COOPERATIVE EMOTIONAL INTERACTION IN VIRTUAL COMPETITIVE GROUP ACTIVITY

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Abstract

This study examines emotional interaction within virtual competitive group activity. The participants are 5 Counter-Strike: Global Offensive (CS:GO) players who belong to the same team. The study is an observational study in a naturalistic setting that utilizes an inductive-deductive approach. The study uses a methodology developed specifically for video-based research as well as Ethnomethodological conversation analysis (EMCA). The data consists of video and audio recorded on the participants’ computers during a match. The results illustrate how players utilize emotional interactions in different ways during a virtual competitive group activity. The interpretations of the data were based on two theories: The Emotions as temporal interpersonal system (TIES) model and the Emotions as social information (EASI) model. Using the TIES model, instances of co-regulation and co-dysregulation in the participants’ interactions during the match are explored. Using the EASI model, the participants’ use of emotions as information was examined. Our interpretations indicate that players use emotions in their interactions during a virtual competitive group activity and partake in interactions where the emotional content escalates and de-escalates. We suggest that these findings should be taken into consideration when developing training programmes for esports athletes and that further research on emotional interactions within competitive virtual context is possible.

Keywords: emotion, emotion regulation, esports, team, Counter-Strike, TIES, EASI

Abstrakt


Nyckelord: emotion, emotionell reglering, esport, team, Counter-Strike, TIES, EASI
Cooperative emotional interaction in virtual competitive group activity

It is a fundamental aspect of being human to belong to and interact in different groups such as family, at work or in sports teams. Humans need each other to fulfil social needs as well as to be able to work together to accomplish goals and make life easier and more effective. In this social interaction we get influenced by others and also influence them in a reciprocal exchange (Eys, Burke, Carron & Dennis, 2010).

The role of emotions in social interactions and human communication has been viewed as being functional and purposeful, as it is viewed through the lens of socio-functionality (Keltner & Haidt, 1999, Van Kleef, Heerdink & Homan, 2017). In the socio-functional approach emotions are thought to have different functions in social interactions on an individual, dyadic (i.e. between two people), group and cultural level (Keltner & Haidt, 1999). On the other hand, emotions can be viewed as essential and inseparable from human interaction, with its basis on our evolutionary psychobiological connectedness (Butler, 2011; Parkinson, 1996). Emotional responses have also been thought to be affected by the cultural and social context as well as the nature of the relationship they occur in (Butler, 2017; Mesquita & Boiger, 2014; Parkinson, 1996). Felt and perceived emotions in others can guide us in reaching our goals (Lazarus, 1991) as well as give us vital information about our social context (Keltner & Haidt, 1999).

Emotion as temporal interpersonal systems

Emotions have been theorized as being a part of a temporal interpersonal emotion system (TIES), vital for human interaction and coordination (Butler, 2011; Mesquita & Boiger, 2014). A central concept in the theory is temporality, which refers to how emotional interactions progress over time, and can be visualized as streams of emotions that link with and affect each other either at certain observable points or continuously (Butler, 2011). Emotion systems are not seen as static, but rather as dynamic, as its components are constantly changing and interacting across time (Butler, 2011).

Emotional responses occur within each participant in a given social context. The stream of these responses can be described as being chained, namely one person’s stream of emotional experience is linked with the other’s over time bidirectionally (Butler, 2011). As each person interacts with one another verbally and non-verbally over time, they continuously affect categories such as behaviours, emotions and experiences in each other. The content and nature of these interactional events can increase or decrease the nature, temporality and strength of each of these categories, both within and across them (Butler, 2011). Two concepts that describe the character of emotional interaction are morphogenic processes and morphostatic processes (Butler & Randall, 2013).

Morphogenic processes can be described as processes that change the emotional state, where the stream of emotions in interacting people keep shifting towards extreme states (Butler & Randall, 2013). This change of emotional state is achieved through positive feedback loops, where the emotional interaction escalates. Morphogenic processes in which emotional interaction escalate in this way can be referred to with the term co-dysregulation. Co-dysregulation is defined as “a process in which partners’ emotions are bi-directionally linked and mutually amplifying, away from emotional stability” (Reed, Barnard & Butler, 2015, p. 45).

Morphostatic processes indicate a stable pattern, where negative feedback loops tone down emotions (Butler, 2011; Butler & Randall, 2013). In the TIES model, the term co-regulation is used to refer to such processes in which chains of interactional events between
individuals decrease or strengthen the emotional response in one another in order to gain stability (Butler & Randall, 2013). Streams of emotional events between persons are suggested to be co-regulated when they are “bidirectionally linked and mutually dampening” towards emotional stability (Reed, Barnard & Butler, 2015, p. 45). Butler and Randall (2013) have proposed that the term co-regulation should be defined as one form of interpersonal emotion regulation.

Indications for the sort of dynamic interaction that is proposed by TIES have been found in studies of mother-infant relationships (e.g. Evans & Porter, 2009; Waters, West, & Mendes, 2014) as well as in romantic couples (e.g. Ben-Naim, Hirschberger, Ein-Dor, & Mikulincer, 2013; Helm, Sbarra, & Ferrer, 2012). As an example, the findings in Evans and Porters (2009) study of mother-infant co-regulation showed that over time, the co-regulated interaction patterns between mother and infant was developing toward a more synchronous interaction. In an experimental study of 127 romantic couples’ emotion regulation during conflict Ben-Naim et al. (2013) found that when one of the partners was asked to suppress their emotions negative affect increased in both partners. When one of the partners was asked to focus on positive parts of their relationship, negative affect decreased in both partners.

**Emotion as social information**

The emotion as social information model proposed by Van Kleef (EASI; 2009; 2010) develops the socio-functional approach and sees the function of emotions as containing social information, and proposes that emotions are especially helpful in determining the character of ambiguous social situations. The EASI model includes two different processes of interpersonal emotion regulation that can individually or simultaneously affect behaviour: inferential processes and affective reactions (Van Kleef, 2009; 2010).

