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## **Introduction**

The aim of this brief article is initially an attempt to shed a light on how we communicate face-to-face, and further discuss how this differs from when we communicate in a video-assisted e-meeting. The primary focus of this paper concerns the need and ability to attain mutual eye contact during a dyadic e-meeting. Most web camera setups on laptop computers and recommended placement for separate webcams on external screens position it just above the screen. We postulate that this placement makes mutual eye contact flawed – you either look at the image of the other participant, or into the camera. If one looks into the camera, the other person gets the impression of eye contact, when there is none. And when one looks at the image of the other, the other person sees the first one looking slightly below the eyes.

The role of eye contact in interpersonal communication has been explored by scholars for several decades (see for example Argyle & Dean, 1965; Kleinke, 1986; Senju & Johnson, 2009), and it has been a subject research relating to ICT (Information & Communication Technologies) as well as within the CSCW (Computer Supported Cooperative Work) field. Chen (2002) discusses eye contact in videoconferencing, and Grayson & Monk (2003) experiments with the camera position.

Lately though, the issue of mutual eye contact in dyadic e-meetings has seen less attention, even though cameras have become smaller and with higher resolution, allowing for better controlled experiments with altering the position of the camera lens. This development of hardware has spurred our interest in re-examine the position of the camera and the effect this has on dyadic communication.

## **Background**

This article is part of a larger joint research project between educational institutes in the city of Aalborg in Denmark, and University West, located in Trollhattan in Sweden. The

project is partly aiming at creating a "digital bridge" between the two nordic countries of Sweden and Denmark. This bridge concerns the educational market, where we work towards a goal of allowing students to partake in higher education courses across the two countries. This presents itself as an interesting case to test different camera positions, since it involves language barriers.

Language barriers can be classified into 6 groups (Lunden, 2002), where the situation between Denmark and Sweden can be characterised as "The languages are officially different but are reciprocally understandable". This case can then be seen as a critical case, where dyadic communication with language barriers heightens the importance of eye contact between participants. In reality, while Danes and Swedes understand each other with little effort (Kiprianoff, 2005), the communication can not be seen as effortless.

The next section will provide a brief introduction to the social aspect of communication in general, and eye contact in particular.

## **Theory**

The richness of human communication is complicated and complex, so we will only be able to offer a glimpse. This presentation will outline some of the characteristics in the wide framework of interpersonal communication and look upon communication in everyday life.

The field of communication is consisting a huge range of theories from different disciplines and must always be understood in the specific context of interaction. This discussion is most generally and has its roots in communication theory and from social psychology and cognitive science. After providing with a glimpse in the complexity involved in interpersonal communication within a shared physical context, we subsequently will highlight important studies in the field of teaching online, and finally we will discuss the challenge involved in mediated communication.

A world without structure is a world without meaning Nilsson & Waldemarson (2017) stresses. We need meaningfulness or predictability to feel safe and secure. Therefore, we have mental structures named schema for almost everything we do and meet in social life. We know what is normal behavior in a library, how to go by bus etc. When a

schema is activated and the information we perceive is meaningful, social interaction is less complicated. But when the information occurs to be different to your expectations it can lead to uncertainty, confusion, discomfort, prejudice or maybe a conflict will occur.

Hartley (1993) discuss the meaning and significance of the social context consisting an environment and a social structure. The social structure is defined by a) social norms (the shared ideas of what is the 'normal' way to behave in a specific situation. And a wide range of b) social rules for what has become a regulation or common sense in a specific place (Hartley compare social rules with a football game). And finally, the structure consists of c) social relationships that reflect how we interact in different ways with different people.

The environment is the setting or background and can be regarded as both physically and socially. A) Physically element is interiors and exteriors, the shape and size of a room, the temperature, lighting etc. b) The social environment is how you perceive a specific place in terms of being cozy, controlling, supporting and so on.

Jensen (2015) defines distinctions in the term context as physically, social, cultural relational, and educational. Nilsson and Waldermarson add a psychological context which is about feelings such as discomfort, stress, suspicion and prejudices.

