

**LOUDEST VOICE IN THE ROOM:  
The Streamer Effect on Twitch Chat Communication**

Master's Thesis  
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<p>Tiivistelmä - Abstract</p> <p>Reaaliaikaisten suoratoistopalvelujen suosio on viime vuosina kasvanut räjähdysmäisesti. Yksi suosituimmista suoratoistopalveluista on pelien reaaliaikaiseen suoratoistoon keskittyvä Twitch.tv. Sen käyttäjät ovat luoneet alustalle omanlaisen internet-kulttuurin, omilla tavoillaan, normeillaan ja tavalla käyttää kieltä.</p> <p>Tässä tutkielmassa tarkastellaan käyttäjien Twitch-chattiin lähettämiä viestejä ja tapaa kommunikoida. Työssä verrataan kahteen erityyppiseen suoratoistolähetyskseen lähetettyjä viestejä. Toisessa lähetyksessä vetäjä on läsnä juontamassa lähetystä ja toisessa juontajaa ei ole. Tavoitteena on selvittää, vaikuttaako juontajan läsnäolo tapaan, jolla keskustelijat käyttävät Twitch-chattia. Käytetty data valittiin Dota 2-peliin keskittyvistä lähetyksistä pelin suuren suosion vuoksi Twitchissä. Viestit analysoitiin käyttäen kvalitatiivista sisällön analyysia.</p> <p>Viestien luokittelussa ei havaittu eroa lähetysten välillä. Alkuperäinen oletus oli, että juonnetussa lähetyksessä, jossa juontaja aktiivisesti osallistuu lähetykseen sisältäisi enemmän informatiivista sisältöä, sillä käyttäjät keskustelisivat juontajan kanssa tai osallistuisivat muihin yhteisötoimintoihin. Toisaalta ilman juontajan vaikutusta chatin oletettiin sisältävän itseään toistavaa "spämmiä". Juonnetussa lähetyksessä havaittiin enemmän informatiivista sisältöä, mutta keskustelu ilman juontajan vaikutusta huomattiin kuitenkin olevan oletettua vaihtelevampaa. Siten alkuperäinen oletus sai tukea vain osittain.</p>	
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## 1. INTRODUCTION

Over the past decade and a half the online media landscape has changed dramatically. Commonly called Web 2.0 the new online media, such as YouTube, Twitter, Facebook, wikis and many others, put emphasis on user-generated content where users are not only consumers but the primary producers of content on a given platform. User-generated content is defined as “media content created or produced by the general public rather than by paid professionals and primarily distributed on the internet” (Daugherty 2008:16). One fairly recent addition to user-generated media landscape is the emergence and fast growing popularity of internet protocol television, more commonly known as streaming.

Streaming in essence means transferring multimedia content (video, audio, text, animation, etc.) from the provider to the end user and presenting it while it is being transferred (Dapeng 2001:282) instead of first transferring the content, such as a video file, in full and only then presenting it to the user. A subcategory of streaming media is live streaming, which is the practice of simultaneously recording and broadcasting streamed media to an audience. This sets it apart from other streaming services, such as YouTube, Netflix and other video-on-demand platforms, where the media is not live, although from a technical standpoint it is streamed. Live streaming gaming content especially has in just a few years become immensely popular with YouTube Live, Facebook Gaming, Mixer and Twitch.tv having combined 3.77 billion

hours watched over the first half of 2019 (Yosilewitz 2019). The most popular of these is Twitch.tv accounting for three quarters of this number.

This study will focus on one infamous but equally important aspect of Twitch: the chat. Particularly the focus will be on how the streamer in large Twitch chat affects the style of communication that happens in them. There have been some studies done on Twitch chats (e.g. Ford 2017, Chow 2016, Hamilton 2014), but dedicated studies focusing on the streamer's effect on the chat behavior has so far not been done as far as could be found. This is a gap that the present study hopes to begin to address.

Twitch is an online streaming platform founded in 2011 as a spin-off of the general interest streaming platform Justin.tv. It quickly eclipsed its predecessor becoming the fourth largest source of US peak Internet traffic in February 2014 (Pires 2015:225) and was acquired by Amazon the same year. On Twitch users stream themselves mostly playing video games, but other activities such as drawing, painting or playing music are also common. Broadcasting on Twitch as well as watching streams is completely free, which makes it possible for anyone with interest to have access to the platform. Today Twitch has over 140 million unique viewers and 2.2 million broadcasters monthly (Smith, 2019). Increasingly companies and other organizations, especially ones involved in tech and gaming, are also using Twitch to broadcast various events such as product announcements, news coverage, press events and video game tournaments.

An important part of Twitch streaming is the Twitch chat, which allows viewers to send messages to each other and the streamer. In big streams with viewers in the thousands messages can scroll past in seconds as dozens of messages are sent every minute, which makes regular conversation extremely difficult if not impossible. This study examines how the people in the chat communicates and how Twitch communities continue to function in such a chaotic environment when other chatting

methods, such as IRC, Discord channels and other similar platforms become nigh unusable with much fewer participants.

Important part for this study is the concept of voice, which is used to investigate chat communication. Large Twitch chats are filled with different voices competing for visibility, the “loudest” of them all likely belonging to the streamer. When a streamer asks their audience a question, if they make a mistake or if they say something amusing the chat will often react in a flurry of messages. Meanwhile a random user in the chat will have much fainter voice. Their messages might go completely unnoticed by other chatters in a rapid stream of information all competing for visibility. Only when the same message is picked up by others is the combined “sound” of these fainter voices likely to draw the attention of the streamer or have larger impact on chat’s communication as a whole. How this dynamic changes when there is no streamer whose attention the chat is trying to draw is one of the questions being investigated in this study. In a video game tournament streams, for example, the messages are only noticed by other chatters. Also the strategies the chatters use to gain visibility for their message when the one with loudest voice, the streamer, is not present to potentially notice and amplify their message is also a subject of interest here.

Voice as referenced here is “a distinct position, an utterance, an event or a recurrent series of events of emitting utterances that are heard, remembered, discussed and have influence on the utterances emitted by the other voices” (Trausan 2009:575). In essence voices are the various communicational positions adopted by participants in a group discussion. In Twitch chat a voice might be represented by a single comment, but voices can also be shared (Trausan 2010). A group of users repeating the same message, for example, have adopted the same position giving their shared voice greater “volume” also affecting other voices in the discussion. For example, a user posting a copied message in Twitch chat might go unnoticed in a sea of dozens or hundreds of other messages. On the other hand, if a large group of users post the same message it quickly becomes noticeable, influencing other users to start posting

the same message, react to it in some way or possibly encourage the creation of competing messages.

One interesting aspect of large Twitch chats is that despite its online nature one can see similarities in behavior between large crowds in Twitch chat and large crowds in live sporting events. When watching a sporting event at a stadium where a referee misses a fault or a team is doing either badly or well, the stadium will often erupt in booing and general heckling. Or perhaps someone in the stadium starts a stadium wave, which then circulates around the stadium without any outside prompting. Such events usually happen without anyone conspiring or negotiating to make them happen, rather an event occurs and the audience knows automatically how to react: if a referee makes a mistake the audience will respond booing and if people see a stadium wave coming they know what to do when it is their turn to participate in the event. Similarly on Twitch when the streamer makes a mistake the chat will quickly fill with emote spam or general delight at the streamer's misfortune or if someone posts a "copy pasta" other people will very often quickly copy it and repost it themselves to continue the "wave".

Because Twitch chats seem to follow offline world crowd dynamics more than online chat room dynamics, models of collective behavior used in sociology to examine crowd behavior in real life situations could provide valuable insight also into Twitch chat behavior. While they will not be actively used in the analysis, the contagion theory, convergence theory, emergent-norm theory and value-added theory have been a source of great inspiration in examining and explaining the group behaviors observed in Twitch chat.

This thesis starts with a look at the background theory including past research and the theoretical framework used in the analysis. The past research primarily presents studies focusing on Twitch in general or specifically on Twitch chat. The theoretical framework section will talk about computer-mediated communication and presents the concept of voice. The theories of collective behavior and how they present in Twitch chat are also covered.

In the data and methods chapter the research questions this study aims to answer are presented as well as how the data used in the analysis was collected, what data was chosen and the reasoning behind the choices. Qualitative content analysis was used in investigating Twitch chat messages while voices present in the chat were studied using methods similar to those used in previous research.

In the next chapter findings from qualitative content analysis and voice use are presented and compared between two types of streams. The thesis ends in discussion and concluding chapters where the results are related to previous research done on Twitch and suggestions are made for possible future avenues of research on Twitch. The research process and methods used in the thesis are also evaluated and suggestions made on how similar research could be improved in future efforts.

Hopefully this study will serve to increase our understanding on how large crowds communicate on the internet especially when it comes to streaming, which is still a fairly new phenomenon, but has in only a few years become immensely popular and continues to grow in popularity as a new source of entertainment.

## **2. BACKGROUND THEORY**

In this chapter first the theoretical background that this study draws inspiration from is introduced. Main focus is on theories of voice and collective behavior. Afterwards previous research that has been conducted on Twitch will be presented with main focus on research concerning Twitch chat and Twitch communities.

### **2.1 Theoretical Framework**

This section covers the theoretical framework used in the analysis. As this study focuses on analyzing online interactions it seems appropriate to start by briefly covering some aspects of computer-mediated communication as well as its relevant subcategory: computer-mediated discourse. Afterwards a segment on “voice” will follow, which is a concept with much relevance in large Twitch chats. At the end the theories of collective behavior will be presented. While the theories are not directly used in the analysis, they serve as valuable concepts that have served as inspiration in explaining users’ behaviors in large Twitch chats.

Computer-Mediated Communication (CMC) refers any communicative transaction that takes place by way of a computer, whether online or offline (McQuail 2010:459).

Despite being called “computer-mediated”, the term has come to be an umbrella term for communications happening between humans through all electronic means as such means have increasingly moved beyond computers through development of mobile and other non-computer devices (Herring 2013:6). Thus it encompasses communication means such as email, online forums, text messaging and, of course, live chat rooms on platforms like Twitch.

With electronic devices dominating the lives of billions of people, it comes as no surprise that CMC has been studied with tools and approaches from a variety of academic disciplines such as computer science, sociology, media studies, linguistics and health care (Thurlow et al. 2004:20-21). A more focused subcategory of CMC that has been extensively studied is Computer-Mediated Discourse (CMD). CMD is “distinguished by its focus on language and language use and by its use of methods of discourse analysis to address that focus.” (Herring 2015:127).

A theoretical approach to analyzing CMD pioneered by Susan Herring is computer-mediated discourse analysis (CMDA). As this study investigates the behaviors and interactions in a pair of online communities, CMDA is of particular interest. To conduct an analysis of this type, Susan Herring’s (2004) article stands out as a primary source. In it Herring maintains that CMDA is not a singular method or theory (Herring 2004:4) but rather a collection of analytical methods used in other disciplines adapted to investigating computer-mediated discourse. Thus, broadly speaking any study investigating online behavior focusing on language use regardless of methodology could be considered computer-mediated discourse analysis.

According to Herring (2004) CMDA view online behavior through the lens of language and can be applied to studying language on four levels: structure, meaning, interaction and social behavior. The structural level includes the use of special typography or orthography, novel word formations and sentence structure. The meaning level includes the meaning of words, utterances and larger functional units. On the interactional level are included phenomena such as turn-taking, topic

development and other interactional exchanges. Finally the social behavior level examines complex linguistic expressions of play, conflict, power, etc. Twitch chat could conceivably be studied on many of these levels. For example, on structural level emote use has important functions on Twitch, while turn-taking and other interactional phenomena could also be investigated. The present study also focuses heavily on the meaning level phenomena as the intent of utterances is central in the categorization process.