According to the EASI model, inferential processes give information about the nature of the situation or relation to the observer (Van Kleef, 2010; Van Kleef, Heerdink & Homan, 2017). These processes can be spontaneous or strategic and can be described as drawing conclusions from the other person’s emotional expressions. In turn, these conclusions can affect our behaviour in different ways (Van Kleef, 2010). As an example, perceiving anger in another person may make us draw the conclusion that we have done something wrong, which in turn might make us change our behaviour to something less offending (Van Kleef, 2010).

The EASI model gives two examples of the effect of affective reactions in interaction. Firstly, the process of affective reactions within one person due to the emotional expressions of another can occur through emotional contagion, where the emotional state of one person affects the inner state of another. Emotional contagion is connected to physiological processes, such as mimicry, and it can be described as emotions spreading from one person to another (Van Kleef, 2010). In turn, perceiving emotional expressions in another person is linked to shifts in interpersonal liking. In other words, affective reactions that occur within us in relation to another person’s emotional expression can have an effect on how we view that person. Emotional expressions like joy usually lead to increased interpersonal liking, whereas the opposite applies to anger (Van Kleef, 2010). Emotional expressions can also have other effects, for example, emotional expressions of anger by an evaluator have been found to decrease creativity in test subjects during an idea generation task (Van Kleef, Anastasopoulou & Nijstad, 2010).

In order to distinguish interpersonal emotion regulation from other related processes, such as self-regulation and emotional contagion, four key characteristics have been proposed by Niven (2017). The first characteristic is that interpersonal emotion regulation is a kind of goal-directed regulation by a regulator to maintain or change a state. According to the second characteristic, regulation has an affective target; even though the motive and indeed the indirect
result may be to affect behaviour, the target of the regulation is the emotional state itself. The third characteristic describes regulation as intentional, controlled and conscious, distinct from the unconscious emotional contagion. The fourth and final characteristic is that interpersonal emotion regulation has a social target; one person regulate and another's emotional state is being regulated. This distinguishes it from self-regulation in which the target is the emotional state of the regulators themselves (Niven, 2017).

The influence of interpersonal emotion regulation can be seen as important in a competitive context. This is because of the many different and intense emotions athletes need to regulate to be able to peak their performance and outperform their opponents, as well as cooperate with other team members (Campo et al., 2017). For example, athletes that exaggerate confidence and calmness to make their opponents feel anxiety and uncertainty or a sport team that needs to keep their heads cool during the last minutes of a game to secure a win (Campo et al., 2017).

In their interview study of two ice hockey captains, Friesen, Devonport, Sellars and Lane (2013b) gave a narrative account of recalled instances of intentional interpersonal emotion regulation during matches by utilizing the socio-functional division on functionality of emotions proposed by Keltner and Haidt (1999). The researchers shed light on how the participants used their own emotions, cultural identity, previous experiences, observations of others and the current situation as a guide in determining when and how to try to regulate the emotions of others through for example the simple act of chatting about something other than the game (Friesen et al., 2013b).

The EASI model has been applied to sport psychological context in a study by Friesen, Devonport, Sellars and Lane (2015) where the authors interviewed 16 ice hockey players about their interpersonal emotion regulation strategies. Using the EASI model, the authors identified inferential processes and affective reactions that were used both verbally and behaviourally in important match situations. Inferential processes included for example deception, where a player might falsely tell another player that a scout is present during the game to enhance their performance. An example of the use of affective reactions included the use of humour in the changing room as an attempt to positively affect the emotions of the team as a whole.

A literature review by Friesen et al. (2013a) references studies that examined several aspects of interpersonal emotion regulation in competitive sports, focusing on affective reactions, inferential processes and factors that may moderate them. Friesen et al. (2013a) apply Van Kleeft’s EASI model on their findings, finding some indications supporting the intentionality of interpersonal emotion regulation in competitive sports and factors that may moderate the processes, however the authors fail to provide a systematic review and thorough examination of the quality of the studies included in the review.

A recent case study by Palmateer and Tamminen (2017) examined interpersonal emotion regulation in a college varsity team. Using a narrative method in their analysis of the material, they showed how the participants described several strategies related to emotion regulation and how they were intentionally used by the team members. The participants’ strategies could vary across different contexts and roles they found themselves in. For example, while interpersonal emotion regulation strategies were often used in one-on-one interactions, the participants who had a leadership role seemed to also attempt to influence the emotions of the team as a whole.

**Virtual competitive group activity as an emotional context**

Esports have been defined as “… an area of sport activities in which people develop and train mental or physical abilities in the use of information and communication technologies.” (Wagner, 2006, “Defining eSports,” para. 10). Hamari and Sjöblom (2017)
however argue that this definition is too broad and propose their own definition based on earlier criticism of Wagner’s definition. They define esports as “a form of sports where the primary aspects of the sport are facilitated by electronic systems; the input of players and teams as well as the output of the esports system are mediated by human-computer interfaces” (Hamari & Sjöblom, 2017, p. 213). Esports is about competitive video gaming, competitions in a virtual environment with many players belonging to sponsored teams. Professional tournaments are arranged and internationally there is an audience of millions of people watching esports online (Hamari & Sjöblom, 2017). For teams aiming to become professional, much money and prestige is at stake.

Survey studies have found that teamwork and communication work as major motivators for semi-professional as well as casual Counter-Strike players (Frosting-Henningson, 2009). In an interview study of temporary teams in the competitive collaborative game League of Legends, the players were found to make attempts (in in-game chat) to create harmonious game environment, as well as compliment players when they did well (Kou & Gui, 2014).

The context of virtual competitive group activity can be seen as distinct from traditional sports, but the past years esports have been increasingly accepted as a genuine sporting activity (Hamari & Sjöblom, 2017). The International Olympic Committee (IOC; 2016) announced recently that “competitive esports could be considered a sporting activity, and the players involved prepare and train with an intensity which may be comparable to athletes in traditional sports.” (IOC, 2016, “the development of ‘eSports’,” para. 3). In a qualitative study Witkowski (2012) explored Counter-Strike players’ physical practices in a competitive context. Fifteen semi-structured interviews with both team and individual players were conducted and the findings suggest that the players used many physically demanding actions while competing in high-performance games. According to the study composure, steadiness and breathing are examples of such actions that can influence game outcome (Witkowski, 2012).

