The role of language sharedness and visibility on communicative success in computer-mediated communication

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1. Abstract

In our modern day and age, we gain more and more methods and tools to communicate with one other. Face-to-face dialogue is no longer our sole communication channel. With the arrival of the recent COVID-19 pandemic, the physical distance with our conversation partners rises. Therefore, understanding of the effects of visibility and language on communication becomes more important. In order to gain insight on the degree in which visibility and language sharedness affect communicative success, this study performed an experiment with 34 Dutch and German participants in a communication-oriented 'find the differences'-task. They were distributed across four different conditions (shared first language with visibility, different first language with visibility, shared first language without visibility, different first language without visibility). The pairs were tasked to identify differences in a diapix. Visibility only affected likeability for pairs with a shared language. Participants that shared a first language liked their partner more when he/she was not visible. Visibility and language sharedness did not affect perceived communicative success. Some positive correlation was found between likeability, solidarity and communicative success rating, amplifying evidence from previous research.

Keywords: Visibility, solidarity, likeability, communicative success, lingua franca, online communication, (perceived) English proficiency

2. Introduction

In our modern day and age, rapid development of technology has opened many roads towards new communicative systems and approaches that we, as mankind, can use to our benefit (Bolter & Grusin, 1999). One such example is through online communicative channels. Communicating with friends, family, colleagues, acquaintances, and strangers has never been so easy as it is today (Subrahmanyam & Greenfield, 2008). Two of the primary ways in which online communication takes place is either through social media, or through online (video) calls (Shklovski et al., 2006). Where social media often resembles a form of asynchronous communication, online calls represent a more synchronous form of communication (Stefanone et al., 2011), and can be considered a more direct replacement of 'daily' face-to-face communication (Baker & White, 2010).

With the outbreak of the COVID-19 pandemic, and nationwide lockdown measures being implemented in order to prevent excessive spread, face-to-face communication became less common as people were forced to spend more time from home without physical presence of acquaintances outside of their household, online communication has become the primary method of maintaining contact with other people (Paradisi et al., 2021). Especially video-mediated online communication platforms have started to replace natural face-to-face communication (Paradisi et al., 2021; Drag, 2020). Most notably, these platforms were now used for meetings in various contexts, both in formal and informal settings (Chan et al., 2020). One of the major platforms to benefit from the societal situation was 'Zoom', which saw an increase of 2900 percent in users during the COVID-19 pandemic (Zoom, 2021).

While this usage of 'mediatized communication' (Drag, 2020) offers us new ways of communication which are less limited by time and space, it does affect the way in which we communicate with those on the other side of the connection (Hall, 1990). Previous research has shown that the perceived distance towards another is higher when communicating online (Morrisson et al., 2010; de Groot et al., 2017; Dunbar & Schultz, 2007), which in turn affects the way we communicate with and understand one another (Drag, 2020; Anderson & Zawacki-Richter, 2014). Such effects might hamper successful communication and cause communicative problems, especially as many of the new users during the pandemic are not familiar with direct online communication (Serhan, 2020).

Theoretical framework

Successful communication

With that effect knowingly present, it is crucial to understand the definitive core of successful communication. When defining the communicative process, we often portray two parties (a sender and a receiver) who converse a message via a particular channel (Frank, 1970; Cobley, 2008; Rocci & de Saussure, 2016). This message is encoded by the sender and subsequently decoded by the receiver, after which the feedback process takes place and the conversational roles are often swapped (Chandler, 2010; Burgoon et al., 2010; Barnlund, 2008). This conversational process takes place with a particular goal in mind of the participants, though it can take place either intentional or pre-intentional (McLean & Snyder-McLean, 1987). Communication as a concept has been defined and explained by a variety of studies, often sharing a common core with slight deviations and differences from another. Inyang and Esu (2003) define communication as a meaningful transition of the sender to the receiver. Nwokeneme (2008) also defines communication as a process where a message is transmitted to a receiver via a particular channel. Along with Dessler (2004), Adams (2006) and Smith (2008), these definitions align with our portrayal of the communicative process mentioned earlier. In its simplest form, successful communication would therefore mean that this communicative process took place without any interference, where the sender has encoded, and the receiver decoded, the message completely as intended by the other party.