Another core assumption of CMDA is that discourse displays recurrent patterns, which the participants may be producing consciously or unconsciously (Herring 2004: 4). Because the participants may be unaware of the patterns they are producing, Herring argues that direct observation may produce more reliable generalizable results of discourse than relying on self-reports. For this study this approach is beneficial as it relies on comparing texts rather than questionnaires or interviews from participants.

Central proposition in this study is the hypothesis that users in large streams with community built around them behave differently than those found in, for example, streams of video game tournaments. These attract audiences interested in the game, but as the tournaments are not continuous events, the audience remains together only for the duration of the broadcast. A point of contention, however, is if “communities” even exist online. Hamilton (2014) as mentioned previously, for example, argued that social activities are central to a community and because socialization is notably difficult in large Twitch chats, it could be argued that they do not constitute real communities. Concerning communities Herring maintains that while especially early researchers considered the existence of virtual communities uncertain due to their fluid membership, reduced social accountability and lack of shared geographical space, it is up to each researcher to assess whether or not the online group they are investigating can be classified as a community (Herring 2004:6).

Herring also presents six criteria for determining if online group is a community and ways to analyze each (Herring 2004:14). These criteria are: 1. Active, self-sustaining

participation including a core of regular participants. 2. Shared history, purpose, culture, norms and values. 3. Solidarity, support, reciprocity. 4. Criticism, conflict, means of conflict resolution. 5. Self-awareness of group as an entity distinct from other groups and 6. Emergence of roles, hierarchy, governance and rituals. Similar criteria can also be found in definitions used by other researchers of virtual communities. Ridings and Gefen (2004), for example, define a virtual community as “groups of people with common interests and practices that communicate regularly and for some duration in an organized way over the Internet through a common location or mechanism.” In this definition, like in the one used by Herring, the importance of regular users with shared interests communicating through virtual means stands out as a defining requirement for a true community to exist.

In that vein this study argues that large Twitch chats do form communities and can be studied as such. Using Herring’s (2004) criteria, there exists regular participants and known personalities (first criteria) in the form of the streamer, moderators, longtime subscribers and so on. Inside jokes and group-specific jargon shows the presence of shared culture (second criteria), friendly banter and other similar acts of solidarity (third criteria) are also common as are criticism and conflict (fourth criteria). Self-awareness (fifth criteria) might be hard to gauge, but users who are members of multiple communities do not behave the same way in every stream they frequent. Thus, it could be argued that they are aware of the different norms surrounding different communities, showing communal self-awareness (“things are done this way here, but that way over there”). Roles and hierarchy (sixth criteria) is perhaps the most significant indication that large Twitch streams do have communities while those of tournament and other similar “special” broadcasts necessarily do not as the streamer undoubtedly stands at the top of the hierarchy with the community built around them while tournaments do not have such a prominent figure.

This study also makes use of the concept of voice. Mikhail Bakhtin (1984) in his analysis of Dostoevsky’s works speaks of polyphony, a term borrowed from music

where it is the act of playing two or more independent lines of melody at the same time to jointly construct a harmonious musical piece. Similarly Bakhtin argued that in Dostoevsky's novels one can find a multitude of voices, which importantly are not guided by the voice of the omnipotent author, but instead act and develop independently. As a result, the reader is presented with many characters that all have distinct perspectives and original objectives not subservient to the author's voice. According to Bahtin (1984:6), this way of writing is the chief characteristic of Dostoevsky's novels and is called dialogic writing, as opposed to monologic where the plot and characters are built around the author's omnipotent voice.

Dialogism also encapsulates Bakhtin's view on society's interactions at large. Similarly to dialogic writing, every person in society is constantly engaged in dialogue with other perspectives unguided by the whims of an omnipotent author. In these interactions the all-inclusive "truth" is negotiated: "truth is not born nor is it to be found inside the head of an individual person, it is born between people collectively searching for truth, in the process of their dialogic interaction." (Bakhtin 1984:110)

Based on Mikhail Bakhtin's work on dialogue Trausan-Matu and Rebedea (2009) used the concept of polyphony to analyze multi-participant chat texts. In their study of language-based interactions, voice is not the vocal expression of an idea but instead represents the various themes being negotiated and debated among the participants as they seek a consensus or resolution to a matter at hand. In essence voice is the subject matter being discussed. As the participants negotiate and debate they influence each other's positions just like instruments in music composition have influence on each other. Replacing or changing one instrument changes the overall composition of the music as does influencing participants in a conversation affect the overall voice of the subject. Voice is not a unique position to one participant, but rather participants may join into a single shared voice, representing a common perspective or approach (Trausan-Matu 2010: 359).

Especially in large Twitch chats shared voices are common. They can be seen when a group of users adhere to similar style of speech or common syntax, for example, when a group of users use a similar phrase or emote in quick succession.

Additionally the streamer is probably the greatest influence on chat discourse both by being the only one who can usually physically talk to the audience and by being the host and the owner of the channel. When the streamer asks their chat questions or suggestions, it is almost inevitable that chat quickly fills with answers. Therefore, the absence of such a significant influence on the voices in the chat should have a great impact on chat communication overall.

This study also makes use of the concept of collective behavior in investigating large Twitch chat behaviors. This is important to consider because the behavior of participants in Twitch communities often diverges from other established online groupings. Instead Twitch communities often more closely resemble real life crowds in their behavior rather than virtual groups especially in the case of large Twitch chats. These theories are not actively used in the analysis, but they have served as an inspiration in interpreting interactions found in large Twitch chats.

Well known theories in social sciences the theories of collective behavior examine and explain how groups of organisms operate. While often used to study animal behaviors, the theories are also commonly used to study human crowd behavior. The four theories presented here and developed for explaining crowd behavior are the contagion theory, convergence theory, emergent-norm theory and value-added theory. What follows is a short introduction to each of these adapted from Linda Levy's study on sports crowd behavior (Levy 1989) and how they could be applied to studying online crowd behavior specifically on Twitch and how collective behavior can be found on Twitch.

First developed by Gustave LeBon (2001) at the end of the 19<sup>th</sup> century by observing social unrest in his time, Contagion Theory postulates that people are individually rational but become capable of irrational behavior in groups. During social unrest

people may become engaged by the occurrence of some exciting event. Individuals become sensitized to one another, experiencing rapport, which induces the lowering of social resistance and a loss of normal individual control (Levy 1989:70).

Anonymity awarded by groups allows people to abandon personal responsibility and be influenced by others in the crowd to irrational deeds, which they would not commit on their own.

Convergence Theory, developed by Sigmund Freud (1990), states that people who want to act in a certain way come naturally together to form crowds. This sets it directly opposite to contagion theory where the crowds themselves create the environment that make "normal" people behave irrationally. The convergence theory has been criticized for not explaining certain crowd dynamics such as behavioral shifts, multiple predispositions, or role acquisition (Levy 1989:70).

Ralph Turner and Lewis Killian (1987) developed the Emergent-Norm Theory to give an alternative explanation for crowd behavior. They theorized that unfamiliar situations create new norms of behavior. When unique circumstances such as hooliganism or mob violence arise, the people in a crowd unfamiliar with such situations look to the other members for cues on appropriate actions and model their behavior accordingly. In this way individuals pressure rest of the group to conform to new norms of behavior (Levy 1989:71).

The fourth theory, called Value-Added Theory developed by Neil Smelser (1964), breaks collective behavior into its determinant parts, some but not all of which needs to be met for collective action to occur. The theory argues that should these conditions become favorable, collective action will become inevitable. The factors are: social conduciveness: the conditions must be such that collective action can occur. Structural strain: there needs to exist societal problems as collective behavior will not happen without cause. Spread of generalized beliefs: a belief which identifies and attributes characteristics to the source(s) of strain and then determines an appropriate response. Precipitating factors: factors exist that confirms the beliefs and

intensifies the previous factors. Finally social control: agencies of social control, for example police, may prevent or interfere with the determinants at any stage. In other words, collective action is more likely to occur if the participants believe they will not be punished. (Levy 1989:71)

### **2.1.1 Collective behavior on Twitch**

These theories have been used to investigate crowd behavior in sporting events (Levy 1989). This study proposes that the behaviors of Twitch chats, especially large ones, are in many ways analogous to behavior of the crowds in live sports events. The participants in both types of events for the large part are there for entertainment, merrymaking and general revelry, which could be conducive for creating the excitement and loss of personal inhibitions proposed by contagion theory as a reason behind collective action. Both events also naturally draw together people of similar interests, which give relevance to the convergence theory. Sports events crowds as well as Twitch chat often undergo rapid shifts in behavior. For example, switching from cheering to heckling when something happens to set it off, which the emergent-norm theory could help explain, while the value-added theory is useful for investigating the conditions and triggers that make collective action happen.

Eric Chow (2016) argues for the applicability of these theories in investigating Twitch chats. He found especially the convergence and emergent-norm theories useful in analyzing large Twitch chats in what he called crowd phase, which is a typical state for large Twitch streams to be in. In this phase messages are typically short and game and Twitch specific terminology becomes prevalent, which draws in similarly minded people and gives rise to new norms of behavior. On the other hand when a trigger occurs and chat enters the collective phase where the chat becomes filled by an emote or a single copied phrase he found the contagion and value-added theories useful as in this phase users can participate even without any knowledge of Twitch or channel specific in-jokes simply by mimicking what others are doing.

## 2.2 Previous Research

Founded in 2011, Twitch has not been around for a very long time yet and live streaming itself has only been possible a short while longer, but several studies have already been done on streaming. Some focus on the technical aspects of streaming (e.g. Deng 2015, Pires 2015, Pan 2016) while others have examined more social aspects of streaming phenomenon such as the motivations involved for users and streamers to engage on live streaming (e.g. Hamilton 2014, Gandolfi 2016, Gros 2017, Ford 2017). As the most popular streaming platform, Twitch has been the focus of many of these studies.

Focusing on social side of streaming Gros (2017), for example, examined viewer and streamer motivations for using Twitch. He discovered that for many users the primary reasons for using Twitch are entertainment (often even replacing TV as the main entertainment source), information (for example, finding strategies or authentic gameplay footage to support purchasing decisions) and socialization. Socialization was especially noticeable reason for those who have spent money on the platform either by donating to streamers or by subscribing. Every stream on Twitch has its own chat channel where it is easy to interact with potentially thousands of other people from all over the world, sharing at least interest in the stream they are watching. It is not surprising, then, that for many people socialization is a major reason for using Twitch.

Gandolfi (2016) likewise studied motivations on Twitch. His study showed the importance entertainment has for users of the platform, but it also highlights the community aspects of stream viewing. Almost half of their respondents lists “specific twitchers” as their reason for watching Twitch streams, meaning people are watching specific streamers regardless of what game they are currently streaming. However, users also reported that very few friendships are created on Twitch and the content is not consumed with others, but rather it is a solitary source of entertainment. Thus, it seems the community and social aspects of Twitch are

heavily centered on the streamer, with their influence being the most significant factor in keeping the community together.