In the context of this study the players compete in Counter-Strike: Global Offensive (CS:GO), a collaborative, competitive first-person shooting game released in 2012. In competitive situations, the teams play in the competitive mode. The winner of the match is best of three, so a match can consist of either 2 or 3 periods. The team that first wins 16 rounds wins the whole period. Each round has a time limit of 1 minute and 55 seconds, often ending before that due to one team winning. The competitive match is played between two teams that consist of 5 players each. Both teams play the part of terrorists or anti-terrorists during a period, switching roles after 16 rounds. The team playing the terrorist side can win by planting the bomb. The anti-terrorist team can win by disarming the bomb or because the time runs out. Both teams can win by eliminating the opposing team. A player who is eliminated loses all their equipment, which can be purchased again for varying amounts of in-match currency. Each individual player can earn this currency during the match making each player’s budget something that must be taken into account by the teams. Witkowski (2012) points out that there are several ways the players can interact during a game. For example, they may write in the chat, both to each other and the opposing team. It is also common to communicate through voice with the help of the game software or an external software installed on the players’ computers. The players also have access to certain non-verbal communication methods, though these are limited to basic movements.

In addition to utilizing the theoretical framework of TIES (Butler, 2011), we will apply existing theories on interpersonal emotion regulation developed and applied in organizational and sport psychology (e.g. Van Kleef, 2009) on observational naturalistic data. To our knowledge, neither of the two main models we aim to utilize in our study have been previously applied in an observational naturalistic study. Studies that utilize TIES model focus on mother-infant relationships and romantic partners (e.g. Evans & Porter, 2009), whereas EASI model is
has been applied on interview data in sports and organisational contexts (e.g. Friesen et al. 2015). The previous studies on interpersonal regulation seem to indicate that intentional emotion regulation does exist within sports, however, intentionality becomes a difficult matter to determine in an observational study. As such, our study should be considered explorative regarding both its methodology and its use of theory – but we hope to show that studying emotions in esports with naturalistic observational data is possible. We believe that the intensity of CS:GO matches, the necessity to communicate during the match and the interdependent nature of esports teams suggest ample possibilities for further research on the subject of emotion regulation. It seems likely to us that esports that require collaboration between players also include elements of interpersonal emotion regulation. The inner experience of emotion is something we do not aim to study within the scope of this study but rather our wish is to examine the observable emotional expressions of emotion regulation as they develop in the group’s interactions with one other. Our research question is as follows: What instances of cooperative emotional interaction can be discerned amongst players during a virtual competitive group activity?

**Method**

**Participants**

Based on a convenience sample the participants consisted of 5 volunteers who were all members of a single CS:GO team that trains and competes on a regular basis, and are on the edge of becoming professionals in the field. The participants were all men over 18 years old, aged between 18 and 24 years, with a mean of 20.8 years. They had trained and competed together for several months at the time of the study.

**Material**

The source material consists of video and audio recorded on the participants’ computers during a CS:GO match. Each participant recorded their in-game activity on their computer during the match. A sound file that included conversation during the match between the players was obtained from one of the players. We also had a recording of the participants' movements on the in-game map.

**Choice of method**

In our processing of the material at hand, we have primarily used the methodology outlined for specifically dealing with audio and video content (Heath, Hindmarsh & Luff, 2010). The methodology draws from ethnomethodological and conversation analytic traditions (EM; CA). Additionally, Evans’ (2017) use of ethnomethodological conversation analysis (EMCA) in his study of coaching has influenced our choices.

Traditionally in EM, it is assumed that participants in their interaction with each other work together to build their reality and that this interaction is worthy of closer examination (Hutchby & Wooffitt, 2008). It could be said that participants are knowledgeable in their own context, instead of being objects of study for someone who “knows better” (Hutchby & Wooffitt, 2008). EM has a pragmatic view on analysis of material at hand and argues that common sense guide both the researcher and the participant in their actions (Norrby, 2014).

The aim of CA is in examining talk as it unfolds between people which is also commonly referred to as talk-in-interaction (Norrby, 2014). Traditionally, conversation analytic method focuses on describing the content of the conversation as closely as possible -
including pauses, mispronunciation and even breathing sounds by using a complex system of symbols (Norrby, 2014). The analysis begins with “unmotivated looking”, a sort of preliminary review, where the researcher studies the material with no specific agenda in mind (Hutchby & Wooffitt, 2008). In CA, even the smallest detail can contain meaning and should not be overlooked (Jefferson, 2004). The transcription is not to be seen as the material or data itself, but rather as a tool and the source material (i.e. the recording) and the transcription should ideally be used together during the analytical process (Heath, Hindmarsh & Luff, 2010; Hutchby & Wooffitt, 2008).

EM has a reflexive view on context - meaning that action and context are inseparable (Evans, 2017). CA combines this conceptual heritage of a reflexive context from EM with its interest of talk-in-interaction (Evans, 2017). The focus of the method is in “[attempting to] capture and document the back-and-forth, or processual, character of interaction.” (Drew, 2013, p. 135), i.e. the method sees interaction as sequential, with its own logic in its context, and assumes that the participants follow this logic. The participants can be said to in this way do their own analysis on the ongoing conversation and base their own actions on their conclusions (Hutchby & Wooffitt, 2008). This analysis or logic of the speaker in the first turn is thus visible in talk of the speaker in the next turn (Hutchby & Wooffitt, 2008). A combination of EM and CA enables us to analyse video recorded social interaction that includes the interplay between verbal and non-verbal conduct such as talk and movements of the avatars in specific contexts (Evans, 2017: Heath, Hindmarsh & Luff, 2013).

**Applications of method.** Within a sports context, CA has been utilized in an observational study of communication between teammates during defensive play in football (LeCouteur & Feo, 2011). The study found that the participants frequently failed to adjust their communication regarding directions when the recipient of the instruction was oriented differently than themselves which in turn could lead to problems during the game (LeCouteur & Feo, 2011). Our study design most closely resembles that used by Evans (2017), who utilized EMCA to study the coaching process. Evans extracted sequences that included corrective instructions from the coach to a player, which he in turn transcribed using the CA method. In both aforementioned studies the authors first collected video and audio excerpts in order to examine talk-in-interaction.