Hartley (1993), a Senior Academic in Communication Studies, compares communication with dancing. You need to coordinate your movements and you need to have a mutual understanding of where you are going. Communication and dance involves rules and skills, but in both activities, you can inject your own style and personality. But you will never succeed being a skilled dancer or socially talented in conversations if you don't listen. When dancing you need to listen to the music in order to find the right beat and in conversation you need to listen to the person you are talking to. You need to show interest and to stay on track to a specific topic and according to achieve a mutual understanding listening is an important skill. If you fail to be attentive you will probably in the first scenario look funny and you even might step your dance partner on the feet, and in the next it be will bad manner and often it causes disrespect and misunderstanding.

Listening is often claimed to be one of the most important skills of interpersonal communication. Mark Twain once quoted that if we were meant to talk more than listen, we would have two mouths and one ear. We can make a distinction between the ability

to hear as a physically process and to listen as a mental activity searching for meaningfulness and understanding (Nilsson and Waldemarson 2016).

Listening is like speaking an active process demanding both attention, energy and interest. On an everyday basis you listen 45-50 percent during the time we are awake. 20-30 percent you talk, 13-16 percent you read and 9-12 you write. (Jensen 2015). You do of course need to pay attention when you listen, but it is never enough to hear what is being said, you must even understand and response (sometimes verbal in the matter of turn taking, but often you show interest with nonverbal signals as a response to express that you are awake and listening).

Sometimes you don't listen yourself and sometimes you suspect people don't listen to you. Hartley (1993) outnumbers tree frustrating styles of listening that are quite common in social life's. First you have the pretended listener who gives you some appropriate non-verbal signals when you speak; but their minds are elsewhere you soon will perceive. The second one is named the limited listener. You get their attention only on specific topics and they may rudely distort or interpret on others. The last one is the self-centered listeners who simply look for agreement, and don't have a slightly interest in others point of views than their own.

Being active and emphatic is the most respectful way to listen. To be empathic is an interpersonal phenomenon consisting two different parts. Cognitive empathy is an objective understanding of what is being said, and affective empathy is understanding the person's feelings (Pryor et al. 2013). (See Nilsson and Waldemarson 2016 for six further listener styles)

## **Eye contact**

When communicating, eye contact has been seen as a vital mechanism. One important use is in getting feedback of the reactions from the person you are talking to (Argyle & Dean, 1965). While eye contact is intermittent in a communication, lasting 2-10 seconds and mostly occurring when a person in a communication is talking, a lack of eye contact can make people feel unengaged in the communication (ibid.). The other way around, too much eye contact can make people feel anxious.

In online settings, lack of eye contact is seen as a major contributor to a toxic online communication (Lapidot-Lefler & Barak, 2012), pointing towards the importance of it as a tool in social, interpersonal behavior.

In a traditional video conferencing setting, eye contact can be seen as asymmetric due to the position of cameras in laptops and the common placement of external cameras on top of monitors. The asymmetry means that it is impossible for participants in a dyadic communication to look into each others' eyes at the same time. When you are speaking, you are either looking into the camera, or at the image of the person you are talking to. You cannot do both. If you are looking at the camera, the other person, if they are looking at the image of you, they perceive that you are looking at them, when in fact you are not. And in revers, if you are looking at the image of the other person on the screen, they do not perceive that you are looking at them, rather you are looking blow their head.

## **Method**

In our experiment, we want to experiment by allowing the web camera to be positioned in close proximity to the image of the person you are talking to, i.e. directly on the screen. Since web cameras has shrunk in size due to technological advances, we are able to position the cameras on the screen without too much effort, by adding a suction cup to the base of the camera. Needless to say, this arrangement eats up some screen real estate.

In order to examine if the position of the camera affects the performance of an e-meeting, an experiment was set up for dyadic video conferencing between a Swede and a Dane. A small web camera was modified with a suction cup on the back, made for assembly directly on the computer screen. The experiment was conducted twice, with two different sets of people. In total 4 people was involved in the brief pilot experiment.

The test subjects was given a paper where two assignments was detailed. In the first part, the persons were instructed to get to know each other by asking a questions in their native language. The questions related to where the other person lived, their age and their occupation. The answer to the assignments was to be written down. The second part was a practical part. One of the participants was given images of a pre-built

lego construction consisting of 15 lego bricks. The other participant was given the lego bricks. By describing the construction, the participant with the bricks was tasked to build the set exactly as the image depicts.