Hamilton et al. (2014) studied Twitch communities, how they form and motivations that users have for engaging in streaming content. Investigating participatory communities, i.e. communities where users actively participate in shared activities, they found two reasons for people to engage in live streaming. Firstly, they are drawn to the content of a particular stream and, secondly, they like participating in that streamer's community. Using the concept of third place, Hamilton posits Twitch communities as virtual third places, settings outside of home (first place) or work (second place) where people gather to socialize. As socialization is the primary function of such places, Hamilton also argues that small Twitch chats are more desirable for communities as "overly crowded chat rooms on Twitch streams destroy the potential for communities to form through participation" (Hamilton, 2014:1321). They argue for this reason, that participatory communities are only possible in small streams.

It is also clear that the streamers have huge impact on what kind of community forms around them since those viewers whose views and attitudes are incompatible with the streamer tend to move on (Hamilton 2014:1319). For the purposes of this study this also means that the streamer should have a large impact on their chat's communication practices. After all, unwanted behavior would likely be discouraged through moderation as the community grows, which could lend credence to the idea that in streams without a streamer presence different communication practices emerge.

Nematzadeh et al. (2016) analyzed over a billion messages in Twitch chats for specific markers such as message length, frequency of question marks and emote use. They found that as viewership of a broadcast grows, there is a point where Twitch chat transitions from conversational state to a cacophony characterized by lower user participation, more copy pasted messages and less information per message. This, they argue, is evidence that participants in active chats suffer from information

overload. As the amount of messages increases the amount of information a participant has to process eventually surpasses their ability to follow the conversation. As a result, participants experiencing this information overload may stop participating altogether, will only reply to certain topics or in simpler manner. This obviously has an impact on possibilities of socialization as Twitch communities grow larger. This naturally begs the question how large Twitch chats continue to be coherent to those using them despite the apparent information overload associated with them.

Studies focusing on socialization on Twitch (e.g. Hamilton 2014) have in the past sometimes likened Twitch chats to traditional online chat rooms, such as IRC channels. In these systems, without the added benefit of live video feed, as the number of participants grows, users will quickly suffer from information overload and conversation becomes impossible. This certainly also happens on Twitch as Nematzadeh (2016) discovered and it would be easy to label large Twitch chats as failed communities because of this as Hamilton (2014) may be suggesting. However, the fact that there exists thriving communities for streamers with viewers in the thousands shows that communities on Twitch can function despite the lack of traditional chat room socialization methods. Often these studies have seemed to assume that the primary function of a chat room is socialization. However, as Gros (2017:50) discovered socialization was only the third highest scoring factor after entertainment and information seeking for users on Twitch. Thus conclusions from previous research on chat room use might not be applicable when investigating Twitch communities as the motivations among users seem to differ between the mediums.

Ford et al. (2017) focused their research on large Twitch chats. They found that while conversations between viewers and streamer are not abundant and messages are typically shorter, communication in large Twitch chats is not meaningless cacophony. Rather big chats develop a distinct way of communicating they call "crowdspeak", where the chat might look chaotic and incomprehensible, but which is coherent to

the participants attuned to it. Because of this, they emphasize that large Twitch chats can be examined as successful communication spaces in their own right rather than as failing communities.

Ford's (2016) study has in many ways served as an inspiration for the present study. Their study does not consider is the streamer's effect on big chat communication practices, which is something this study hopes to at least start to address.

"Crowdspeak" happens when large chats grow too large for regular conversation, but whether it is possible because the streamer is directing or focusing their viewers on the stream or because the audience naturally adopts crowdspeak mentality is so far unknown. Similar crowdspeak phenomenon does not seem to happen on other chatting platforms, like IRC or Discord channels, which could indicate that the streamer has a role in making crowdspeak possible. On other chat channels large number of users chatting simultaneously inevitably leads to communication breakdown, so in this way too streaming seems to differ from traditional online chatting methods.

Eric Chow (2016) also notes the distinct difference in communication between small and large Twitch chats. He divides Twitch chat communication into three distinct phases: the chat phase, the crowd phase and the collective phase. Chat phase represents the typical online chatting environment, where conversations and general discussions are abundant and possible. The crowd phase and collective phase is where the chat's communication becomes what Ford (2016) referred to as crowdspeak in their study. In crowd phase chat moves faster, messages become more difficult to follow and conversation stops. In collective phase chat is filled by a single message (or voice), for example, same emote spammed over and over, copy pasted message or some other dominating phrase. Even large Twitch chats do not stay in collective phase indefinitely; instead they mostly stay in crowd phase where a single action or an event on the stream might put the chat temporarily into collective phase.

Streaming and Twitch are still recent subjects for study and not many studies have been conducted on them, but the few that have already present a new and interesting topic. It is clear that chatting practices in Twitch follow different rules than previous online chatting methods. Instead of breaking down into meaningless spam when number of users reaches critical mass, users in Twitch chats have instead developed a way of thriving in the chaos. As discovered by previous researchers, social aspects on Twitch become secondary especially in large streams and instead the stream and the accompanying chat are used for entertainment purposes. Later on this study will dig deeper into how it is that entertainment could be found in what many previous researchers have described as chaos and cacophony.

### **3. DATA AND METHODS**

This chapter will introduce the data and methods that were used to analyze Twitch chat interactions and the research questions the analysis aims to answer. First, the questions will be presented, followed by the presentation of the data that was chosen for analysis. The chapter will end with an overview of the methods employed in the analysis.

#### **3.1 Research questions**

To date there has been some research done on Twitch, mostly investigating streaming as a new media format (Pires 2015), motivations of users (Gros 2017, Hamilton 2014) and its place as a part of gaming culture (Gandolfi 2016). Twitch chat specifically has been studied even less and many of those have focused on small Twitch chats where communication more closely matches that of traditional chat rooms (Nematzadeh 2016). Very few studies have investigated what goes on in large Twitch chats and how the communities continue to function despite problems presented by information overload and frequently chaotic environment. Another interesting aspect of Twitch chat is that before Twitch's rapid growth in popularity traditional chat room style communication had largely been relegated to niche

activity supplanted by other types of social media such as Twitter and Facebook. On Twitch such chat rooms are ubiquitous and used by millions every day.

The aim of this study is to firstly present how large Twitch chats communicate and then compare communication styles in two distinct types of streams. The first stream type is a “regular” stream where a streamer is present hosting the broadcast, which form the majority of Twitch streams. The second type is a tournament broadcast focusing on professional video game tournament where viewers typically have very little opportunities to interact with the broadcast, instead being forced to simply passively enjoy the show. Streamers command great influence on their channels having not only the power to steer discussion to directions they wish but also delete unwanted messages and remove users at will or empower others to do so on their behalf. This way the streamer can influence what kind of community forms around them and how it communicates and behaves on their channel. One aspect this study is interested in is if the communication of users in Twitch chat changes when such a strong voice is not present to guide and influence them. Various e-sports tournament streams, for example, do not have a streamer hosting and guiding the stream. This study looks at how large Twitch chats communicate, whether or not the streamer has an effect on chat communication practices in large Twitch chats and how these communication practices differ from non-streamer broadcasts, which normally do not have the streamer as a central figure. To this end the questions being investigated here are:

1. What types of messages are posted in Twitch chat?
2. What differences (if any) can be found in the types of messages posted between streams with a streamer present and non-streamer broadcasts?
3. Are there differences in voice use between the streams?

### 3.2 Data

The data consists of video recordings of two Twitch streams as well as transcriptions of Twitch chats of those streams. Every broadcast on Twitch is automatically recorded on the site and can in most cases be freely accessed after the broadcast so material to choose from is virtually limitless. This study has chosen to focus on streams of Dota 2, which is one of the most popular games being broadcasted on Twitch. This was chosen for a few reasons. First reason is the author's previous familiarity with Dota 2 and Twitch culture surrounding the game. Twitch channels are full of in-jokes, memes and Twitch and game specific lingo that requires a certain amount of familiarization to understand, so to help with the analysis the focus was limited to a game where this familiarity already existed. Second reason was the popularity of the game both as a streaming title as well as an e-sports title meaning several large streamers as well as regularly held tournaments broadcast frequently on Twitch, which provides ample material for data collection.

Dota 2 itself is an online multiplayer game where two teams of five players battle each other. Their ultimate goal is to destroy the opposing side's "Ancient" residing in their home base (hence the name Dota: Defense of the Ancients). Each of the ten players in a given game controls one hero who upon defeat respawns in their home base after a short while ready to continue the battle. During tournament events teams confront each other in matches of one to five games each, while in online matches games are typically individual events with no continuity. A typical game lasts 15-45 minutes. However, there is no set lower or upper limit to game length and it is not unusual for games last over an hour.

Large streams were favored for this analysis. The differences in the ways people communicate in streamer and non-streamer broadcasts were expected to be more obvious when the amount of chatters is larger. This is because in small streams the chat is dominated by relatively few individuals, meaning the style of communication largely depends on how those individuals communicate. In large streams on the

other hand as the number of chatters increases, chat becomes dominated by the collective voice of thousands of individuals. One aspect of interest in this study is if this collective voice changes depending on streamer presence or other factors. The data was gathered from streams of over ten thousand concurrent viewers, which is very large number by Twitch standards. Streams of this size can be expected to showcase Twitch chatting environment typical for large streams.

The channels chosen for this analysis were one tournament stream hosting one of the Dota 2 Majors, which are tournaments of significant importance in Dota 2 professional scene, and one regular streamer who streams Dota 2 almost daily on Twitch for a very large audience. These streams were chosen for their popularity as the primary interest was in active chat channels. Tournament streams often have tens of thousands viewers, while the streamer whose channel was used in the analysis likewise routinely draws viewers in excess of ten thousand. Permission for using the channels and their chat logs for research purposes was obtained. As the identity of individual users is not relevant for this study they are not identified even by their usernames, which could be used to identify individuals after the fact. Thus chatters in examples later in this paper are simply referred to as User #1, User #2, etc. and usernames are obfuscated in the example screenshots.

The chat logs from the two broadcasts were created using “RechatTool” script by J. D Purcell (2018), which takes a Twitch video’s identifying number and converts all messages posted in chat during that broadcast into a plain text file.

The data was gathered from streams broadcasted on January 25<sup>th</sup> (the streamer broadcast) and January 26<sup>th</sup> (tournament broadcast) 2020. Messages were posted during one Dota 2 game in their respective streams. During the two games over 26000 messages were posted by 7600 unique users. From these a total of 800 messages were chosen by picking four sections of 100 messages from different parts of the game in each stream. Audience might use chat differently in the early parts of the game compared to near the end, so segments were chosen from different parts in

order to capture this possible change in audience's focus. In addition a segment of two minutes from both streams was used to analyze voices.

Based on Trausan-Matu and Rebedea's (2010:355) previous work, voices here are defined as a shared viewpoint rather than every individual participant having a unique voice. Thus, "voice" here refers to a specific subject matter in the stream chat rather than to any individual message. Shared voices can be seen in Twitch chat, for example, when several individuals repeat similar phrases or emotes. These different voices in the segment were counted to determine if either type of stream was significantly more likely to engage in a more varied discussion. The hypothesis was that viewers in a tournament stream would be more likely to be "narrating" the events of the game, leading to fewer voices. Those watching a regular streamer, in contrast, would engage in community activities or interact with the streamer resulting in more varied topics being discussed and more distinct positions being adopted in the chat.

### **3.3 Methods**

This study focuses on investigating Twitch chats of two distinct types of streams: a "normal" broadcast with a streamer hosting the stream, interacting with viewers, and a tournament stream without a streamer present. Focus is on examining how people communicate in the streams and comparing the two streams to find out if there are significant differences and if those differences could be attributed to the presence of the streamer affecting the way people use Twitch chat.

