 2. Thematic content of chat messages

React to game play	Negotiate game play	Off-game topic	Greet	Respond to reaction	Tech problem/ status	Other	Total
156	55	3	18	26	15	2	275
56.7%	20%	1.1%	6.5%	9.5%	5.5%	0.7%	100%

The majority of the messages (56.7%) were reactions to game play. This use is illustrated in the sequence in Table 3,[2] which is typical. The second most frequent chat content involved negotiation of game play (20%), followed by responses to reactions to game play (9.5%). These uses are described further below.

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[2] Time intervals in Table 3 suggest that most of the reactions were responding to separate game play events (time stamps were added by the researchers).

Table 3. Examples of reactions to game play

2:46:27	tankzilla	works
2:46:54	Ginny	oopsa
2:47:36	Ginny	rofl
2:47:37	A Vicious Muffin	hehe
2:47:54	A Vicious Muffin	uh.. (after G shot A, her teammate)
2:48:02	A Vicious Muffin	lol?
2:48:22	tankzilla	ROFLMAO
2:48:30	A Vicious Muffin	..
2:48:31	anteater	ops
2:48:36	anteater	cool
2:48:36	A Vicious Muffin	lol
2:48:37	Ginny	wierd
2:48:51	tankzilla	nah
2:49:14	A Vicious Muffin	gah
2:49:54	A Vicious Muffin	harumph
2:51:06	tankzilla	smsh
2:51:49	tankzilla	oh that sucked

5.4. Extended chat sequences

Despite most chat utterances being one-word exclamations in reaction to game play, longer, interactive sequences of messages also occurred. In the random sample, 40% of messages responded to another message, and thus were at least minimally interactive. In comparison, in the active game with the most interactions, 47% of messages were responses.

The distribution of extended exchanges in the same active game is shown in the VisualDTA diagram in Figure 2. In the diagram, message numbers (assigned by the researchers based on chronological order of posting) are along the y-axis, and the x-axis shows the cumulative semantic distance between messages, manually assigned according to the degree a message relates to the message to which it is logically responding. Each message is also labeled for its topical relation to a preceding message: T (narrowly on-topic), P (parallel shift), or B (break). By convention, T's always have a semantic distance of 0, and B's always have a distance of 4 from the first message in the sample. Strings of T's or B's thus produce a vertical line, whereas diagonal lines are produced by P's, which can have a semantic distance from 1 to 3, and indicate that topical development is taking place [8]. Previous research has shown that coherent conversations in Internet Relay Chat and instant messaging, when visualized in DTA, tend to exhibit a diagonal step-wise progression from upper left to lower right [8, 9, 23].

In contrast, Figure 2 shows an overall vertical development (produced largely by reactions to game play, which are mostly B's). This is interrupted by intermittent exchanges, which appear as branching structures (circled) off the vertical line. The topics of the exchanges are labeled to the right of the diagram.
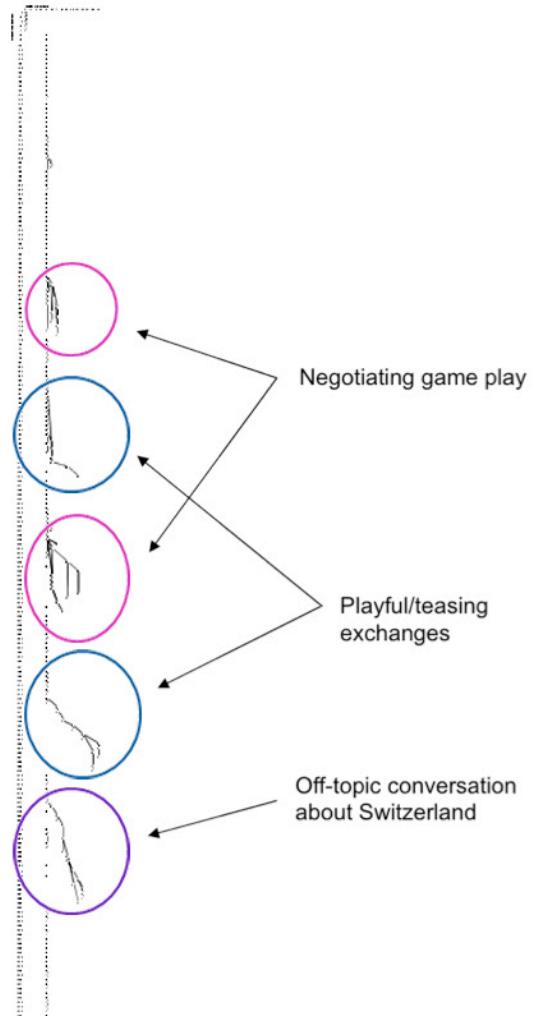