Many studies have already tried different approaches of measuring successful and effective communication (Cooper, 1973; Roberts & O'Reilly, 1974; Blum et al., 2005, Muszyńska, 2018). As mentioned earlier, the more a receiver understands and is able to decode a message in its intended form, the more likely the contents of the message are received properly and, thus, the more successful the communication took place. One method to look at communication effectiveness is quantification of its process or, more notably, its results. This is, for instance, done by studies from Hollingshead et al. (1993) and Jackson et al. (2011), where a task is used to determine a communicative success rating. From a standpoint where the outcome determines the effectiveness of the communicative process, this would make sense. In a different context, a study by McLerney and Walden (2013) used a diapix task to determine communicative success by having participants work and communicate together to find as many differences as possible. This quantification allowed them to place ordinal scales on communicative success.

Likeability and solidarity

So there are ways to define and measure communicative success, in addition we also need to look at the supporting factors. Pickering and Garrod (2006) established that social interactive alignment is the basis of successful communication in dialogue. They argue that the more similar participants of dialogue are, and the more willing and likely they are, it becomes much easier to establish successful communication where encoding, sending and decoding particular messages take place without much error. This idea is consistent with the 'Communication Accommodation Theory' (Giles, 2008). This theory explains one's tendency to either conscious- or unconsciously adjust and adapt one's communicative style and interaction towards the other participant(s) of dialogue with the intent to improve the outcome of the conversation and increase one's perceived likeability and solidarity of others. Our opinions of others, along with our evaluations, therefore seem to play a large role in our approach and success in communicating. A study by Nikoleizig, Schmukle, Griebenow and Krause (2021) found that likeability was a significant contributor to task performance evaluation and perceived communicative success. Participants who seemed to like each other more performed better at a problem-solving task, and also evaluated the communication as more efficient and effective. Another study done by Giraldo and Passino (2016) also finds that shared likeability between participants improves effective communication, along with task performance. This study also stresses the importance of solidarity in communication amongst people. A higher degree of perceived solidarity improves one's opinion of their communication partner, which also leads to more efficient communication and better task performance (Giraldo & Passino, 2016). Further studies on perceived solidarity between people and task performance also showed significant better performance and perceived communication for pairs and groups where perceived solidarity was deemed to be higher compared to pairs and groups where perceived solidarity was rated to be lower (MacDonald, Kelly & Christen, 2014; Kelly & MacDonald, 2016; Kelly, Graham, MacDonald & Goke, 2018).

While it sounds easily achievable in theory, successful communication can often be hard to achieve, both in face-to-face scenarios as well as in online settings (Andersson, 2015). Any form of noise in any of the elements of communication affects clarity and interferes with the meaning of the message. Eisenberg (2010) defines four types of communication barriers that explain the causes of unsuccessful communication: Process barriers, psychosocial,

physical barriers, and semantic barriers. Process barriers designate the core cause to a problem in one or more parts of the communicative process (sender, encoding, medium, e.g.). One of these elements would either be incomplete or missing. Psychosocial barriers refer to the psychological elements that play a role in communication. They describe the limiting role of affection towards the other person, as well as the influence of hierarchy and status. Physical barriers explain the limitations caused by circumambient circumstances, often heavily influenced by the choice of media used in the process (Lunenburg, 2010). As described earlier, the lack of physical presence in an online environment is often a cause for ineffective communication. Lastly, Eisenberg (2010) defines semantic barriers, which describe the barriers caused by both semantic problems, as well as linguistic problems. On a small scale, semantic barriers are often different interpretations of particular words or sentences. On a larger scale, these barriers are attributed to different languages or cultures, where the different backgrounds cause unequal proficiency of the language spoken in a particular context (Lunenburg, 2010). These last two barriers are increasingly problematic, given the societal developments in recent years (Keyton, 2010).