A mix of quantitative and qualitative methods will be used here. Qualitative analysis will be used in the first part to present the types of comments found in Twitch chat and to categorize them. Reducing the subject into quantifiable numbers makes differences more obvious and easier to understand, thus, quantitative analysis will be used in analyzing and comparing the differences between the two stream types, as well as investigating the use of voice in Twitch chat.

To categorize and compare Twitch chat messages, Qualitative Content Analysis will be used. Later on in the analysis voice use in Twitch chat will be investigated using methods similar to those used in previous research. Next sections of this chapter will go over the methods in more detail.

### **3.3.1 Qualitative Content Analysis**

To achieve a mix of quantitative and qualitative analysis Qualitative Content Analysis (QCA) as described by Margrit Schreier (2012) will be used to investigate Twitch chat logs. QCA allows one to be interpretative in analyzing data in a way common to qualitative research methods, but at the same time its origins in quantitative content analysis allows one to be flexible by drawing on quantitative side of content analysis. In this study QCA is used to categorize comments of the two streams, while quantifiable metrics are used in comparing the streams.

QCA is done by assigning segments of the material to categories of a coding frame, which is at the heart of QCA. The coding frame consists of a number of main categories and any subcategories these main categories may have. To create these categories researchers can use either the inductive approach or deductive approach. In the inductive method the categories are derived from the research data while in the deductive method the categories are based on an earlier theory or model (Elo et al. 2008:109). To date there has been some incidental categorization of Twitch comments, for example, by Eric Chow (2016), which has also served as an inspiration for this study. However, many messages observed in the data did not fit any pre-existing categorization, necessitating creation of new categories. Thus inductive approach was unavoidably chosen to conduct this study.

In this analysis of Twitch chat communication patterns four major categories of comments were identified: Revelry, Discontentment, Serious and Other. These main categories were further divided into a number of subcategories to create the finished coding frame. In total the coding frame consists of 4 main categories and 15

subcategories. The categories and the reasoning behind categorizing certain messages into specific categories are presented in detail later in the analysis chapter.

### **3.3.2 Voice**

To analyze voice in Twitch chat, methods similar to those previously employed by Ford et al. (2017) were used. They observed chat segments from small and large Twitch streams and used metrics such as voices per segment, word count per message, unique word count per segment and participant count to analyze voice taking. They hypothesized that large streams would contain fewer unique voices than small chats, which turned out to be unfounded as voice counts were comparable although large chats were discovered to have more repetition i.e. more people adopted shared voices.

The present study focuses exclusively on large chats and instead compares voice taking in two different stream types. Hypothesis inspiring this approach is the belief that a stream with the streamer hosting and directing activities contains more unique voices in chat as users are believed to be interacting with the streamer or performing community activities. Meanwhile, viewers in tournament streams would be more likely to narrate the events of the game, leading to reactions in chat being more uniform and contain less unique voices.

For this study “voice” following Trausan-Matu and Rebedea’s (2010:355) example was defined as a shared viewpoint rather than an individual position. Thus, voice here is a specific subject matter, distinct position or a style of speech, i.e. several people laughing or reacting to an event the same way or in the same style would constitute a single voice. A two minute segment from both streams was analyzed, and the number of unique voices present in the chat during that time was tallied and then compared. In addition, the number of chatters and the number of messages during the segment was also counted.

## 4. ANALYSIS

This section will first cover a short introductory overview of Twitch and Twitch chats to briefly present their features, how they work and what one might expect to see when watching streams on the platform. Afterwards the coding frame created by analyzing Twitch chat messages using Qualitative Content Analysis will be presented. Next will be a section comparing the coding frames of the two streams for differences in communicative style. Here possible reasons for these differences, if any, are also presented. The chapter ends in a section analyzing the use of voice in the two streams.

### 4.1 Overview of Twitch and Twitch chat

What follows is a short overview of Twitch and Twitch chat features, how they work and what one might expect to see when watching streams on the platform. When accessing the site, barring technical hiccups, one can expect to see thousands of streams broadcasting at any time of day. On the front page of Twitch.tv ([twitch.tv](https://www.twitch.tv)) are displayed promoted streams. These are chosen by Twitch and given a prominent position on the front page, which often times draws in bigger than normal crowds for those promoted this way. Special streams such as charity streams, gaming related conventions or other special events are often promoted this way. Also on the front

page are recommended categories and streamers chosen by an automated algorithm based on the user's previous viewership history, location and other factors. At the top of the page are "browse, esports and music" links, which direct the user to different sections of the site. If the user has created a user account and is logged in, an additional page for followed channels also appears here. Various administrative functions such as searching are also at the top of the page.

Esports ([twitch.tv/directory/esports](https://www.twitch.tv/directory/esports))

Electronics sports or simply esports refers to playing video games professionally. The esports-page on Twitch contains streams broadcasting various video game tournaments as well as highlights and replays of past tournaments. Every game has their own category, which when clicked would open a listing of current streams and past broadcasts. On this page are also listed the personal streams of professional players who are currently streaming live on Twitch making it easy to find both current ongoing tournaments as well as professionals playing for fun on their own channels.

Music ([twitch.tv/directory/game/music](https://www.twitch.tv/directory/game/music))

In the music-page are, as one might expect, streams related to music, such as radio channels, streamers playing instruments or singing, music related podcasts and so on. This list can be sorted to display streams in other ways, but highest to lowest is the default, which contributes to first few streams having a lion's share of viewers. The page has a search function, which in theory lets the user search for streams that match their interest through filtering different tags set by the streamers. However, possibly because the music section is fairly new addition to the previously mostly gaming-related site the selection of tags is quite limited. For example, it is not possible to search for streams playing specific instruments.

Browse ([twitch.tv/directory](https://www.twitch.tv/directory))

The browse-page contains the main listing of game categories and other activities in order of viewership, starting with the most popular category first. Every individual game or activity has their own category so users know what the streams in them are broadcasting. This page serves as a central hub for all games and activities broadcasted on Twitch, including those in music and esports pages. However, video game tournaments and music streams have also been separated into their own pages for ease of finding these specific interest streams.

Inside a game category ([twitch.tv/directory/game/dota 2](https://www.twitch.tv/directory/game/Dota%202)) the individual streams that are currently online are listed in order of popularity. Streams vary in size, but anything over three thousand viewers can be considered large and could safely be expected to exhibit at least occasionally Twitch's iconic crowdspeak phenomenon although size is by no means the only or possibly even the deciding factor in this.

Streams on this page can also be listed by other parameters. For example, from low to high viewership, recently started broadcasts or by recommendations chosen by the Twitch algorithm. It is not unusual to see the first few streams on the list have most of the viewers in a given category, while the viewership rapidly declines to only a handful of viewers per stream for those further down. This also leads to Twitch streaming scene being largely dominated by a relatively small number of very popular streamers while the vast majority enjoy very little success.

People therefore tend to congregate on the first few streams despite the difficulties large streams presents in socialization, which indicates that socialization is not the primary concern for most people on Twitch; people evidently choose to join the communities that are already established rather than choosing a stream with fewer viewers, despite the ease of conversation and socialization smaller stream chats provide. The way people tend to congregate in large groups is also indicative that convergence theory might have merit here as the theory proposes that like-minded people naturally converge together to form crowds, which causes the collective behavior in a group to occur.

When watching a broadcast a typical stream will have the main show taking most of the screen while the Twitch chat channel will be on one side. As messages are posted in the chat, the screen will scroll up to accommodate new messages and removing the older ones from view. While joining any stream and reading their associated chat channel is completely free, writing in them can be restricted by the streamer. They can set the chat in a mode that allows everyone, only their followers or only their subscribers to write messages in it. In addition they can also use the “r9k” and “slow” modes. R9k mode allows only unique messages to be posted, meaning if two people try to post the same message only one will appear in the chat while in slow mode one user can only write one message in a set amount of time. These modes are in addition to other methods of control the streamer possesses, such as giving users timeouts, which prevents users from posting messages in a set amount of time, and banning users, which prevents them from posting messages in the chat indefinitely. All of these tools are designed to limit the amount of messages Twitch chats receive, thus, keeping it readable and maintaining the chat phase longer. This also means the amount of viewers needed for chat to enter crowd and collective phases varies heavily from stream to stream depending on how rigorously the streamer engages in chat moderation.

Those watching the stream are called viewers. Viewers can further be divided into groups based on their status on the channel. Followers are ones who are following that particular channel, letting them get notifications for when the stream goes live. Subscribers support streamers by paying a certain amount of money each month to the streamer they are subscribed to. In exchange they get a special subscriber badge icon before their name in the chat to show how long they have been subscribed and gain access to channel specific emotes that they can use in any other Twitch channel as well. Subscriptions are organized into three tiers where tier one costs \$5 per month tier two costs \$15 and tier three \$25. Higher tier subscribers get some additional benefits, for example, exclusive channel emotes, but many streamers often grant special privileges to incentive subscribing, such as playing games with their

higher tier subscribers. All of these features are clearly made to encourage building of communities.

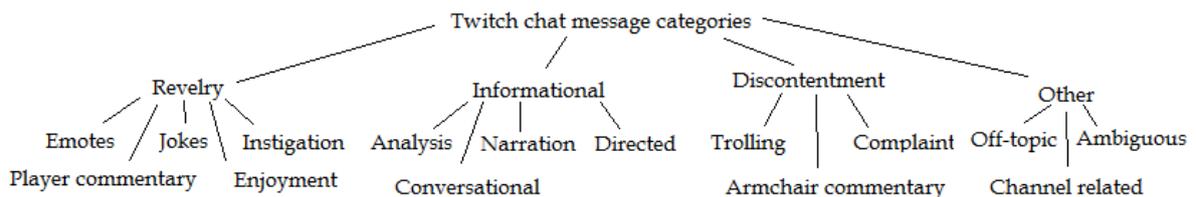
By watching a stream viewers on a channel are also awarded channel points, which can be used to redeem various rewards set by the streamer. For example, unlocking channel emotes normally restricted to subscribers temporarily or highlighting messages for everyone in chat. Some viewers are also moderators on the channel. Moderators have the power to ban or timeout users, change the modes chat is in and conduct other administrative actions. Usually long time viewers, subscribers or other significant people of the community are made into moderators, but the channel owner has the power to make any viewer into a moderator.

## 4.2 Qualitative Content Analysis of Twitch chat

This section covers the qualitative content analysis part of this study. The coding frame created using QCA is presented through the use of examples from each category of message that was observed in Twitch chat.

### 4.2.1 The Coding Frame

As mentioned previously, the coding frame created from the data contains 4 main categories and 15 subcategories and is displayed in Figure 1.



**Figure 1. Coding Frame**

Comments were categorized based on the intent of the message whether to show the poster's enjoyment of the stream, reacting to something that happened in the stream or to voice their disappointment. While it might sometimes be dangerous to infer

motives without knowing the larger context, since participation in Twitch chat is voluntary and practically without long term repercussions to the participants, it is safe to say the messages can be taken at face value. It should also be noted that the categorization is unavoidably rather subjective as the true intent behind messages is difficult to definitively state without interviewing the individual users, which was not done for this study. Thus the categorization has been done relying largely on the researcher's own experience and expertise with Twitch chat as a long time participant. Other difficulties encountered during the coding process are further discussed in the discussion chapter. What follows is a presentation of the categories of the coding frame with examples from Twitch chat and explanation of the reasoning behind each category.