Figure 2. Overview of public chat in an active game

It is notable that the exchanges seem to occur at regular intervals, and that they are approximately the same length (about 25 messages), suggesting constraints on how much interaction is possible during active game play. Within these constraints, however, the exchanges that occur can be surprisingly complex and coherent.

Figure 3 shows a close-up of the second exchange labeled 'negotiating game play' in Figure 2. This exchange is notable for the efficiency with which the number of players per team is renegotiated after two players leave the game. Despite the potential confusion caused by three parallel threads (labeled in Figure 3), game play was resumed with a new team configuration in only 25 messages and approximately one minute; this transition was accomplished entirely through chat. Note the frequent use of abbreviations in this exchange (g2g, brb, gg, 6v6, cu, fm, k).
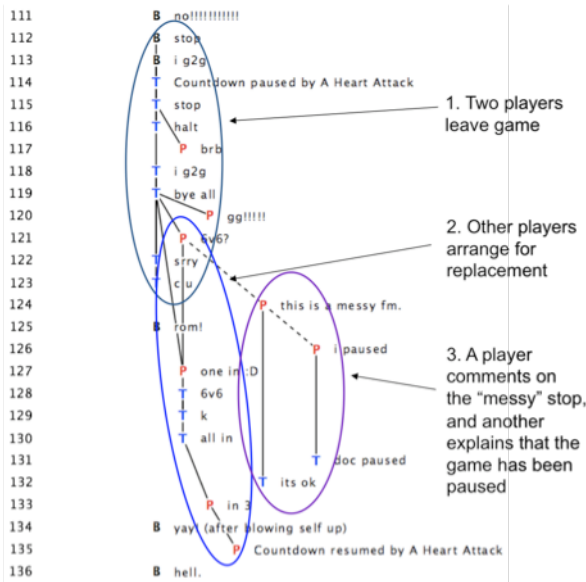
Figure 3 lines (111–136):

```
111   B   no!!!!!!!!!!
112   B   stop
113   B   i g2g
114   T   Countdown paused by A Heart Attack        ┐
115   T   stop                                       │── 1. Two players
116   T   halt                                       ┘   leave game
117   P   brb
118   T   i g2g
119   T   bye all
120   P   gg!!!!!
121   P   6v6?                                       ── 2. Other players
122   T   srry                                          arrange for
123   T   c u                                           replacement
124   P   this is a messy fm.
125   B   rom!
126   P   i paused                                    ── 3. A player
127   P   one in :D                                      comments on
128   T   6v6                                            the "messy" stop,
129   T   k                                              and another
130   T   all in                                         explains that the
131   T   doc paused                                     game has been
132   T   its ok                                         paused
133   P   in 3
134   B   yay (after blowing self up)
135   P   Countdown resumed by A Heart Attack
136   B   hell.
```