In emotion research, the CA method has been preliminarily used in a doctorate thesis by Sandlund (2004). In her thesis, by analysing video-taped seminars, she sheds light to how academics use emotions in their interactions with each other. Sandlund argues that emotions, just like any other research subject, can be used as a point of departure for studies that use CA as a method. She emphasizes that the methodology is useful for studying emotions as interaction, something she believes other methods may overlook, and her focus is “how they [emotions] are made available for others to work with, regardless of the correspondence between an inner feeling state and outer expression” (Sandlund, 2004 p. 316).

The Finnish professor Couper-Kuhlen (2009) has suggested that CA can contribute to the study of affect and emotion if it proceeds from four assumptions. First, that emotions are publicly available in interaction and secondly, they become embodied practises. Thirdly, she suggests that these practises occur within interaction at “specific sequential positions” and finally emotions should be “interpreted in a context-sensitive fashion” (p. 96).

Based on the modern view of language as a distributed system, Jensen (2014) has proposed an ecological perspective on human language, where emotion and language are seen as inseparable from each other. Jønssen (2014, p. 5) argues that “Language, at the same time, is a cultural organization of processes and naturalistically grounded in human biology”. In this way, he merges the view that language is embodied with emotions’ dependence on the cultural context.
Procedure

Prior to data gathering and during the analytical process, authors took steps to educate themselves to become familiar with the CS:GO by for example studying competitive matches and playing the game themselves. Terminology and slang used in the game was also studied.

Data gathering. The authors met the team to inform them about the scope of the study and to see the place where the team trains and competes. The participants were asked about their upcoming games to find a game with some stake and difficulty level. A more important game was assumed to be more likely to elicit emotional expressions in the participants. On the game day, the authors were present while the participants played their match. The data that was recorded on the participants’ computers was extracted and stored on a separate medium.

The authors decided to use the second half of the match as a basis for our analysis. This choice may reduce the effect of the presence of the observers, as the participants’ may be more aware of the recording in the beginning of the game before their focus has fully shifted on to the game. The second part of the game was also found to be especially interesting, as the stakes were higher and losing meant losing the whole match.

After retrieval, the data was compressed, and combined into a single file that allowed for simultaneous viewing of all five perspectives, including sound from voice chat. For an image of the set-up, see figure 1.

Inductive phase. In the first phase of the process, the authors held an inductive approach to the data. To achieve this, the first step consisted of “unmotivated looking” as proposed by CA (Hutchby & Wooffitt, 2008). Interesting, or meaningful fragments of video were noted down separately by the two authors during this preliminary phase. The second step, as proposed by Heath, Hindmarsh and Luff (2010), was cataloguing video fragments and describing the basic aspects of the material. During this phase, an open-source software called Boris (Friard, Gamba & Fitzjohn, 2016) was used as an aid in the process. Interesting sequences in the video were marked in the software, extracted and viewed separately as well as in their context. These sequences were initially described broadly by the author that had chosen them and the descriptions were exported into a separate document. These two first steps were done separately by the two authors in order to get a breadth of interesting instances, and to prevent the authors from affecting each other’s decisions. After that a more substantive review was done by examining the material more thoroughly and giving more detailed description as proposed by Heath, Hindmarsh and Luff (2010). In order to achieve this, both authors repeatedly viewed the sequences together and discussed them thoroughly, broadening the description and including direct quotes in the working document. At this point in the process, the approach shifted towards a more deductive one and a more distinct element of analysis was introduced. Based on these descriptions, the authors started to focus more on the research question at hand - emotion expressions and co-regulation.

Deductive phase. After all of the chosen sequences had been described, a clear deductive approach to the material was adopted and the authors started to view the material with theoretical frameworks on emotion in mind. After initial training in transcribing and developing observations the authors started transcribing the verbal conduct in the fragments by using the transcription system developed by Jefferson (2004). The glossary of symbols we have used can be found in Appendix 1. The transcriptions enabled the authors to do a close and detailed inspection of the audio in the video fragments. Furthermore, a method for transcribing visible conduct was used as an additional tool for analysis (Heath, Hindmarsh & Luff, 2010). In these transcriptions, the participants’ avatars visible actions were mapped in relation to their talk. This technique is based on that interaction is seen as having a sequential character, where
an action gives rise to one or several further subsequent actions (Heath, Hindmarsh & Luff, 2010). These actions are viewed as responsive to the prior action. The transcribed talk and activities were drawn by hand in a horizontal fashion across the page, for an example of how such a transcript looks like see Appendix 2. Working with the assumption that the source data itself is the richest material there is, to which a transcription is not superior, transcription was limited to instances where it was vital for further understanding or needed in exemplifying a certain process (Hutchby & Wooffitt, 2008; Heath, Hindmarsh & Luff, 2010). With the help of the transcription and original video, the sequences were abstracted into their essential parts, deriving meaning from what was being said and done. The conclusions were based on combined sense-making of the authors and the participant’s actions in the context.

Translation of transcripts. During the final part of the analytical process, the transcripts were translated from Swedish into English. The English translations were added next to the original transcription texts. Examining different translation practices used by researchers, Nikander (2008) points out that what is included in the translation is essential. We see the meaning, rather than grammatical correctness as essential for understanding in this study, and so the translations resemble the original text more in their meaning than their grammatical structure. Presentation of the two texts side by side is aimed to give a non-Swedish reader some sense of the structure of the conversation.

Ethical considerations

The authors have used the ethical criteria outlined in Forskningsetiska principer, ethical guidelines authored by The Swedish Research Council (Vetenskapsrådet, 2012) as a guide in solving ethical dilemmas that arose during the project. These guidelines are based on the underlying requirement of protection for individuals in society which means that the society’s participants have the right to be protected and that they cannot be exposed to psychological or physical harm, insults or humiliation. The requirement of protection for individuals can be divided into four major requirements on research: Information, consent, confidentiality and usage.