Physical barriers and visibility

As mentioned earlier, the global COVID-19 pandemic has led to a majority of the working population to move from their office to working at home. Maintaining contact with colleagues and managers now took place in an online setting, most notably via Zoom meetings (Bick, 2021). This already brings in the role of physical barriers in communication, as technicalities start to play a role in the way these online meetings take place. Technical issues on one side or both sides can already severely affect the quality of the meetings, and therefore the outcome. The existence of these physical barriers can already potentially lead to the creation of more process barriers, where parts of a meeting are, for instance, inaudible or interpreted wrongly due to audio or (possible) video issues. While certain benefits can be attributed to working from home and meeting via Zoom, notably (next to) no commuting and easy access, there are also some drawbacks (Bloom, 2021). There have been major concerns about the mental health consequences of working online full-time (Chawla, 2020; Feijt, 2020). It has had such an impact that, throughout the pandemic, the term ‘Zoom fatigue’ arose both in mass media, as well as scientific research (Fauville, 2021). It describes the effect of both physical and mental health decline, attributed to the mass use of Zoom in our working environments (Fauville, 2021). Over time, the effects of this fatigue lead to cooperative and

communicative problems among colleagues (Fauville, 2021). This fatigue is described to be caused by close distance eye gaze, reduced mobility, and, most importantly, cognitive load (Bailenson, 2021). The cognitive load describes the effect of nonverbal cues in the online setting, compared to face-to-face settings. Bailenson (2021) argues that nonverbal cues that would have a meaning in face-to-face contexts, lose their meaning in an online setting. The attributes contribute to the already present strong physical barriers that online meetings contain. As this fatigue affects both concentration and mood, it can also be described as a contributor to worsening process and psychosocial barriers. Lowered concentration and grumpier moods can lead to a loss of logic and reason, and therefore affect successful communication (Eisenberg, 2010).

Based on this information, Bailenson (2021) suggests that, in order to limit development of 'Zoom fatigue', and improve communicative effectiveness, experimentation is required with 'audio only' meetings where webcams are disabled, therefore completely disabling any form of nonverbal communication and visibility. This suggestion is interesting as it contradicts with findings by previous studies that argue that the presence of visual cues overall improve rated communicative success, along with performance and affection, compared to contexts where no visual cues are present (Boyle, Anderson & Newlands, 1994; Oviedo & Fox Tree, 2021; Lapidot-Lefner & Barak, 2012; Adams & Kleck, 2005). Boyle et al. (1994) studied the effects of visibility using a map task. In this study, participants were tasked to communicate a route on a sheet of paper to their partner, who was tasked to draw the route. Pairs that were able to see each other produced shorter and more effective dialogue when they were able to see each other compared to the pairs that solely had to rely on audio cues. A more recent, task-oriented study by Brennan and Enns (2015), where pairs were tasked to identify certain predetermined objects in an image together, also found that conditions where participants were not able to see each other scored averagely lower in terms of communicative effectiveness. On these elements, all studies reported better results when visual cues were present, compared to when visual cues were absent. The rise of Zoom as a primary communication media, however, might have changed this perspective. Face-to-face communication has become less prevalent, and extensive exposure to, and usage of online communication channels have changed the way in which we approach the communicative process as a result (Beighton, 2021).

Language Sharedness and proficiency

It is not just the role of visibility, time, and space, however, that affect our communicative success. One major element of verbal communication, which is represented in all parts of the communicative process, is language. Language is a communicative structure based on speech, gesture, and writing, and it is used continuously in our daily lives. Every human being grows up with a language, often acquired from their parents, and develops its proficiency via educational systems, practice, and exposure (Kramsch, 1998). This acquisition process leads to large groups of people with a common, shared language. Language sharedness among communicators is a great contribution to communicative success (Thomas & McDonagh, 2013). The lack of need to translate and re-interpret literal and underlying meanings avoids major roadblocks of the communicative process, while simultaneously providing communicators with a sense of familiarity (Hartsuiker & Bernolet, 2017). As a result of this, second language learning has become an important process to acquire more communicative tools to work with (Chang, 2012). Having the means to speak another language results in a wider reach of targets to communicate with.

One primary example of this is the growing influence and use of English. As a result of globalization, English has become the go-to language for international relations (Crystal, 2003). It has become such an influential language that non-native speakers of English outnumber native speakers by a ratio of 1 to 3 (Crystal, 2003). An example of the importance of being able to speak English as a second language are the Dutch primary schools, where children start getting taught English from the age of 5 to 6 years old (Nuffic, 2019). This leads to the scenario where most of us grow up learning two languages, a first and secondary language, commonly defined as L1 and L2 languages (Backus, Gorter, Knapp, Schjerve-Rindler, Swanenberg, ten Thije, Vetter, 2013).