#### **4.2.2 Revelry**

To be entertained is possibly the most common reason users have for engaging in streaming content on Twitch (Gros 2017:55), doubly so for large streams where the other common reasons, information seeking and socialization, are more difficult. For this reason the chat is also often used to have fun by making jokes, expressing one's enjoyment through emotes or by trying to goad other users into action (making "stadium waves"). Examples of merrymaking, the first major category of the coding frame, contain messages whose posting has been motivated by a desire to simply have fun.

#### Emotes

Emoticons or emotes are pictorial icons created using common symbols found on a computer keyboard. They are used to display emotions in written text where body language or tone of voice cannot be used to convey nuanced meanings of face to face conversations (Walther & D'Addario 2001). For example, :- ) and :-( are examples of common emoticons. A different, but related, way of displaying emotions in written text is the emoji from Japanese "e", meaning picture and "moji", meaning character (Grannan 2016). Unlike emoticons, which are created using characters found on a keyboard, emojis are pictures usually requiring text input, which is then recognized

and converted to the desired image by the computer. Technically “emotes” used in Twitch chat are in fact emojis, but because they are referred to as emotes even in official contexts by Twitch itself (Twitch.tv 2020), this study will also refer to them with this term.



Figure 2. Emotes

Emotes have a significant role in Twitch communication. They are used as a concise way to indicate practically any emotion or as a response to virtually any situation that might demand a reaction. Their importance is highlighted by the fact that many emotes commonly used on Twitch are not natively supported by Twitch itself, so many viewers use third party programs such as FrankerFaceZ and Better Twitch TV to add and display emotes that have not been approved by Twitch. In the examples above users in the first four users in Figure 2 are all emoting laughter using different emotes. “KEKW” is a commonly used laughing emote on Twitch, however, when a channel does not have an emote enabled as was the case here the text input is not converted to an image, which is why it is displayed as text instead of its pictorial form. Despite this, long time users will still likely recognize the poster’s intent due to the emote’s ubiquitousness in different Twitch channels.

The “Kappa” emote used by the fifth commenter in Figure 2 is used to express sarcasm but also doubt when used on its own or in response to someone, as was the case here. Emotes used by the last two viewers are used to express amazement and stupidity/silliness respectively. Especially in very large chats where messages are

sent in very rapid pace, conveying meaning in as few characters as possible is advantageous in order to be noticed. As can be seen here emotes are convenient way of expressing thoughts wordlessly.

### Player commentary

Another form of revelry that users in Twitch chat engage in relates to commenting on the performance of the players or the streamer, often by mocking or praising them. If someone makes a mistake it is not uncommon for Twitch chat to fill with mocking messages, or if a player is doing well they might receive praises. While comments may sometimes seem hostile (such as the user #1 message in Figure 3), in the context of Twitch there is rarely real malicious intent behind them. Rather the comments should be considered just friendly banter that is almost expected in any kind of sporting event with viewers jeering and cheering the competitors.



Figure 3. Player comments

In the examples in Figure 3 one can also once again see the importance of emotes in Twitch communication. The laughing emotes used by the second and third commenter makes it clear the mocking comments are friendly in nature while users #6 and #7 are showing amazement. The comment from user #4 saying “RAMZE POS 5” followed by an emote showing amazement at first glance seems like a praise for the player. However, in Dota 2 “pos 5”, short for position 5 refers to supporting players, while Ramzes, the player the comment is referring to, was not playing a support role in the match so in actuality this comment is joking about his poor performance. This also shows the importance of being “in the know” about specific

game terms and functions. Lack of such knowledge is likely one of the major contributors to Twitch chat's reputation as a chaotic and incomprehensible discussion environment.

### Jokes, memes & references

Inside jokes, "copy pastas" and other references are common in Twitch chat. In addition to site wide "Twitch meta", communities develop their own jokes and references that are instantly recognizable to members of those communities. They are used during broadcasts for humorous effect and to have fun. One such reference is "The biggest oversight" in the Figure 4. It refers to a popular copy pasta, a block of text copied and pasted on social networking sites across the internet, involving one of the playable characters in Dota 2 who was played in this match, which explains why such reference was used in this game. The full copy pasta is much longer than what the users #1 and #2 posted but even without the full text block being posted, a simple reference to it is enough to bring it to mind for those who are aware of its existence and serves as a shared community joke.

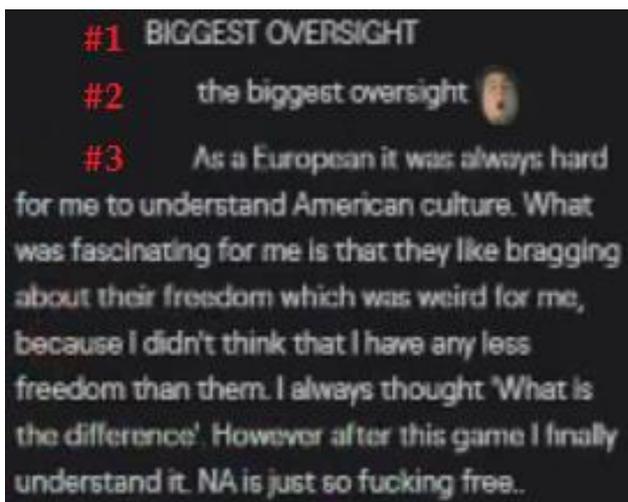


Figure 4. Jokes and memes

Copy pastas are also fairly commonly circulated in Twitch chat as a full text block as shown by user #3 in Figure 4. This one was spammed repeatedly in the chat during the end stages of the match when it became apparent that the North American team was going to lose to the European team. It is also an example of a copy pasta that is

created on the spot and used for a while in the chat of the channel where it was created rather than an established community joke that is more widely circulated in related streams. Instead of being community jokes these kinds of copy pastas usually serve a specific short term purpose. In this case it represents the rivalry that exists between North America and Europe in the game and mocks North American players' skills (they are a "free win" for the European players).

### Instigation

Instigation comments try to elicit a specific response from others in the chat. Often such comments are used in an attempt to spur the chat into "crowdspeak" mode, where the chat is dominated by a single phrase, emote or other message. Often users posting copy pastas are also instigators as the purpose of a copy pasta often is to get others to spread it further. Other times instigators seek validation from others in chat, for example. This can be seen in the message posted by user #4 in Figure 5. "Who else is baked here? push 1" would then result in those agreeing filling the chat with "1". Often users also subvert this by posting 2 or other numbers than the one requested.



Figure 5. Instigation

In the other example type in Figure 5 users #1 and #2 are showing their support for the player Arteezy and are trying to get others to repeat the action in support. The emote used in these types of instigator comments have no particular meaning beyond making the chant rhyme with the cheered player's name (cheezy-artezy). The third comment develops the chant by changing the used emote to the "BabyRage" emote, which is often used to deride streamers who get angry, which Arteezy has a

reputation of doing. Instigator comments provide solidarity and belonging with others “in the know” through shared opinions or agreement with the instigators’ propositions.

### Enjoyment

Some comments are clearly examples of Revelry, where the users are showing their enjoyment of the stream or which are posted for purposes of entertainment but were either too rare to warrant their own category or were hard to justify as belonging to one of the other categories. These have been gathered here as general examples of users displaying their enjoyment in Twitch chat.

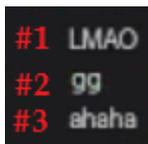


Figure 6. Enjoyment

The role of emotes in Twitch chat is once again highlighted Figure 6 by their absence. It is fairly rare for people to use traditional internet abbreviations for laughter (lol, lmao, etc.) or to type out “hahaha” or equivalent onomatopoeia. The “gg” used by #2 in Figure 6 is common phrase in gaming circles meaning “good game”, which is commonly said at the end of a match as a show of sportsmanship.

### **4.2.3 Discontentment**

The second main category contains examples of users generally acting in disruptive manner. Reasons for such actions might include annoying other chatters to one’s own enjoyment, voicing frustrations or to show their own superiority. Often only the most disruptive behaviors are punished, so practical lack of consequences and the anonymity afforded by the internet often aggravates such behavior.

### Trolling

Trolling comments are typically insulting, provocative or otherwise inflammatory. The troll’s intention is to be intentionally offensive and cause anger in other users.

While a degree of trolliness is in keeping with Twitch chat's playful nature and few subjects are immune to be made fun of, sometimes the intent is to simply cause offense.

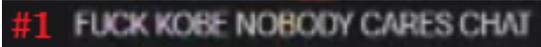


Figure 7. Trolling

The user in Figure 7 is clearly trying to cause offense by saying “FUCK KOBE NOBODY CARES CHAT”. Basketball player Kobe Bryant had died in an accident earlier the same day and throughout the day users in Twitch chat had expressed their condolences over the event. While other jokes were also made about the incident as can be expected of Twitch chat, this comment and other trolling comments are more likely intended to only be inflammatory, rather than morbid but ultimately good natured fun. The message is also posted in full capital letters in order to make it as visible as possible which further indicates the poster's desire to cause offense to as many as possible.

### Armchair-comment

Also used in other contexts, armchair experts are people who know a lot about a subject but have little practical experience or understanding of it. In sports such people often criticize the performance or decision making of players believing themselves to be more skilled and knowledgeable than them.

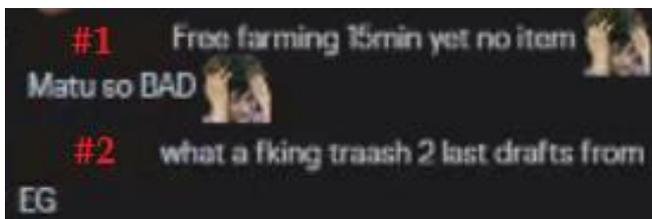


Figure 8. Armchair comments

In Figure 8 the first commenter calls Matu, one of the players in the match, bad for not having bought an item after 15 minutes of “free farming”, or collecting money without interference from the opposing team. However, there might be other reasons for the player to not have bought an item even if he was free farming for so long, so

this comment has little actual analytical value and comes across as typical armchair comment.

The second commenter questions the team Evil Geniuses' draft. Drafting refers to choosing which characters to play in the match to have best chances against the opposing team's choices. Such messages are common to see after a team loses a match regardless of what happened in the match; while draft is certainly important it is far from the only deciding factor in the outcome so comments like these again show a typical armchair mentality.

### Complaint

Complaints are noticeable and common in streams covering professional tournament play. Common instances for venting are, for example, technical problems, poor gameplay or lack of excitement.



Figure 9. Complaint

The first commenter in Figure 9 is dissatisfied with the observer in the game focusing on the Enchantress hero too much. The second commenter is using the “NotLikeThis” emote to show their exasperation with the way the game is going. The third commenter is complaining about a player “farming”, that is fighting computer controlled enemies for gold, which is generally regarded as more boring gameplay than fighting other players. The message is further punctuated by the use of the “ResidentSleeper” emote to signify boredom. The last commenter puts into words what many supporters of Evil Geniuses felt during the game and what sports fans in general have felt when the team they have favored is losing.

#### 4.2.4 Informational

The third major category contains those messages that have a more serious intent behind them, such as information seeking, discussion with other chatters or analyzing or narrating stream events. While this kind of serious discussion is common in smaller streams, it is much rarer and harder to accomplish in very large streams, where any posted message or a question scrolls out of view in moments. However, the large number of chatters means someone is still likely to notice a message no matter how many other messages are competing for attention, so questions can still be asked and answered occasionally.