Each participant was informed individually and as a group about the purpose and design of the study. Participants were informed that their participation is voluntary, that they may at any point during the study withdraw their consent to participate in the study and that their participation is anonymous. The participants have been anonymized by assigning each player a randomized number, where for example PL1 stands for Player 1. Names and nicknames have been removed from the transcriptions are marked simply as “(NamePL1)” and “((NicknamePL1))”. Only authorized individuals had access to the source material.

One of the dilemmas that were discussed during this study was how it could be possible to guarantee voluntary participation in the study. Because the participants belonged to the same team, we had to consider the possibility that they were giving us their consent because of group pressure. We tried to solve this by sitting one-on-one with the players to inform them that their participation was voluntary, and that they could withdraw their consent whenever they wanted without explanation. However, there may still be a chance that the participants are affected by group pressure and wouldn’t likely withdraw their consent anonymously.

Another dilemma that arose during our study was how we could guarantee the players that the gathered data would be anonymized to keep our promise of confidentiality. We discussed with the participants about the possibility that our analysis might reveal strategic information that may be beneficial to opponents. From the participants' perspective it didn’t seem to bother them because it is common practice to share videos of matches with other people
within the field. Still there is a possibility to reveal information that the participants couldn’t have thought of due to the close examination of the recorded material.

*Figure 1.* Combination of all screens. Timeline for the match.
Results

The match the team plays ends up consisting of two periods. The period in these sequences is the second one that ends up being their last. Before this period, the team has just played a period where, after winning several rounds and leading by about ten points, they lost round after round and in the end the whole period. If they win this one, they will play one more to determine the winner of the game. If they lose, they have lost the whole match, and their place in the tournament. The temporal placement of each sequence can be found in Figure 1.

Sequence 1: Round 8

It is the beginning of the round. The team has lost all 7 rounds of the period so far. For transcription, see figure 2.

There seems to be a bit of a depressed mood or climate in the team due to the previous seven lost rounds. PL3 repeatedly voices his concern if his teammates are enjoying the game. It seems like he tries to remind them that it is supposed to be fun playing by explicitly asking them if they are having fun (row 5-6). The negative responses could be interpreted as signalling a low mood. Even when he specifies and directs his question to PL4 (row 9) while at the same time running his avatar backwards while facing him, the answer is reluctant and negative and delivered after a pause (row 11). This can be interpreted as a discrepancy between the emotional expressions of PL3 and the rest of the team. PL1, seemingly annoyed or stressed, quickly tries to shift the attention to the upcoming round instead (row 12-13) but PL3 persistently asks the group again if there isn’t anyone having fun (row 14). PL1 responds affirmatively (row 16) but it is unclear whether he truly means it or if it was a way to end the situation.

Figure 2. Transcript of sequence 1.
Figure 3. Transcript of sequence 2.
Sequence 2: Round 11

Prior to the round, PL1 has instructed the players to execute a specific strategy. The round is over very quickly, as the opposing team eliminates the players in quick succession. For transcription, see figure 3.

In the last seconds of the round it seems like the team are confused about their positions which gives the opponents an advantage. Three players (PL2, PL4 and PL3) are eliminated rapidly one after the other and seconds after PL5 and finally PL1 are both eliminated. It seems like the mood is still down in the group due to several consecutive losses and losing yet another round. PL1 appears restrained while he seemingly tries to direct the teammates attention to their own actions in relation to the failure by asking them what is happening (row 16-17). PL5 initially seems to express guilt by reluctantly confessing it went wrong (row 18) whereby PL3 immediately also takes a part of the blame for the failure (row 23-24) appearing to try relieving PL5 of some guilt. PL5 suggest a change of strategy (row 28-31) and his reason for this is interpreted as trying to shift the fault away from the players themselves on to the strategy. This appears to elicit a growing discrepancy between the views of PL1 and PL5, and later also PL4 (row 33-60), regarding the character of the strategy that was used during the round. Again, PL1 appears restrained as he points out that the proposed strategy was the one they used (row 33). PL5 and PL4 disagree (row 34-41). This situation seems to be at danger of escalating the groups’ emotions, seemingly towards anger. However, the situation appears to be de-escalated by finding a compromise (row 57-63).

Sequence 3: Round 18

It is the beginning of the round. The players have won 3 consecutive rounds. For transcription, see figure 4.

The team is in a positive mood after winning 3 consecutive rounds. PL1 initiates the exchange with a strong and encouraging exclamation (row 2-3) which seems to elicit a chain of positive utterances between the teammates. PL2 and PL4 appears to reciprocally agree with and strengthen one another’s praise on their team’s ability while PL3 voices his agreement (row 5-11). The team seems to work in unison, regulating their emotions towards more positive feelings. Seemingly happy with the passage of events PL4 lets out a small laughter at the end of the exchange by both challenging and encouraging the team (row 11).
Sequence 4: Round 18

It’s the middle of the round and the players have recently run to their positions on the game field. For transcription, see figure 5.

The communication in the group is escalating in a fast pace. They are in the middle of the round and the opponents are closing in. The players' actions and utterances of their own and the opponents' positions are overlapping or latched on to one another’s. In the middle of this exchange PL5 warns the other of an opponent’s position in a fast, loud and high-pitched tone (row 8-9) which seems to escalate the pace of the communication even further. PL1 sees an opponent and starts shooting him while with emphasis informing the other teammates that the opponent has been hit (row 11-12), but his utterance is interrupted by PL5’s hypothesis of an opponent’s position (row 13-14). Directly afterwards, PL5 is confronted with two opponents from another direction, is eliminated, and at the same time urgently, fast and with emphasis warns the other teammates of the opponents’ position (row 15-16). One of the team members seems to comprehend how fast they are talking with each other and laughs at the situation (row 18).

Figure 5. Transcript of sequence 4.
Figure 6. Transcript of sequence 5.

Sequence 5: Round 20

The team has just finished a round where PL3 eliminated three opposing players in a fast pace and PL2 eliminates the last opponent whereby the team wins the round. For transcription, see figure 6.