At the end of the day, however, L2 proficiency is likely to lack behind compared to L1 proficiency (Archibald, 2000). This creates various degrees of proficiency differences between speakers of the same first language, but even bigger differences between speakers of a different first language (Slabakova, 2016). Even if at its core people speak the same language, different levels of proficiency might still cause communicative barriers, nullifying advantages gained by a shared L2 (Backus et al., 2013). As we travel around the world and are forced to use our developed L2 as our primary communicative language, we get exposed to these varying degrees of proficiency. We interact with different native and non-native speakers of English, connecting us with different linguistic backgrounds, but also with different proficiency levels. These differences cause speakers often to adjust their speech based on the estimated proficiency of the recipient (Pickering, 2008). Pickering (2008)

discusses the use of 'foreigner talk' by L1 speakers when interacting with non-native speakers, where the L1 speaker simplifies its speech to improve alignment with the other speaker. In their study, Pickering (2008) found that L1 sharedness did in fact affect interlocutor alignment. Communication between a native and non-native speaker of English was often less successful than communication between two non-native speakers. Pickering (2008) argue that is this caused by L1 similarity of non-native speakers, but likely also a more equal speech rate. The effect of first language sharedness of non-native speakers, however, is not studied. Pickering (2008) argue that the degree of difference of L1s of non-native speakers could affect interactive alignment and communicative success. Despite a degree of sharedness, two Italian speakers of English can yield different communicative results compared to an Italian and Spanish speaker of English. A study by Watanbe and Swain (2007) also noted the effect of different L2 proficiency levels in collaborative dialogue, where communicative success differed significantly in pairs with a shared L1 compared to a different L1 background. This study was performed with speakers of Japanese and speakers of English. Since different regions have varying levels of English proficiency, it is hard to predict whether these results also apply to other regions where general English proficiency differs (Watanbe & Swain, 2007). This is why other studies might not yield the same results, therefore making the findings of this study hard to generalize.

We have established that language affects communicative success, as does visibility. The degree in which they affect communicative success, however, seems to be disputed. For visibility for instance, some studies argue that, when people are able to see each other, overall communicative success is rated to be better (Boyle et al., 1994; Brennan & Enns, 2015), whereas other studies argue the opposite idea (Bailenson, 2021). Furthermore, what we do not yet know is whether these two factors work together, or perhaps cancel each other out.

This study aims to find out whether visibility and sharedness of the first language affect communicative success. In order to study the effects of language sharedness and visibility, the following research question is formulated:

RQ 1: To what extent do first language sharedness and visibility affect communicative success with regards to task performance?

RQ 2: To what extent do first language sharedness and visibility affect communicative success with regards to speaker evaluations?

RQ3: To what extent to language sharedness and visibility affect each other when it comes to communicative success with regards to speaker evaluations and task performance?

3. Methodology

2.1. Design

The design of this experiment utilized a 2x2 (Visible & Non-visible; Shared first language & Non-shared first language) between-subjects design. Each respondent was allocated a partner to form a pair. The first independent variable, visibility, consisted of two conditions. In the first condition, participants were able to see each other through their webcam during the call, whereas in the second condition they were not able to see each other. The second independent variable, language sharedness, described whether the participants had a shared first language with their partner, or whether their first language was different. The first condition (shared language) included both Dutch and Dutch, as well as German and German pairs. The second condition included pairs where one participant had a Dutch first language, and one participant had a German first language.

2.2. Materials

Participants attended a Zoom-meeting online and were therefore required to have access to either a computer, laptop or mobile device with an internet connection and the Zoom application installed. Participants who are assigned to the 'visible' categories were also required to have access to a webcam or any other live video device. During this meeting, an image was shown to the participant. This image is part of a diapix, which is a set of two images with slight differences. This diapix was gathered online based off a study by Baker and Hazan (2011), and was the same for all groups to avoid differences in difficulty. The images were selected based on a balanced difficulty level so that it included easily spotted differences, as well as differences that were harder to spot. There were no alterations made to the images by the researchers. The two images used in the experiment are shown in Figure 1a and 2b, below.