##### Analysis

Analysis comments focus primarily on analyzing gameplay. They discuss the strategies employed by the players, mistakes that lead to a lost or won battle and make suggestions and other observations regarding the match.

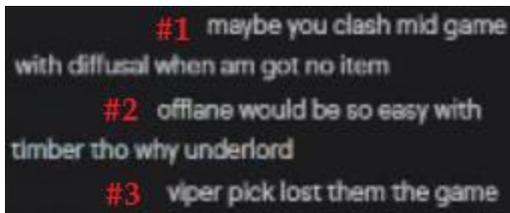


Figure 10. Analysis

In Figure 10, the first commenter is making strategic suggestion of fighting a decisive battle using a “diffusal”, an item in the game, before enemy “am” (Anti-Mage) gets an item of their own. In the second comment “timber” and “underlord” refer to characters in the game and the user is wondering about the players’ game strategy as they seem to not follow the easier strategy. In the third comment “viper” once again refers to a character and the user believes picking it led to the team losing the match. Analytical comments like these often seem aimed at creating discussion. For example, the second user’s comment includes a question, but rarely any discussion arises from such observations, likely due to the difficulties large chats present for extended discourse.

However, as can be seen later in this paper, analytical and other informational comments are one of the most common types of messages observed in the data, so clearly the lack of a follow-up conversation is not a disastrous hindrance on viewers' analytical commentary.

### Narration

Narration comments are posted as a reaction to something unfolding on the stream or something the streamer says. Often these comments simply repeat what the streamer or, in the case of tournament stream, casters observing the match have said but in more casual and "fun" manner customary for Twitch chat.



Figure 11. Narration

The first commenter in Figure 11 is reacting to the player "Fly" being "cliffed", or being stuck in an area, unable move. Traitor is a disparaging nickname the player has earned in the Dota 2 community. Second commenter is expressing their surprise that the Enchantress hero, which at the time was a powerful character, had not been played before the current match. The third commenter is laughing at a player's usage of a skill called song, while the fourth is anticipating an item called philosopher's stone to drop from enemies. Narrative comments like these serve to draw the attention of other users for particular aspects of the game, which is why they are here considered informational messages despite not being terribly analytical or conversational. For viewers unfamiliar with the stream, narrative comments are important indicators for what to focus on in a new game.

### Directed messages

Some comments are directed at specific chatters instead of the chat as a whole, although everyone can still see them. Using another user's name highlights messages

in Twitch chat, which is useful in making messages more noticeable, especially in large Twitch chats where reading every message becomes impossible. “@” character is used before names to explicitly indicate to the recipient that the message is intended for them. Conversations are difficult to maintain in large Twitch chats even with directed messages, so usually in large chats directed messages are largely limited to responding to questions. However, Figure 12 highlights some other uses for directed messages.

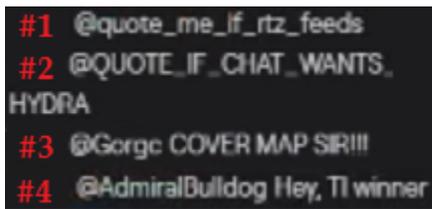


Figure 12. Directed messages

The first comment in Figure 12 could just as well be an example of instigation-type comment. A user has created a username called “quote\_me\_if\_rtz\_feeds” with the intention that other users will direct messages at them whenever Arteezy, one of the players in the match, dies (“feeds”) thus filling the chat with the message in the example. This use of a username to bait a reaction from chat is by no means unique to this individual as shown by the second comment. However, in these instances they did not elicit the desired reaction from chat and went largely unnoticed.

The third commenter uses directed message to make their message more noticeable to the streamer by using “@” before their name, which highlights the message in chat for the recipient. This is used to ask questions from the streamer or to inform them of things, for example, reminding them to cover the map to prevent enemy team from gaining unfair advantage from watching the stream.

The last comment is an example of what often happens when known personalities are spotted in different stream chats. AdmiralBulldog is one of the most well-known Dota 2 players and messages are often directed at them to greet them or to otherwise let them know that they have been noticed in chats of other streams.

## Conversational

As mentioned previously, holding a conversation in large Twitch chats becomes increasingly more difficult as the number of chatters increases. Thus, long conversations are practically nonexistent and even short back-and-forth exchanges rare enough to have warranted their own category here.

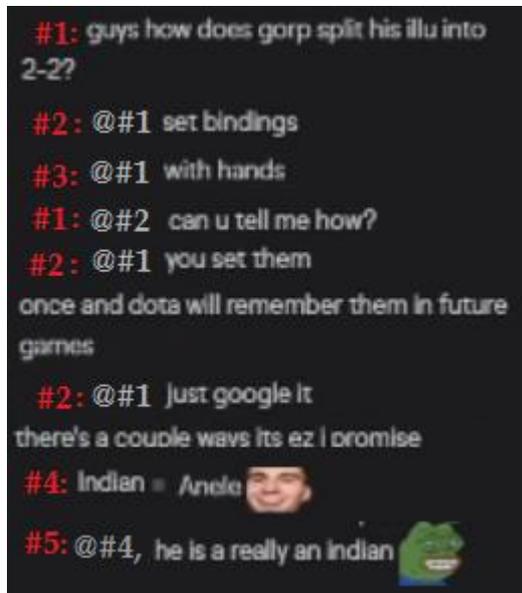


Figure 13. Conversational messages

Still, conversations do happen, usually as a result of information seeking. For example, someone asks a question, which is then answered. In Figure 13 user #1 asks how the streamer is splitting illusions created by his character into two groups. They receive replies from two other users, one joking while the other helps with the problem but ultimately recommends using Google to find specifics on how to do it as there are several ways to do what the user is asking.

Such interactions are typical examples of conversations that happen in large streams. Activity is too high for general discussion and lengthy problem solving sessions so conversations are limited to short questions and answers and throwaway replies to another user's comments.

### 4.2.5 Other

The last major category contains messages that are ambiguous in their intent, are somehow specific to the channel and other miscellaneous off-topic messages, i.e. messages not related to the channel or the game being played.

#### Channel specific

These are messages that are somehow related to that specific channel's operation; for example, automated messages from bots, bot commands from users or viewer engagement schemes.

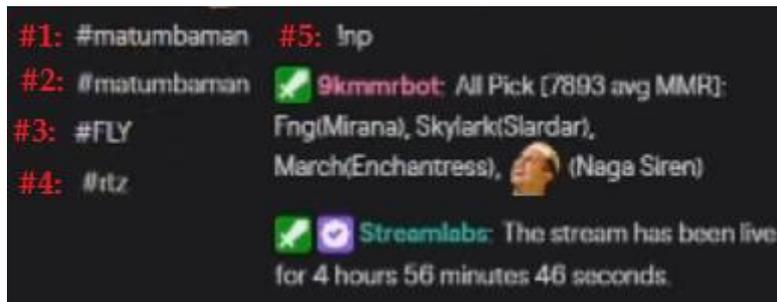


Figure 14. Channel-specific messages

The left side Figure 14 shows one such viewer engagement scheme in action. Viewers watching the match were encouraged to use hash-symbols to vote for the most valuable player, who would then be announced at the end of the match. Viewers do not gain anything by voting, but it is one way to show their support for their favorite player.

On the right are examples of bot messages. Because large Twitch streams are extremely active, streamers use various methods to help keep their chat manageable. One method is setting up bots to handle administrative tasks, such as automatically moderating chat, answering frequently asked questions, or to look for specific phrases and responding to them in a preset manner. In Figure 14, user #5 uses the bot command “!np”, likely short for “now playing”, which the “9kmmrbot” recognizes and responds with information about the current match being played. In

the next comment another bot, Streamlabs, is telling how long the stream has been broadcasting.

### Off-topic

Because holding conversations is close to impossible in large streams, the chatter in Twitch chat is usually focused on the streamed content and revolves around it in some form. In smaller streams it is common for discussion to include many “off-topic” subjects, but in large chats only particularly significant events have the power to divert chat’s attention and cause off-topic discussion to happen.

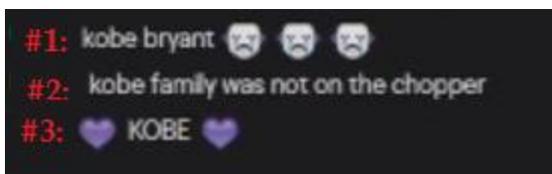


Figure 15. Off-topic messages

One such event was the death of basketball player Kobe Bryant on January 26<sup>th</sup> 2020, the day the stream, from which the data was drawn, was broadcasted. The first commenter in Figure 15 expresses their sadness over the death using several crying emotes for emphasis. The second user is using the chat to share new information as the situation was still developing and full extent of the accident was not yet known. The third user is using heart emotes before and after Kobe’s name to show their admiration for him and also writing the name in full capital letters for emphasis. Full capitalization in writing is usually interpreted as shouting and it also makes the text more noticeable in fast moving Twitch chat.

### Ambiguous

Not all messages in Twitch chat have easily discernible purpose. Incomplete messages, one word statements and other comments whose meaning was difficult to interpret without asking for their sender’s intent were categorized simply as ambiguous.



**Figure 16. Ambiguous messages**

In Figure 16 are few such examples. The first comment saying simply “0%” might be a reaction to something happening in the match, but no obvious reference was noticed. The second commenter saying only “THE” might have intended to write a full message and sent it accidentally too early, but no further comments were seen from the user. The third comment saying “ayh” seems like a simple interjection, but no obvious culprit for what prompted it could be found. Short incomplete messages like these are fairly common but ultimately are not disruptive due to how short they are and how fast very active chats scroll such messages out of view.

### **4.3 Stream Comparison**

In this section the coding frames created from the two streams are compared for differences in the types of messages users post during the broadcasts. Possible reasons for the differences are also proposed.

Because anyone can live stream a wide variety of content freely on Twitch, many organizations and companies are now taking advantage of streaming for marketing purposes. Regular streamers form communities around them where users adopt certain ways of communicating characterized by the use of in-jokes, references and specific manners of behavior, distinct from other channels frequented by the same users. However, organizational streams rarely have an established streaming community surrounding them so users in these streams lack the community in-jokes and other behavioral habits, which hypothetically would change the manner in which users communicate in these two types of streams.

In this study comments posted in two streams belonging to a tournament stream and a regular professional streamer, with an established community, were categorized

and coding frame was created of both streams. The tournament stream hosts a variety of tournaments so it does not have an established channel community, rather the users most likely to watch the stream are united by their interest in the tournament itself, while the regular streamer more likely has a community grown around the streamer and their channel.