Figure 3. A sequence negotiating game play

Another remarkable sequence is shown in Figure 4. While game play is actively ongoing, a player engages with two other players over a period of two minutes regarding living conditions in Switzerland, where he is thinking of moving. With the exception of the game play reactions in the background, this conversation is as coherent as any dyadic instant messaging exchange, in that it is continuous and progresses in a diagonal, step-wise fashion [23]. This sequence is unique in our data, in that it is the only conversation that is purely social and unrelated to the game.
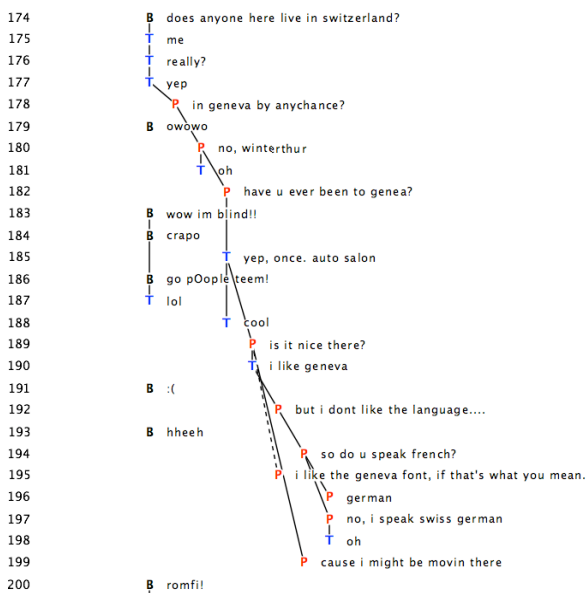
```
174   B   does anyone here live in switzerland?
175   T   me
176   T   really?
177   T   yep
178   P   in geneva by anychance?
179   B   owowo
180   P   no, winterthur
181   T   oh
182   P   have u ever been to genea?
183   B   wow im blind!!
184   B   crapo
185   T   yep, once. auto salon
186   B   go pOople teem!
187   T   lol
188   T   cool
189   P   is it nice there?
190   T   i like geneva
191   B   :(
192   P   but i dont like the language....
193   B   hheeh
194   P   so do u speak french?
195   P   i like the geneva font, if that's what you mean.
196   P   german
197   P   no, i speak swiss german
198   T   oh
199   P   cause i might be movin there
200   B   romfi!
```

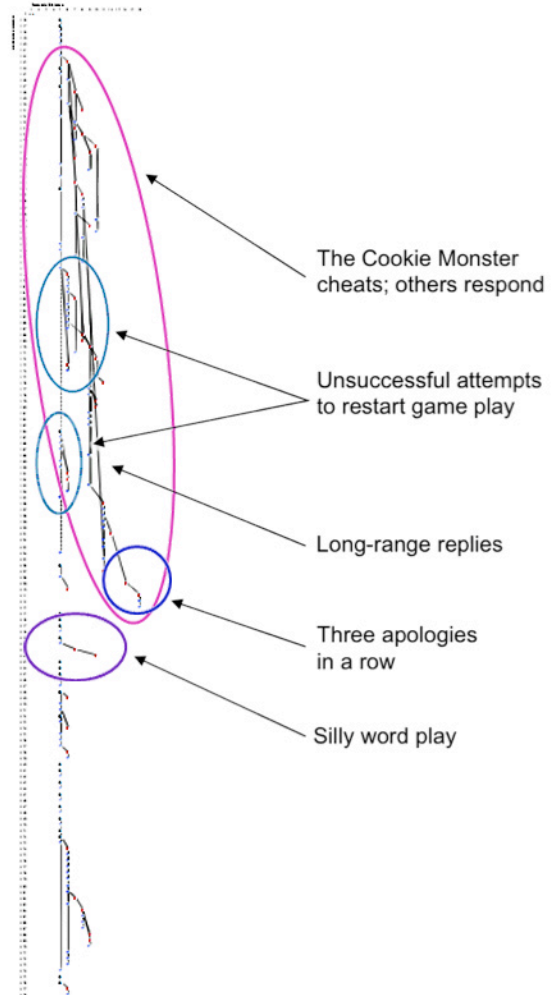**Figure 4. A coherent off-topic sequence**

Figure 5. Deviant game with a cheating episode

Another exception is shown in Figure 5. In this active game, a player called The Cookie Monster was caught in an alleged act of cheating, although the nature of the cheat was somewhat ambiguous, and not all of the players saw it happen. A flurry of questions, attempts to describe what happened, and accusations followed the initial incident. Predictably, after about 25 chat messages, a player attempted to restart game play (the clock had been paused after the suspicious incident), but the restarted game soon encountered a glitch that led to another negotiation, and the same thing happened again shortly thereafter. In the meantime, the cheating incident continued to be discussed, culminating eventually in a string of apologies followed by some silly word play (which seemed to be an expression of relief), before game play resumed nearly 100 messages after the original incident.

This is an exception that proves the rule, in that when the normal pattern—reactions to game play interspersed with brief exchanges—was disrupted, a se-

quence of redressive actions followed. Through it all, other players attempted to preserve the implicit norm of chat exchanges no longer than 25 messages, and sought repeatedly (and eventually, successfully) to return to normal game play.