Figure 2a. Diapix image A

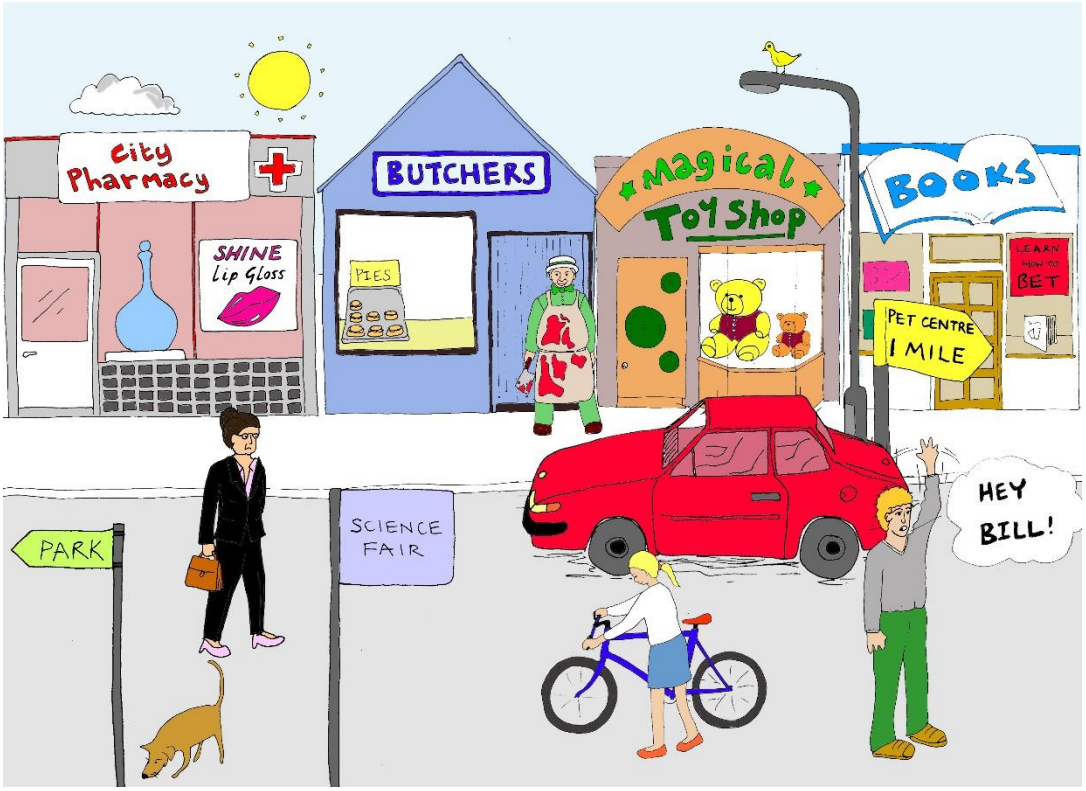

Figure 1b. Diapix image B

2.3. Participants

Participants were personally approached by the researchers based on a selection of criteria. Participants were to be native speakers of either Dutch or German, aged between 18 and 40 years old, and not study or have studied English Language and Culture or a similar study programme. A total of 53 respondents filled in the pre-screening questionnaire. Of these 53 respondents, 34 respondents took part in the experiment due to matching availabilities with other respondents. Of these 34 respondents, 17 participants noted Dutch as their first language, and 17 participants noted German as their first language. 23 participants (67.6%) were female, 10 participants (29.4%) were male, and one participant (2.9%) preferred not to specify. The age of participants ranged between 19 and 26 years old (M = 22.1, SD = 1.89). The age and gender statistics of participants per condition is displayed in Table 1, below. The educational level of participants ranged between secondary school and university, with university being the most frequent educational level (73.5%). Participants were also asked to fill in their self-estimated proficiency in various aspects (reading, writing, speaking, and listening) of the English language on a 6-point scale. Of these aspects, Listening scored highest (M = 5.24, SD = 1.08), while participants averagely rated speaking as their least proficient skill, though still fairly proficient (M = 4.68, SD = 1.25),

Table 1. Statistics of age and gender distribution across conditions

Condition	Age (years)		Gender (N)	
	M	*SD*	Male (%)	Female (%)
Shared L1 & Visible	22.4	1.77	2 (25%)	6 (75%)
Shared L1 & Non-Visible	22.0	1.90	2 (33.3%)	4 (66.7%)
Non-Shared L1 & Visible	21.5	1.65	1 (7.1%)	12 (85.7%)
Non-Shared L1 & Non-Visible	23.0	2.53	5 (83.3%)	1 (16.7%)

To check for equal distribution of participant's gender, age, education level, and self-estimated proficiency across the various conditions, the following analyses were conducted.