**Table 1. Streamer messages**

<u>Streamer</u>									
<b>Total</b>	<b>400 / 100%</b>	<b>Revelry</b>	<b>178 / 44.5%</b>	<b>Discontent</b>	<b>9 / 2.25%</b>	<b>Informational</b>	<b>136 / 34%</b>	<b>Other</b>	<b>77 / 19.25%</b>
		Emotes	77 / 19.25%	Trolling	7 / 1.75%	Analysis	28 / 7%	Channel	48 / 12%
		Player comment	25 / 6.25%	Armchair	0 / 0%	Narration	53 / 13.25%	Off-topic	1 / 0.25%
		Jokes	19 / 4.75%	Complaint	2 / 0.5%	Directed	38 / 9.5%	Ambiguous	28 / 7%
		Instigation	31 / 7.75%			Conversational	17 / 4.25%		
		Enjoyment	26 / 6.5%						

**Table 2. Tournament messages**

<u>Tournament</u>									
<b>Total</b>	<b>400 / 100%</b>	<b>Revelry</b>	<b>209 / 52.25%</b>	<b>Discontent</b>	<b>20 / 5%</b>	<b>Informational</b>	<b>76 / 19%</b>	<b>Other</b>	<b>95 / 23.75%</b>
		Emotes	66 / 16.5%	Trolling	2 / 0.5%	Analysis	13 / 3.25%	Channel	43 / 10.75%
		Player comment	58 / 14.5%	Armchair	5 / 1.25%	Narration	41 / 10.25%	Off-topic	26 / 6.5%
		Jokes	24 / 6%	Complaint	13 / 3.25%	Directed	17 / 4.25%	Ambiguous	26 / 6.5%
		Instigation	22 / 5.5%			Conversational	5 / 1.25%		
		Enjoyment	39 / 9.75%						

Tables 1 and 2 display the number of messages that were assigned to each category both as absolute number as well as a percentage of the total number of analyzed messages. In total 400 messages were analyzed in both streams. The first row of each table contains the main categories with their subcategories listed in the column underneath.

The tables show a few notable differences between these two streams. Firstly, tournament broadcast had a higher number of messages in revelry, discontentment and other categories, although the number of disruptive messages in general was low. Revelry as a category was the largest in both streams accounting for around half of all messages. The streamer broadcast conversely had a higher count of informational messages.

While absolute conclusions cannot be drawn from only looking at two streams and relatively small number of analyzed messages, some potential reasons for the

differences and how much these could be due to the different dynamics of streamer versus non-streamer broadcast can be put forth.

In the category of “revelry” the tournament stream had 209 messages making up 52% of all messages while the streamer broadcast had 178, or 45%. The biggest major difference was the number of messages about specific players and their performance, which was more prevalent in tournament stream (14.5% to 6.25%). One explanation for high count of “revelry” messages goes back to one of the main reasons people have for engaging in streaming content: entertainment. Users watch the stream to be entertained, which naturally extends to their use of the chat for the same purpose. Higher number of comments about players specifically in tournament stream is possibly because the players themselves are known personalities in Dota 2 scene, which means their fans and detractors scrutiny their actions during games more. On the other hand, normally when a streamer plays a game in normal settings outside of tournaments, most players in a match are regular people largely unknown in the scene so chatters find enjoyment in other aspects of the stream. For example, using emotes more or instigating others in chat, both of which had higher prevalence in streamer broadcast although in a fairly minor way.

Messages of discontentment were very low in both types of streams at 20 messages in tournament stream and 9 messages in streamer broadcast. The low number could have a couple of explanations. Notably since Twitch has thousands of streams broadcasting at any given time, if a viewer is not enjoying the stream, it is more likely that they simply switch streams and find content more to their tastes than voice their discontentment in the chat. In keeping with Twitch’s jovial nature a degree of disruptive behavior is also often just another example of revelry, so the decision on whether a comment is categorized as revelry or discontentment can also be a thin line and could be affected by the coder’s attitudes. For example, instigation messages might be considered by many to be disruptive enough to be an example of discontentment, especially if they successfully incite other users to an action, such as flooding the chat with many messages in very short amount of time.

The overall lower number of messages of discontentment in streamer broadcast could be one benefit of having an established community. As streamer's following grows, those who are incompatible with the community cull themselves and move on to other streams leaving only those who enjoy the streamer's content, thus leading to fewer instances of disruptive behavior in the chat. The tournament streams on the other hand do not have the benefit of self-culling as the viewers are drawn to the stream in large numbers for a short time by the game being played and do not stay to form a lasting community.

Informational messages were significantly higher in the streamer broadcast making up 34% of the streamer's chat, while in tournament stream 19% of messages were deemed informational. The benefits of community might once again be one of the reasons for this as well as the presence of the streamer. For example, making strategic suggestions directly to the streamer is not possible in a tournament setting so more people might be encouraged to make such analytical observations in regular streamer broadcasts. More regular viewers and the community present in streamer broadcasts likely also contributes to higher "directed" message and "conversational" message numbers. Especially messages directed at the streamer are very common and obviously only possible in streamer broadcasts.

Another possible explanation could simply be the number of viewers. While both streams studied here were very large by Twitch standards, with both exceeding ten thousand simultaneous viewers, the tournament stream exceeded it by several times during the broadcast. Although both streams had very active streams with behaviors typical of large streams observable, the tournament stream, thanks to higher viewer count, also had much more active chat. In such an environment many people might simply not contribute informational content as the chances of it going unnoticed are high.

In the "other" category all subcategories were equal in both types of streams, except for the off-topic category having significantly more in the tournament stream.

However, virtually all off-topic messages in the stream were related to a significant

news item happening the same day, namely Kobe Bryant's helicopter accident. Without a significant event outside the game to divert chat's attention, off-topic discussion in both types of streams could be reasonably assumed to be similar. On the other hand, the higher number of off-topic messages could also be an indication that viewers in tournament streams are not as invested in the stream, instead discussing topics not related to the stream.

#### 4.4 Voice

In this section the streams are analyzed for their use of voice. A two minute segment from the two streams was used. The number of messages, chatters and unique voices were counted and three metrics were created from the results: messages per chatter (how many messages each user posted), messages per voice (when a new voice emerged, how many messages adopted the same voice, i.e. how long "crowdspeak" mode lasted) and chatters per voice (how many users adopted a new voice). These results can be seen in Table 3.

Table 3. Voice

	Tournament	Streamer	Ratios	Tournament	Streamer
Messages	574	136			
Chatters	419	97	Messages per chatter	1.37	1.40
Voices	163	43	Messages per voice	3.52	3.16
			Chatters per voice	2.5	2.2

In total the two minute segment saw 574 messages being posted in the tournament stream's chat by 419 unique chatters while 136 messages were posted by 97 chatters in the streamer chat. Thus both chats had messages per chatter ratio of about 1.4. That is, every chatter posted on average 1.4 messages in the chat during this two minute time period. 163 distinct communicative stances (voices) were identified from the chatters in the tournament stream and 43 in streamer chat, giving messages per voice ratio of 3.52 and 3.12 respectively. This meant that on average, when a new

voice emerged, between three and four messages adopted that same voice. Lower number would mean more variety in discourse with 1.00 indicating that each message represented a distinct new voice. In practice both chats had periods where one voice dominated chat discourse while other voices went unnoticed. This can be seen in the example of the analysis process shown in Figure 19.

	Voices
#1:ahaha	1
#2:FORSEN SUBS PepeMods	1
#3:LUL	0
#4:3Head	1
#5:LUL	0
#6:LUL	0
#7:KEKW	0
#8:KEKW	0
#9:grove bow on physical dps hero?	1
#10:hahahahaha	0
#11:LUL LUL	0
#12:PepeLaugh	0
#13:KEKW	0
#14:who even listens to indian music? lol	1
#15:OMEGALUL	0
#16:Jebaited	1
#9:LULW	0

Figure 17. Example of voice

Figure 17 is a fairly representative snippet of Twitch chat discourse as it was observed in these segments. In the analysis process comments were listed in the order they were posted and each (unique) voice tallied. In the example several users are laughing at an event that occurred in the game. Users express laughter in the example through emotes such as LUL, LULW, KEKW, PepeLaugh and OMEGALUL and variations of haha, common textual representation of laughter. Even though the users are expressing their enjoyment in several different ways, the stance is clear and so “laughter” is counted as a single voice. Other weaker voices can also be seen, for example, user #9 asking about an item or #4 posting just the 3Head emote. However, these go unnoticed while different expressions of laughter dominated the chat for some time.

The original hypothesis concerning the variety of voices in Twitch chat was that the tournament stream would contain fewer distinct voices, as the chatters in a tournament stream would be engaged in watching the match and reacting to the events in a unified fashion similar to what is commonly seen in real life stadium sporting events. The viewers watching a regular stream on the other hand were assumed to be engaged in more community activities with each other or interacting with the streamer, thus adopting more varied stances.

This turned out to not be the case. In absolute numbers significantly more distinct voices were identified in the tournament stream, but when accounting for the number of chatters, the streams were fairly equal with a slight edge to streamer broadcast in terms of higher frequency of unique voices with 3.16 messages per voice against 3.52 in tournament. Again a message per voice ratio of 1 would indicate that each message represents a unique new voice, meaning the streamer broadcast had slightly more varied stances. However, this edge was fairly minor so this result is not yet enough to definitively claim that the regular stream has more voices and more varied discourse.

Another perhaps unexpected feature was the variety of viewpoints in the tournament broadcast. While chatters reacted to events happening in the game as expected, they often did so from many perspectives instead of uniformly. This can be seen in the example in Figure 18.

#1: fly drawing KEKW
#2: Yapzro is so gooooooood meeiin
#3: 5 man for Puppey LUL
#4: puppey higher nw than yapzor monkaS
#5: @dungsieu LUL BA at his finest
#6: GOD Matu Pog

Figure 18. Voice variety in tournament broadcast

In Figure 18 chatters are reacting to same events but from different perspectives. In this game a player (Puppey) has just been caught off-guard and their hero killed

while another (Yapzor) has managed to narrowly escape. In the aftermath another player, Fly, is seen drawing directions for his teammates on the game's map, which draws the first commenter's attention. The second commenter meanwhile is impressed by Yapzor's ability to escape the fight unharmed, while the third one is mocking the opposing team for requiring 5 players to defeat Puppey, and so on. While users often displayed uniform reactions after particularly significant, funny or otherwise noteworthy events, varied reactions to same event like this example were much more common than originally expected. This shows that variety of voices is still expressed even if most of them do not spur others into adopting the same voice.

#### **4.5 Summary of findings**

Entertainment, socialization and information seeking and sharing are for most users the main reasons for participating in streaming content. Of these, opportunities for socialization become increasingly more difficult as the number of chatters grows larger. For this reason it is common to see Twitch chats of large streams rife with jokes, good natured mockery and general merriment. In this Twitch chat despite being an online medium more resembles live sporting events than online digital chat room. Audiences cheer their team, mock their opponents and express other such sentiments of revelry and merriment.

In addition to displays of revelry, displays of discontentment were also observed. Users engaging in disruptive behavior often did so either for their own enjoyment through trolling or to simply voice their own dissatisfaction. Desire to show one's own superiority ("I am better at this game") might also lead to disruptive behavior depending on how such actions manifest. Lightheartedly mocking the player's skills, for example, is unlikely to cause offense or disruption whereas a more hostile approach likely would.

Second to entertainment many use Twitch for information seeking or sharing their own expertise in the game being played. Users would narrate the events of the stream, strategize and even converse with others. Long conversations were unlikely to take place due to the size of the streams. However, people would still share their own thoughts on events of the stream even if those thoughts often elicited no response from others.

The examples shown here has by no means been an exhaustive list of the types of messages that appear in Twitch chats. Not only does the way people communicate depend on the size of the stream, different games have different communities who likely have different ways of expressing themselves. This has merely been a small look at the types of messages that are common in streams of one specific game, but it already shows interesting ways of communicating, which are common on Twitch but rarely seen on other social media channels. Most notable example being the tendency for users in large chats to adopt a single voice to amplify their message.

One point of interest for this study was what, if any, differences could be seen in how users communicate in streamer and non-streamer broadcasts. Streamer broadcast was observed to have more informational messages and less messages showing discontentment. Both of these could be thanks to having a stable community that has grown around that specific streamer. Those who are not enjoying the content leave the stream, which means less messages of discontentment, and the possibility of communicating directly with the streamer with suggestions encourages more informational communication style. This benefit is lost in tournament and possibly other organizational streams, which do not have their own established communities, instead drawing their audience from general interest groups. For example, tournament stream drawing audience interested in the game that is being played.