The team are doing well, and the players’ expressions appear to signal a good mood and satisfaction with how the previous round transpired. After PL3 eliminates three opponents in a row and PL2 seconds after takes out the last opponent the majority of the team collectively praise the team (row 1-3). PL3 is especially credited for his effort by PL4 (row 2) and PL1 gives praise to the whole group (row 5-6) seemingly wanting everyone to know that they’re doing well. The team appears to collaborate, exchanging weapons and giving praise to each other. PL1 continues giving praise to the team and also seems to try encouraging their belief in their ability, his utterance is drowned when PL4 enthusiastically appears to hype up the teammates (row 15-17). PL1 and PL4 seem to take turns in encouraging, strengthening and agreeing with one another’s praise of the team (row 15-23). After a small pause PL4 continues his encouraging utterances with seemingly emphasis on that the team can turn the game around to their advantage (row 19, row 22-23). Almost all the players in the team participate in activities to instil hope in one another during this round.
Discussion

Our aim with this study was to discern instances of cooperative emotional interaction amongst players during a virtual competitive group activity. In five sequences, we have illustrated that the participants interact with each other emotionally in a reciprocal exchange. Previous studies have found that athletes in traditional sports use different strategies to regulate each other's emotions (Campo et al., 2017). Even though esports can be considered to be distinct from traditional sports, and the focus of the players is aimed at a computer screen instead of each other, cooperative emotional interaction seems to take place with a similar intensity that can be observed in traditional sports. The players can hear each other and use the behaviours of the avatars as a tool in their emotional interactions on the virtual playing field. We believe these aspects make emotional interaction possible and as we see it, can be utilized in effective and functional ways. This can be achieved both by using emotions to co-regulate towards emotional stability as well as by using emotions as information to guide the players in their actions and assumptions.

Previous studies utilizing the TIES-model show that emotions in interaction covary between partners through processes of coregulation and codysregulation (Reed et al. 2015; Butler & Randall, 2011). Even though the model has neither been applied on a group or a sports setting, the sequences we have examined show an interaction that fluctuates over time, as situations can be observed to accelerate and decelerate in a matter of seconds. We believe the participants’ interdependence is evident, as they share and ask for information to be able to coordinate and plan their actions. In these sequences, we have observed the players use emotional interaction as an aid in their communication. These emotional interactions can be viewed both as directional, something that happens between a regulator and a target, or bidirectional, as a sort of cooperative emotional interaction where each participant has their role in affecting the team reciprocally.

In a study by Palmateer and Tamminen (2017) players in a volleyball team often interacted in dyads, but the leaders of the group were more likely to address the whole team, and attempt to regulate it. For example, in sequence 2, a question by PL1 elicits a thorough discussion, where all of the players are involved. The leader’s emotional state may have an essential role in the team’s performance, as a previous study indicated that an angry instructor can inhibit a participants’ creativity (Van Kleef et al., 2010). PL1 seems to have an informal leadership role as his utterances are given weight by the other players, and he is allowed to set the tone and content of discussion in the sequences. Keltner and Haidt (1999) argue that regulation can have different consequences for research at different social levels. In the sequences shown, the players communicate both in dyads and in groups. The whole group hears everything that is said, but at times players direct their speech towards a specific person by addressing them by their name or nickname. Even if the social target may seem to be a verbally assigned specific person, any utterance is likely to affect the whole group in one way or another, thus we believe the primary level of analysis should be at a group-level, even if dyadic interaction is also taken into consideration.

Instances of co-regulation and co-dysregulation

At a micro-level, the interactional patterns between players seem to indicate changing emotional states as the players’ interactions sometimes escalate throughout the exchange. This process appears to resemble a process of co-dysregulation, as described by Reed, Barnard and Butler (2013). At the same time, we have discerned instances that we interpret as co-regulation, where the players seem to move towards a sort of baseline of emotionality together. These instances appear similar to the emotional events described by Reed, Barnard & Butler (2015)
as streams of emotions that affect one another bi-directionally in a dampening way. Our findings propose that studying emotional interaction in a group setting is possible, and that co-regulation may be something that occurs between members of a sports team in a way that resembles other close relationships.

Sequence 1 shows an emotional interaction and exchange that at first seems to be developing towards what seems like a process of co-dysregulation. The mood in the group appears to be down because of all the recent losses. PL3 repeatedly asks if anyone is having fun (sequence 1 row 5-6, 9, and 14) but he only receives reluctant and negative answers from the other players (sequence 1 row 8, row 11). We interpret this as a sign of discrepancy in the emotional states of the players. The negative answers appear to trigger PL3 even more in his search for a positive answer which in turn could be making the others even more reluctant. Across time the interpersonal emotional interaction can first be viewed as diverging between PL3 and the others towards emotional instability. When PL3 is persistent and asks one last time, PL1 responds affirmatively to the question, saying he is having fun (sequence 1 row 16). This is interpreted as a turning point, and a move towards co-regulation and thereby less emotional distress.

The emotional exchanges and events between the players in sequence 2 initially seem to develop away from emotional stability as proposed by the process of co-dysregulation (Reed et al., 2015). According to our interpretation, a disagreement occurs between PL1 and the players PL4 and PL5 regarding where to put the blame for their recent failure (sequence 2 rows 28-60). All of the players are rapidly eliminated, and it appears that the atmosphere between them is restrained and the mood is down. The disagreement begins when PL1 and PL2, apparently restrained, try to make the other players examine their own actions as a cause of the failure (sequence 2 rows 16 and 22). From this point on, there seems to be an escalation of the players’ emotional interaction towards anger and thereby away from their emotional baseline. Especially between PL1 and PL5 what seem to be emotions of anger appear to escalate when they cannot agree on which strategy they used during the previous round and PL5 is trying to, as we interpret it, shift the fault away from the players themselves on to the strategy. But the events take another direction when no one admits they were wrong (sequence 2 rows 57-63). After that their emotions seem to be de-escalated and move towards emotional stability as proposed by the process of co-regulation (Butler & Randall, 2013).

In sequence 3, our interpretation of the character of the interaction is that it is shifting towards a more stable emotional state in a co-regulated interaction. The team has just won three consecutive rounds and it appears like the emotions in the group are getting a more positive tone as the players take part in a chain of positive utterances. This communicative exchange is jumpstarted by PL1 with a strong encouragement directed towards the whole team. The team’s interactions and the positive emotional events during this exchange seem to be chained and continuously affecting one another as proposed in the TIES model (Butler, 2011). We see this as being especially visible in the interaction between PL2 and PL4 who are finishing each other’s sentences in a positive and encouraging way (sequence 3, rows 5-11).