Chi-square analyses showed no significant relation between the condition and language of participants (($\chi 2$ (3) = 1.17, p = .761), nor between the condition and the educational background of the participants (($\chi 2$ (9) = 12.27, p = .199). This means that the language of participants and educational backgrounds are equally distributed amongst the four

conditions. However, a chi-square analysis on the relation of gender and the condition did find a significant interaction (($\chi 2$ (6) = 12.85, p = .045). This means that gender was not equally distributed amongst the four conditions. As displayed in table 1, three out of the four conditions display a dominant presence of female participants (75%, 66.7%, 85.7% female), whereas the 'Non-shared L1 and non-visible' condition contains more men than women (83.3% male, 16.7% female).

A two-way univariate analysis on the relation of the condition and age (F (3, 31) < 1, p = .416) showed no significant difference, indicating that the age of participants is equally distributed amongst the conditions.

A two-way univariate analysis on the relation of condition and average self-estimated proficiency in English (F (1, 33) = 3.65, p = .024) did find a significant difference between conditions, however. This shows that self-estimated proficiency is distributed unequally across the conditions. Participants that shared a first language and were able to see each other during the experiment had rated their own proficiency in the various elements of the English language averagely lower (M = 4.25, SD = 1.24), than the participants of the other three conditions (M = 5.58, SD = .49; M = 5.21, SD = .60; M = 5.25, SD = .74). Two-way univariate analyses of the individual aspects (reading, writing, speaking, listening) showed interactions for the condition and self-estimated writing (F (1, 33) = 3.48, p = .028) and speaking (F (1, 33) = 5.95, p = .003) proficiencies, but no significant interaction between the condition and self-estimated reading (F (1, 33) = 2.09, p = .123) and listening (F (1, 33) = 1.48, p = .24) proficiencies. In regard to the individual aspects of English language proficiency, participants from the 'shared L1 and visible' condition rated their own English writing (M = 4.14, SD = 1.35) and speaking (M = 3.57, SD = 1.27) skills significantly lower than participants of other groups. No significant difference was found between the conditions for reading and listening skills, however. The results of these analyses are found in table 2 below.

Table 2. Means and standard deviations of self-estimated proficiency rating of English language skills based on CEFR levels across the different conditions (1 = very poor, 6 = very good)

Condition	Self-Estimated English Proficiency				
	Average *M (SD)*	Reading M (SD)	Writing M (SD)	Speaking M (SD)	Listening M (SD)
Shared L1 & Visible	4.25 (1.24)	4.43 (1.51)	4.14 (1.35)	3.57 (1.27)	4.86 (1.07)
Shared L1 & Non-Visible	5.58 (0.49)	5.50 (0.55)	5.67 (0.52)	5.50 (0.84)	5.67 (0.52)
Non-Shared L1 & Visible	5.21 (0.60)	5.36 (0.63)	5.00 (0.78)	5.00 (0.78)	5.50 (0.65)
Non-Shared L1 & Non-Visible	5.25 (0.74)	5.33 (0.82)	5.33 (0.82)	5.00 (0.63)	5.33 (0.82)

2.4. Instruments

This study aimed to analyse effects of visibility and sharedness of language on five dependent variables. The two variables 'task performance and 'communicative success rating' related to the communicative process, whereas 'likeability', 'perceived English proficiency' and 'solidarity' related to speaker evaluation. 'Task performance was coded by the researchers, and defines the number of differences that the participants spotted. Whether the difference that the participants spotted was actually present or not was not relevant to the study, therefore all differences spotted were noted down. The questions included in the questionnaire are included in Appendix B.