## 5. DISCUSSION

Streaming is a fairly new phenomenon but already immensely popular. Yet not very much research has been done on the topic, especially considering how influential Twitch has become on the social media landscape as a whole. Jokes, memes and lingo originating from Twitch streams can often be run into on other social media platforms Twitch is already affecting the language of the internet outside its own little corner. Understanding internet has obvious applications in various marketing and public relations endeavors so studying internet phenomena is immensely important and worthwhile. This study in particular has hopefully also increased our understanding of crowd dynamics on the internet. Specifically how large crowds and communities function and communicate on Twitch, and how the streamers affect it (or not). Thus far large Twitch communities have in previous research often been deemed failures due to the chaotic environment and the impossibility it makes of traditional ways of socialization. This study has shown examples of how, while one on one conversation might be difficult or not happen at all in these communities, there is camaraderie of a different sort to be found.

The questions this study set out to investigate were:

1. What types of messages are posted in Twitch chat?

2. What differences (if any) can be found in the types of messages posted between streams with a streamer present and non-streamer broadcasts?

3. Are there differences in voice use between the streams?

For the first question this study analyzed 800 messages from two streams using qualitative content analysis and presented a coding frame of the types of messages that were observed in them. Four main categories of messages were observed: revelry (messages where users are having fun), informational (asking and answering questions, providing information, strategizing, etc.), discontentment (complaints, trolling and other disruptive behavior) and other (ambiguous, administrative and other miscellaneous messages). In addition a number of subcategories were further identified for all four main categories for more specific categorization.

All types of messages were observed in both streams meaning no radical differences were seen in the way users use the chat. Largest category of messages was revelry in both streams, which shows Twitch's importance as a tool for entertainment for its users. One significant omission in observed message types was "conversational." Messages of this type were expected to be more numerous but were instead relegated into a minor category of only a few messages in both streams. This undoubtedly was due to high number of chatters in these streams, which translated to a very high number of messages being posted making conversations difficult, something also observed in previous research (e.g. Hamilton 2014, Nematzadeh 2016). Another surprisingly little seen message category was discontentment. The proposed reason for this was that since Twitch has thousands of streams broadcasting at any given time, people who are unhappy with the stream content will often simply leave the stream and watch another instead of voicing their complaints in the chat.

For the second question this study investigated the differences in the way users communicate in the two streams. It did this by comparing the number of messages assigned to different categories in the two coding frames. The main differences discovered this way was higher number of informational messages in regular stream

and higher number of revelry messages in tournament stream. The differences in informational content could be attributed to having an established community in regular stream, as the possibility of making strategic suggestions directly to the player or interacting with familiar members of community might encourage chatters to be more informational in their chat use.

The difference in revelry in tournament stream on the other hand was mainly due to higher number of comments about the players in the game, both positive and negative. The overall higher amount of revelry in tournament stream could be attributed to one of the main reasons people use Twitch: entertainment. Conceivably, more people are watching tournaments for fun rather than socialization opportunities, which is reflected in the way the chat is used. Higher number of commentary on the players specifically is attributable to the fact that competitors in tournaments are known personalities in the game community so their performance is scrutinized and talked about in chat more than players in regular stream, where participants and their performance is not interesting enough to warrant ridicule or praise.

For the third question the use of voice was investigated by analyzing a segment from both streams and counting the number of unique voices present in them. It was expected that tournament stream would have less distinct voices with chatters reacting to game events uniformly while those in regular stream would be interacting with other members of the community or the streamer, resulting in more varied voice use. Support for this prediction was mostly not found. It was discovered that the streams had close to equal number of voices when accounting for the difference in chatter numbers, albeit regular stream had slightly more diversity, which would support the original hypothesis. However, the difference was minor, so further investigating would be required for definite conclusion. Both streams had periods of uniform reactions, but even during these times there were competing voices, which simply went unnoticed and had no effect on chat discourse. Thus, no major differences in voices or voice use were discovered between these two streams.

In previous research on Twitch and Twitch chat Hamilton et al. (2014:1321) argued that overly crowded chat rooms “destroy the potential for communities to form through participation” meaning active chats makes it impossible to participate in community activities. This means large participatory communities do not exist on Twitch or at least that the collections of people watching very popular streams cannot be considered a participatory community. Primary activity in a participatory community stream as Hamilton (2004:1315) defined it is sociability, which takes the form of humorous banter and light-hearted conversation, alongside play, while core community members engage in building community by engaging other participants, promoting participation, and moderating chat.

This study looked at two very large streams, one of which draws a fleeting crowd interested in the thing being streamed, in this case a tournament of a video game, much like a sporting event might draw people interested in football to a stadium but who cannot be called a close-knit community, while the other was argued to have a community centered around the streamer. Directed messaging and conversational messaging are something one would expect to find in a community chat and indeed both were observed and in greater number in the streamer chat. Humorous banter, a feature of sociability found in communities according to Hamilton, is a staple feature of Twitch chat’s merrymaking along with light-hearted conversations engaged in by regular personalities such as moderators and longtime subscribers. In small chats the community is defined by a small set of “regulars” (Hamilton 2004:1318). However, in large chats the discussion is structured around the adoption of shared references, speech patterns and lexicon, a collective voice. One-on-one socialization takes a back foot in large chats in favor of general revelry, but it seems clear large streams do have communities, participation to which might not always be as easy for an individual as in communities of smaller streams, but they are no less participatory.

Similar to this study Ford et al. (2017) investigated among other things the use of voice in Twitch chat. Findings presented here mostly line up with those from Ford. They investigated differences in voice use between small and large streams and

found large streams to have about 2:1 ratio of chatter per voice meaning every unique voice was adopted by two chatters. This was very close to chatter per voice ratios identified previously in this study, which were 2.5 to 1 and 2.2 to 1 in the two streams. This would support the idea that Twitch chat behaves somewhat uniformly after surpassing a certain size threshold from a small chat (Ford's study had chatter to voice ratio of about 1 to 1 in small chat) to a large chat where communication becomes collective crowdspeak.

While this study did not gauge user motivations through interviews, the way viewers were using Twitch chat coincides with findings reported in studies by Gros (2017). His study investigated motivations for using Twitch through questionnaires, where entertainment and information seeking were found to be the two most common reasons. Entertainment, or revelry, and informational content were also found to be the two most common types of messages found in Twitch chat in this study, which seems to indicate that the way viewers use Twitch chat is reflective of their motivations for engaging in streaming content, i.e. people seeking information communicate in a more informational manner, while those seeking entertainment use the chat to have fun. This could also explain the generally low numbers of discontent messages that were observed in this study; few people watch streams only to be a nuisance.

## 6. CONCLUSION

Researching online discourse often deals with what is anecdotal or speculative from the researcher's perspective. Central part of this study has been interpreting intent behind short messages in a chaotic chatting environment full of abbreviations, emotes, references and inside jokes, which leaves room for myriad of interpretations. Should another researcher analyze the data used for this study, there is no doubt that their interpretation of the intents behind chat messages might differ significantly from those presented in this paper. For this reason if there were an opportunity to redo this study, great effort would be put towards making it more collaborative especially in the process of creating the coding frame and categorizing Twitch messages.

Collaborative effort would undoubtedly also ease the second big problem this study had, namely that it would allow for more data to be analyzed. The subject of this study was investigating very large chats with tens of thousands of viewers. In streams this large, thousands of messages are posted during one match so the amount of data would very quickly overwhelm one person's or even a small team's capacity to analyze by hand. For this reason the amount of data was cut down to only few hundred messages, a tiny percentage of total number, to make it manageable. This was necessary but it also means the picture of how Twitch chat communicates in these streams is not as complete as it could be, so much more

research would need to be done. Considering the amount of messages in a typical very large Twitch chat, a more automated way of categorizing and statistical way of analyzing the results would help a great deal.

This study was a foray into new but immensely popular form of entertainment, that of livestreaming. Chat during very popular streams can be chaotic, intimidating and incomprehensible to a new viewer not attuned to it. This study aimed to present and decipher the communicative methods used on Twitch.tv chats. As livestreaming as a subject was humongous the scope was limited to a single game, Dota 2.

The underlying idea for this study was to investigate the streamer's impact on chat communication style and propose possible reasons for the differences. From the findings the one major difference between streamer and non-streamer broadcasts was that chat of a stream with the streamer present and interacting with the audience contained more informational content in the form of strategizing, suggesting and conversing with others in chat despite there being no major difference in chat activity or the number of messages or participating chatters. These findings have importance because streaming is still fairly new phenomenon so the intricacies of new online behaviors have not been exhaustively studied yet. Understanding how very large groups of people behave online and how they could be managed could have wide ranging applications in a variety of fields, for example, in education by applying the knowledge to online classes.

The results of this study are mostly speculative as it relied on the author's own knowledge of Twitch chat communicative style and interpretation of the intent behind the messages that were used in the data, instead of consulting the users who posted them in the first place. This is made even more difficult by the ever changing "Twitch meta", the overarching way emotes and Twitch specific lingo is used on the platform. New inside jokes, emotes and ways of speech are created and spread among popular streams on a daily basis. The examples presented in this study have likely already become outdated by the time this paper has been finished, so Twitch is ever relevant topic for many kinds of research.

From linguistic point of view the importance emotes have in Twitch communication should be a high priority in future research. While the present study did not focus exclusively on emotes, their impact on Twitch discourse was evident throughout the examples presented here. In chat of thousands, in order to get one's voice heard, it is imperative to be noticed and for others to adopt the same voice. As images, emotes are inherently attention grabbing and their punctuation-like usage in Twitch chat allows users to get their voices heard even in the midst of hundreds or thousands of other chatters. Furthermore, the simultaneous interactions of thousands of viewers foster a sense of community, where consensus of thousands is built in seconds in response to events on screen or in chat. Being able to reach instant consensus highlights the communicative strengths of the new media, which warrants further research. Twitch emotes can also perceptibly become neologisms outside of Twitch, even when their textual form is not converted to an image outside the platform. Already many Twitch emotes can occasionally be seen as Twitter hashtags or used as regular expressions on other social media platforms.

Investigating crowd behaviors in Twitch chat could also be of interest for those in the field of sociology as well. This study has, for example, suggested that similarities exist between the way Twitch chat participates in electronic sporting events and crowd behavior in stadiums during live events. How people in Twitch chat can be influenced to adopt certain collective behaviors could be one avenue of such research.

Research focusing on chats and subcultures of other games being streamed on Twitch would also be another worthwhile avenue. This study focused only on streams of Dota 2, which is certainly one of the most popular games on Twitch, but with hundreds of other games and thousands of streams on the platform at any given time possibilities for further studies is endless.

Livestreaming has become hugely popular form of entertainment for both the viewers and the streamer. Often, the viewers themselves become a self-propagating form of entertainment; the chat and jokes, banter and general merrymaking are for

many vital part of Twitch experience. As evidenced by their popularity, the chaotic nature of large Twitch communities is big part of the appeal for countless people while others might prefer the smaller and more personal communities of less popular streamers. Twitch draws a wide demographic as a new entertainment venue and the inclusion of a communication tool adds an entirely new dimension to the experience for the viewer. There is ample room to take further research on Twitch and livestreaming in many directions in the future.

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