6. Discussion

This study asked how actively users chat, with whom, about what, and how coherently, in one fast-paced FPS gaming environment. The hypotheses and the study's findings are summarized below:

H1: Messages will be short and abbreviated, moreso than in other modes of recreational chat.

Strongly supported.

H2: Participation in chat will be limited.

Not supported.

H3: Most messages will be on themes relating to game play.

Supported.

H4: Most chat messages will not respond to any other message, and most conversations will be short and fragmented, relative to other modes of recreational chat.

Partially supported. Stretches of one-off game reactions are periodically interspersed with more coherent, interactive sequences.

The findings that chat messages are short and abbreviated and that most chat concerns the game itself—either as comments on events in the game or negotiation of gameplay—reflect the temporal and attentional demands that the game makes on players. It seems that shooting tanks and chatting at the same time is not easy to do. As one long-time BZFlag player emailed to one of the authors, "I usually play while talking, and I usually get killed while I'm typing." However, he went on to add: "For some reason it doesn't bother me too much - and I've found that the people I'm talking to sometimes get killed while typing too." This comment underscores that chatting in BZFlag is an activity that may be enjoyed for social reasons, even when it interferes with effective game play.

The social gratifications available through game chat may also explain why players chat publicly as much as they do, even though it gains them little advantage in the game. The player quoted above stated: "I find it a bit boring to play too much, but the one thing I've really enjoyed is the text chat. With the right people on a map, it can be hilarious."

Sometimes "hilarity" emerges from the exchange of cryptic utterances, as in the example in Table 1. Sometimes one-off reactions to one's own game play (Table 3) can be a sociable way to be "alone together" [4]. And sometimes actual conversations take place, which, although they tend to be limited in scope, can be engaging and unexpectedly coherent.

These findings reflect to some extent the specific game play features of BZFlag. One such feature is that when the need to stop game play arises, players must indicate this via the chat interface. For example, if a player wishes to bring another player into the game as a substitute, he announces his intention in the chat interface and asks the other participants to pause their game play. The game is "paused" when all participants cease ongoing hostilities and remain at their current position in the playing field. This feature provides an incentive for players to monitor the chat display more regularly than they might otherwise, lest they miss this important signal. Regular attention, in turn, helps to explain the relatively high degree of coherence some conversations in BZFlag chat achieve.

Another feature is that when a player is eliminated, he is not removed for the duration of the remaining game; instead he respawns with a new tank. As a result of this, a player is constantly engaged in action and does not have an extended period of free time during which to communicate with his team, the opposition, or observers of the game. In other FPSs (e.g., *Counter-Strike*, *America's Army*), player death results in removal from game play for the remaining duration of the round. This puts a player in observer mode and allows him to view the rest of the match as a spectator, during which time he may engage in conversation with other spectators. The design of BZFlag thus leaves less time than other FPS games for chat, which may contribute to the abbreviated, task-focused character of chat in the game.

More generally, these differences could account for why our study found less social activity than some other studies of FPS chat [5, 18]. However, it is also possible that our results are less different from theirs than they seem. What was coded as 'socioemotional' communication in other studies appears to be similar to what we coded as 'game play reactions' (see Table 3). If so, then the findings of studies of chat in FPSs are in fact quite consistent; taken together, they underscore the need to distinguish systematically between MMORPGs and FPSs in MOG chat research.

7. Conclusions

7.1. Implications

In addition to providing evidence that supports a principled distinction between MMORPGs and FPSs, which is important for game research, the present study contributes to a small but growing body of research

that seeks to understand and classify types of convergent media computer-mediated communication (CMCMC). Similar to other CMCMC such as comments posted to YouTube and Flickr and text messages sent from mobile phones to interactive television programs (iTV SMS) [23], FPS chat takes place in a visually engaging environment in which textual commenting/chat is secondary to the presentation of graphical content. In these environments, CMC consists mostly of one-off comments interspersed periodically with interactive exchanges, in which responses tend to reply to an immediately preceding message. FPS chat differs from other CMCMC, however, in that messages tend to focus on the stated purpose of the site (the game), rather than digressing onto other topics. Public chatting in BZFlag is also more interactive than comments posted to Flickr, YouTube, or iTV SMS. These differences can be attributed to the demanding nature of FPS game play and the smaller (and thus more manageable) number of participants in the game environment.