'Communicative success rating' determines the participant's perceived communicative success during the task and is measured using 7-point Likert scale questions based off Kootstra and students (2021). The interrater reliability of this scale is deemed to be accurate with $\alpha = .77$.

'Likeability' determines the affection one participant had to the other and was measured by 7-point Likert scale questions based off of a study by Nejjari et al. (2012). The questions were worded as "The person I worked with was…" followed by the items "Considerate", "Pleasant", and "Friendly". The questions 'Solidarity' measured the degree of perceived cooperativity and unity of one participant towards another and was measured via 7-point Likert scale questions from Fuertes et al. (2012). These questions included the items "Similar to me", "Cooperative", "Caring" and "Trustworthy". Finally, 'perceived English proficiency' consists of questions regarding perceived English proficiency of the partner. Perceived English proficiency entails the degree of proficiency that a participant had of his

opposite number. This included the items "speaking" and "listening". Both items were measured using a 6-point Likert scale with descriptions based on the CEFR (2001) levels of English proficiency. The interrater reliability of 'likeability', 'solidarity', and 'perceived English proficiency' were deemed adequate to good with $\alpha = .89$, $\alpha = .74$ and $\alpha = .90$ respectively.

2.5. Procedure

Participants were tasked to first fill in a pre-screening questionnaire that included basic questions, along with their availability. They were furthermore asked to sign and confirm informed consent in participation. Once pairs were made based on availability and first language, the pairs were divided into the different conditions with the goal of balancing the four different conditions as equally as possible. Once a pair was established, they were contacted by the researchers and notified of their time and date of the experiment, along with their participant ID. A link to the zoom-session was also included.

In the experiment, the pairs performed an online task, which was directly followed by an online questionnaire. The online task consisted of a diapix task, where both participants of a pair will be shown a similar picture with slight differences compared to the other. After a quick briefing by the researchers, which was standardized across all sessions, the participants were given two minutes to look at their respective picture and take notes in a separate breakout room. After the two minutes, and returning to the main room, they were then given five minutes to cooperate and communicate in English via an online call on Zoom in order to find out what differences there are, and how many. During these five minutes, pairs that were assigned to the 'visible' conditions performed this task with their webcam on, whereas pairs that are assigned to the 'non-visible' conditions performed this task with their webcam off. Once five minutes had expired, the participants were asked to remain in the call in separate breakout rooms to fill in an online questionnaire which contains questions about their experience during the task, which were used to provide insight on the dependent variables. Participants filled in this questionnaire individually but were still required to remain in the Zoom call during this time, this was to make sure that their experiences and memories were still fresh on their mind and provide more accurate results. Once they had completed the questionnaire, a message of gratitude was given, and participants were free to leave the call.

2.6. Statistical Treatment

In order to study the effects of visibility and language sharedness on communicative success, and to answer the research questions, multiple univariate ANOVAs were be conducted that study the effects of task performance, likeability, solidarity and perceived English proficiency. Along with analyses on the effects of the independent and dependent variables, correlation tests were also run to study the correlation effects of the dependent variables amongst each other. This was to see whether perceived proficiency also affects personal evaluations and perceived task performance. While not part of the main question, these results provided more insight and clarification as to whether such an effect existed.

4. Results

This study aimed to investigate the effects of a shared and non-shared first language sharedness and visibility of participants on communicative success when performing an online task. In order to study these effects, multiple two-way ANOVAs were conducted on the effects of language sharedness and visibility on the dependent variables 'task performance', 'communicative success rating', 'likeability', 'solidarity' and 'perceived English proficiency'. The descriptive statistics of these analyses can be found in tables 3, 4 and 5 respectively.

Table 3. Average task performance per condition (number of differences spotted)

Condition	Task Performance	
	M	*SD*
Shared L1 & Visible	3.71	2.50
Shared L1 & Non-Visible	3.33	2.25
Non-Shared L1 & Visible	4.29	1.33
Non-Shared L1 & Non-Visible	3.67	0.52

Although the group that did not share a language sharedness and was able to see each other scored higher (M = 4.29, SD = 1.33) than the other three conditions (M = 3.71, SD = 2.50; M = 3.33, SD = 2.25; M = 3.67, SD = .52), a two-way ANOVA on task performance showed no significant effect of visibility (F (1, 33) < 1, p = .410), language sharedness (F (33) < 1, p = .489) on task performance, and no significant interaction between visibility and language sharedness (F (1, 33) < 1, p = .871).