The tests were recorded in two different ways. A pair of cameras recorded the test person from two different angles, one from the front and another from the side. The web camera built into the computer recorded a close-up shot of the head of the person and the screen further recording the whole session.

After each test, the participant was interviewed with the aim of understanding the persons' experience of the test session. We thus get both a video of actual events as well as how the test person experienced the test.

## Analysis and discussion

The videos from the sessions was imported into a video editing software and merged into a single, synchronized video (see figure 1). During the analysis, the researchers focused on moments where mutual eye contact was achieved.

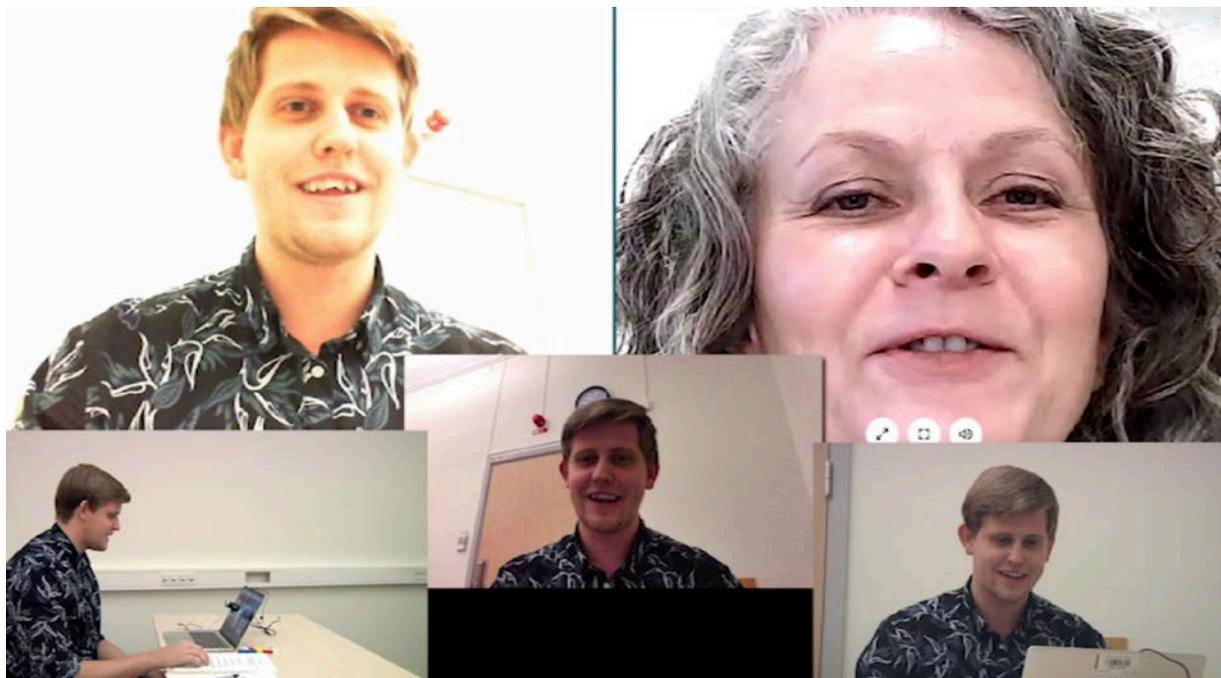


Figure 1

The following is a brief account of the activities regarding eye contact in the analysed videos. It should not be seen as a complete analysis.

As postulated by previous research, the person talking was most likely to look at the other person looking for eye contact. Eye contact increased in critical moments, especially in the Lego building task when the participant building was not sure the model built was correct. Here, mutual nodding of the head complementing spoken affirmative words were used by both participants. As the camera was in close proximity of the image of the other participant, the participants did not need to adjust their gaze in order to gain mutual eye contact, thus making the communication and effort of attaining eye contact much less cumbersome and unintrusive. This further leads to a more exact understanding between the participants when mutual eye contact occurs, thus the participants knew when the other was looking at their image, and when they were not.

While this is a limited pilot study into mutual eye contact in online video conferencing, we believe we have gained preliminary support of the presupposition that mutual eye contact is important in video conferencing, and that it can be achieved by modifying the position of the camera to be more in proximity of the image of the other participant in a dyadic communication. But to strengthen the results, we call for the need to further explore the issue in a larger study with more participants.

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