An example of what is interpreted by us as emotional interaction that shows a co-dysregulated pattern can be observed in sequence 4. The opponents are closing in on the team, which appears to stress the players and affect their interaction. As one player warns the others about an opponent, another player says he is throwing a flash grenade, while a third player is saying he has shot an opponent. PL5’s rapid and high-pitched warning to the others regarding the opponents seems to be the beginning of an interaction where they all appear to be affected and contribute in escalating their emotional interaction and the pace of their utterances (sequence 4 row 9-16). The actions and utterances of the players are overlapping or adjoined directly starting after one another (sequence 4 row 3-4 and row 15-17, row 3-6). It appears like
the process they create together escalates their emotional interaction and creates more emotional distress. We see it as possible that an altered emotional state could also be beneficial when the players need to perform in such a fast pace.

Similar co-regulative processes as discerned in sequence 3 can be observed in sequence 5 where the players seem to participate and interact in a reciprocal exchange of praise and encouragement over time. For example, the teammates are exchanging weapons in a swift and collaborative matter and our interpretation is that they are more willing to work together and help each other in this co-regulative process. One player’s action or utterance of praise or encouragement is followed by another’s and can be observed especially between PL1 and PL4 (sequence 5 row 15-23). These utterances almost overlap as the players complete each other’s sentences in encouraging the team (sequence 1 row 16). This can be seen to turn the process towards co-regulation and thereby less emotional distress.

Instances of inferential processes and affective reactions

Whereas TIES is concerned with co(dys)regulation and the interconnectedness of individuals (Butler 2011), the EASI model focuses on the character of interactive actions that elicit change through two emotion regulation processes (Van Kleef, 2011). In these processes, the regulator regulates a social target, which can be either a group or an individual (Niven, 2017). The focus is not as much on the bidirectionality of regulation processes as the case is with the TIES model. Similar to findings by Friesen et al. (2015) in their study of ice hockey players’ interpersonal emotion strategies, we found instances of inferential and affective reaction processes within the virtual context. This indicates that interpersonal emotional regulation strategies should be considered with the same weight within the esports context as it is perceived within the traditional sports context.

Inferential processes refer to trying to regulate another person by informing the social target of the character of the situation (Van Kleef, 2010; Van Kleef et al., 2017). There are a few instances in the examined sequences where a speaker seems to attempt to affect the other players through this process, perhaps attempting to either change or sustain a certain behaviour or emotional state as proposed by the model (Van Kleef 2010; Van Kleef et al., 2017).

Taking upon themselves a part of the blame, as PL3 does in Sequence 2 (row 24), could relieve others of guilt, but could also implicitly include others in the guilt, activating an inferential process that may have some consequences. The direct consequence seen in the sequence seems to be a certain willingness to shift the blame on to the strategy instead, as expressed by PL5 and PL4 (sequence 2 row 28-31, row 34-41). During the entire sequence 3, the players build up momentum together. In a rapid succession they create a sort of a mantra, where the meaning is that they are capable, and that they may even be better than their opponents. The participants could get information about their capabilities in this competitive context through this exchange, using emotional interaction as information as proposed by the EASI model (Van Kleef, 2011).

A previous study on player interactions found that players intentionally complimented each other in the in-game chat in order to regulate emotions (Kou & Gui, 2014). This strategy is utilized by the players in the present study as well, albeit verbally. The players seem to express more positive appraisals as the game progresses, and they win more rounds. In sequence 5 (row 15), PL1 saying “Continue like this,” informs the other players that the speaker believes what they have achieved so far is positive, and that they should continue the same way. If this regulation attempt is successful, it could affect the group’s feelings towards more positive, and affect their behaviour in such way that they do, in fact, continue the same way. The success of this strategy seems to be context-dependant. In Sequence 1 (row 16) when PL1 finally says that he is having fun after no other player responds to PL3’s question - it may be
questionable whether the utterance has a positive effect on the group’s emotional state and behaviour. In this instance we observe that that the emotional expression of what is said seems hold more information than the actual meaning of the utterance.

Even though more difficult to discern due to our inability to access to the player’s inner emotion states, affective reactions, or their lack thereof may have consequences for the sequences we have examined. For example, what would have happened if PL3 would have used emphasis and displayed emotion in sequence 1 (row 5-6, row 9, and row 14) instead of delivering his line in a monotone voice? A more expressive tone may have had different consequences. In sequence 3 PL2 delivers his line in a loud tone (row 5) that gives the listener a sense of exhilaration, perhaps initiating affective reactions in the others. The subsequent turns (row 6-11) seem to build on this emotional character of interaction, which would support our hypothesis.

Conclusions

We have applied two distinct theories on emotional interaction in our analysis of the data. The theories overlap in some ways – they both have to do with change. The EASI model focuses on change from the perspective of the observer or recipient, and what effects emotion regulation may have on them (Van Kleef, 2010). The TIES model sees emotional interaction as a system, where there is no clear regulator or target, but the interacting individuals are co-regulating, affecting each other in a bidirectional fashion (Butler, 2011). The application of these two different views has some consequences on the results.

In our results, we have shown examples of emotional interactions that seem cooperative in their nature. Our interpretations of the data based on the TIES model show examples of how the participants co-regulate and co-dysregulate over time, and how the mood of the participants can shift throughout the match and seems to be reflected in the ways the participants interact. We believe that the interdependent nature of the team makes it probable that the ability to co-regulate effectively towards emotional stability should have positive consequences for their cooperation, whereas co-dysregulation towards emotional instability should have negative consequences. The players in this study has shown examples where their interaction escalates to dysregulation and what appears to be more frustration. These situations seem to be resolved within seconds or minutes, as the players co-regulate towards emotional stability.