The study's findings have implications for multitasking research, as well. It has been claimed that the "continuous partial attention" required by multitasking causes errors due to insufficient attention [11]. Activity interruption can also result in frustration and stress [14]. In contrast, the BZFlag results suggest that for some users who chat while playing the game, the attention they allocate is largely sufficient for each task. For these successful multitaskers, factors such as youth and experience with the interface may favor success. For others, as suggested by the long-time player quoted above, the social benefits may outweigh the frustration and cost of making errors in game play—indeed, a desire for social interaction may be what motivates BZFlag players to play and chat at the same time in the first place. These findings suggest perspectives that could be explored in research on multi-tasking in other, e.g., work, environments [11].

7.2. Design recommendations

In a classic treatise on computer game design, Crawford [2] argued that underlying technical constraints and possibilities strongly influence game play design and the resultant player experience. We suggest that the designed game environment also plays a role in shaping the quality and structure of chat discourse, and that chat usability, or *chatability*, should be a design desideratum in MOGs, given that chatting is a major reason some online gamers play.

Past research suggests that persistent, reviewable text logs can promote interactional coherence in CMC [6]. However, it seems unlikely that making BZFlag chat more persistent would increase its coherence or usability, in that the pace of game play does not allow players to devote much attention to chat, regardless of how it is displayed or preserved.[3]

In FPSs, what is more important than textual persistence is the arrangement of the interface so as to optimize the efficient management of attention across multiple dynamic content areas. Research on multitasking suggests that gameplay and chat activity should be balanced so that one activity does not interrupt the other, to avoid frustration and stress [14]. The BZFlag designers have attempted to do this: Chat is displayed next to the radar view, and both are immediately below the mousebox (Figure 1); thus players may keep the three most important areas in focal or peripheral vision at all times. However, the chat interface sometimes serves primarily as a peripheral information device; at those times, it would be helpful to minimize its distraction while maximizing its presentation of information [12]. At other times, the presence of coherent continuous chat sequences suggests that the chat interface is the main locus of attention and would be better served by a more prominent representation. Enabling a player to toggle the chat interface between a peripheral and prominent state would be one possible solution to meet these variable needs.

Chat in BZFlag, like other multiparticipant CMC, also suffers from *disrupted adjacency* of messages that are separated spatially from the messages to which they respond [6], and comments on game play are spatially and (by the time they are posted) temporally separated from the game play itself. To provide closer integration of these key activities and reduce the amount of attention shifting that players must do, chat messages could appear (non-persistently) above the tanks that posted them, as well as in the chat interface.

Finally, opportunities for communication without distraction in BZFlag are rare. If the designers of BZFlag wished to create an environment within the game that was conducive to socializing (which, we argue, could increase the attractiveness of the game environment), they could establish an area, such as a lobby, where players could congregate before and after games and chat in a more relaxed manner, without having to worry about their gameplay performance.

7.3. Limitations and future research

This study examined public text chat in one league in one first-person shooter game. Team chat, private chat, and admin chat were not accessible, yet they are used to coordinate important activities, such as server maintenance and catching and sanctioning cheaters.

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[3] The BZFlag interface already gives players considerable control over the size of the chat window and the size of fonts, as well as allowing players to filter out different types of messages.

Moreover, game play and chat in the GU league differ from public server play, in that GU league play emphasizes teamwork and cooperation among players over individual prowess, whereas in public server play, individual differences in skill and the advantages of superflags can result in the appearance of unfair advantage, leading to taunting and complaining. These limitations could be addressed by analyzing a wider range of BZFlag activities and contexts.

Analysis of chat in other MOGs is also necessary in order to test the claim that chat differs systematically in MMORPGs and FPSs. Although the present study was limited to text chat, in-game voice chat is a growing trend in MOGs. Future research should analyze audio conversations, so as to determine the effects of modality on in-game chatting. Other methods, such as eye tracking, could also be used to investigate empirically how user attention is distributed dynamically across features of game interfaces.

Finally, the methods used in this study could be extended to non-gaming environments in which chat co-occurs with other media use. This would provide a broader comparative base from which to generalize about chat and chatability in coactive media.

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