Utilizing the EASI model, we have shown examples of how inferential processes and affective reactions are activated by the participants, and how the ways the participants regulate each other is flexible and variable across time and context. Even though we cannot make assumptions about the intentionality of the regulation practices shown in this study, we see that utilizing emotions in socio-functional ways can make communication more effective. Meaning can be conveyed and retrieved from emotional content of the interaction, as another tool in communication.

In conclusion, we believe varied emotional interaction between players exists within a virtual context in a way that is equivalent to traditional sports. Further, we propose that the processes of co(dys)regulation can be seen to affect individuals even when the perspective is widened to encompass group-level interactions and the focus is not on romantic or mother-child relationships. These findings have consequences for future research as well as training of esports athletes. We recommend training programmes aimed at future esports athletes to increase their emphasis relational aspects in their curriculum.
Limitations

Our aim has been to consider the effect of context on our analysis. This context can be seen in turns before and after an interesting instance, as well as the whole match situation. However, there is a part of the context we cannot have access to. Certain processes may stem from situations that have happened much earlier in time, perhaps an hour or even several months prior. As our participants are five different individuals, each with their own experiences, accounting for this deficiency becomes very complex. That is why our analysis is based inside the context we are observing and connected to other verbal or non-verbal behaviour within that context.

It is the combination of the methods EM and CA that enables the use of observational data and its analysis in the way we have done in this study. We argue that the actions of the participants are to be regarded intentional, and that our findings are supported by their context. For example, a situation is meaningful because it continues and does not dissolve. However, we admit that this study could have benefited from interviews with the participants, which would have provided us with a more nuanced and rich material to work with. Including the participants more closely during the analysis process has some potential pitfalls. As Sandlund (2004) points out, an after-the-fact interviews may mostly give information about the participants’ own ad-hoc explanations for the situation, more than about the situation as it happened and these two may be difficult to discern from each other. Additionally, these descriptions may be dramatized, or even biased towards negative emotions (Sandlund, 2004).

The possible effect of observer’s paradox can’t be disregarded in this study. It has been argued that it’s impossible to record audio and video of naturally occurring conversations because of the presence of recording equipment (Norrby, 2014). The participants may have been inhibited or emboldened in their regulatory attempts by the knowledge that someone will study the match closely afterwards, and that would mean that we have not had access to a true naturalistic context. Even though we have taken steps to combat this possibility by focusing our analysis on the last period of the match, the effect of observer’s paradox cannot be disregarded.

CA has been criticised of giving an almost caricature image of the participant (Jefferson, 2014), but this has been proposed to be due to the fact that spoken language can often seem unrefined to a reader used to the structure and logic of written language, while written language with its grammatical rules, structure and correct spellings cannot capture the true nature of talk-in-interaction (Jefferson, 2014).

Further research

We propose that future research considers the possibilities of studying emotional interactions within e-sport as being compatible with how previous studies have been conducted on traditional sports. Some observational studies on emotion regulation use behavioural coding schemas in their process (e.g. Allan, Turnnidge, Vierimaa, Davis, & Côté, 2016). This method could be utilized in studies on emotion regulation within virtual contexts as well, but the first step may be to do a thorough examination of what processes of interpersonal emotion regulation are possible in a virtual context. It seems likely that most intentional regulation strategies are verbal, but there may also exist non-verbal ways that players can express emotions within the virtual space. For acquiring in-depth knowledge on this, we see the players themselves as the foremost experts. Qualitative research that combines observational methods like that used in this study with interviews could be fruitful. A method of playing back sequences of the match during the interview combined with a narrative analytical method, like
used by some of the papers cited in this study (e.g. Palmateer & Tamminen, 2017) could be one useful way to get the player’s own perspective on regulation practices.

There are several possible avenues to take when studying emotional interaction within the esports context. One possible route would be to study possible convergence or divergence of emotional states amongst players during a match by utilizing methodologies used within TIES research, such as an emotion wheel (e.g. Reed et al., 2015) or a diary (e.g. Butner, Diamond & Hicks, 2007). In addition, the use of psychobiological data, such as heart rate and fNIRS imaging, is becoming more popular within the field and we see these methods as especially useful when studying the context of esports. For recommendations of methods, see Gates & Liu (2016) and Butler (2011).
Reference list


Appendix 1. Transcription conventions used in the present study

[ ] Overlapping or simultaneous talk.

= One utterance latching on to the other with no break between them. Two speakers’ utterances are linked without an overlap or interval between them.

(0.8) Pauses in tenths of seconds

(.) Micropause, less than (0.3) seconds

- Utterance abruptly cut off

Word Underscoring indicates stressed amplitude. The longer the underscoring of the the more emphasis it is expressed with.

::: Colons indicate prolongation of the prior sound, the more colons the longer the prolongation.

WORD Upper case letters indicates especially loud talk or sounds compared to the surrounding environment.

°°word°° Degree signs indicate that the utterance or part of it is especially low, lower than the surrounding talk or sounds.

<word Pre-positioned left carat indicates that the utterance or word is jumpstarted, a hurried beginning.

>word< Right/left carats surrounding an utterance indicates that the surrounded utterance is said especially fast compared to the surrounding talk.

<word> Left/right carats surrounding an utterance indicate that the surrounded talk is said especially slow compared to the surrounding talk.

hhhh A row of ‘h’s indicates an outbreath. ‘h’s in words indicates breathing sounds in it.

↑ Upper arrow indicates that the pitch sharply rises.

(word) Parenthesized words indicates uncertainty on the transcribers part of what has been said.

(( ))) Double parentheses surround the transcribers comments.

Adapted from Jefferson (2004).
Appendix 2. An example of a transcription of verbal and non-verbal conduct.

1. NU KÖR VI GRABbar vår tid är nu let's go (0.8)

2. KAn dom kan VI:=

3. =[Ja-]

4. [och] mycket mer (0.8)

5. Springer mot B efter spelare 2, fortsätter genom Z:CON

Springer mot B efter spelare 2 och 4, fortsätter efter 4 genom Z:CON
de ee::: sant (0.4)

Springer mot B, fortsätter längst LOWER B

Springer mot A via CT-STAIRS

>hehehe< (1.0) det e fan dags asså

Springer mot A efter spelare 3 via CT-STAIRS