Table 4. Average scores on communicative success rating, likeability, and solidarity scales for the different conditions (1 = fully disagree, 7 = fully agree)

Condition	Communicative Success rating		Likeability		Solidarity	
	M	*SD*	*M*	*SD*	*M*	*SD*
Shared L1 & Visible	5.69	1.04	6.10	0.76	5.57	1.11
Shared L1 & Non-Visible	6.23	0.75	7.00	0.00	6.58	0.61
Non-Shared L1 & Visible	6.16	0.57	6.81	0.31	6.25	0.72
Non-Shared L1 & Non-Visible	6.37	0.15	6.67	0.42	6.25	0.50

A two-way ANOVA on communicative success rating showed no significant effect of visibility (F (1, 33) = 1.97, p = .171) and language first language sharedness (F (1, 33) = 1.20, p = .283) on the rating. It also showed no significant interaction between visibility and language sharedness (F (1, 33) < 1, p = .584).

A two-way ANOVA showed no significant effect of first language sharedness (F (1, 3) < 1, p = .347) on likeability. It did, however, show a significant effect of visibility on likeability (F (1, 33) = 4.55, p = .041). Participants that were able to see the other person scored significantly lower on 'likeability' (M = 6.58, SD = .58) compared to participants that were not able to see the other person (M = 6.83, SD = .33). It also showed an interaction between visibility and language sharedness (F (1, 33) = 6.05, p = .020). Because of the significant interaction between visibility and language sharedness, multiple one-way ANOVAs were run to establish the interaction effect. Only the participants with a shared first language saw a significant effect of visibility in terms of likeability (F (1, 12) = 7.56, p = .018). Participants with a shared first language that were able to see each other during the experiment rated their partner lower (M = 6.17, SD = .73) in terms of likeability compared to participants with a shared first language that were not able to see their partner (M = 7.00, SD = .00). No significant effect of visibility was found for participants with a different first language.

A two-way ANOVA showed no significant effect of visibility (F (1, 33) = 2.77, p = .107) and first language sharedness (F (1, 33) < 1, p = .644) on solidarity. It also showed no significant interaction between visibility and language sharedness (F (1, 33) = 2.77, p = .107).

Table 5. Average perceived English proficiency per condition overall, for speaking and for listening (1= very poor, 6 = very good)

Condition	Perceived English proficiency					
	Speaking		Listening		Overall	
	M	*SD*	*M*	*SD*	*M*	*SD*
Shared L1 & Visible	4.71	1.25	4.86	0.90	4.79	1.07
Shared L1 & Non-Visible	5.33	0.82	5.50	0.55	5.42	0.66
Non-Shared L1 & Visible	4.93	0.92	5.36	0.75	5.14	0.77
Non-Shared L1 & Non-Visible	4.83	0.98	5.00	0.89	4.92	0.92

A two-way ANOVA on perceived English proficiency showed no significant effect of visibility (F (1, 33) = (1, p = .612) and first language sharedness (F (1, 33) < 1, p = .709). It also showed no significant interaction between visibility and language sharedness (F (1, 33) = 1.55, p = .222).

Table 6. Correlations (r) between task performance, communicative success rating, likeability, solidarity, estimated English proficiency (EEF), and self-estimated English proficiency (N = 34)

Condition	Task Performance	Comm. Success rating	Likeability	Solidarity	EEF	SEEF
Task Performance						
Communicative Success rating	.10					
Likeability	.21	.55*				
Solidarity	.30	.78**	.81**			
EEF	-.03	.65*	.42	.70**		
SEEF	.08	.17	.09	.19	.34	

** p < .050, ** p < .010*

Pearson's Correlations were run between the study's dependent variables to check for possible correlation effects between the different variables. The correlations are visualized in table 6. For likeability, a positive correlation was found with communicative success rating (r (34) = .55, p = .042). When participants scored their partner higher in terms of likeability, they also rated the communicative success better. The same effect applies to solidarity. As solidarity is rated higher, communicative success rating is rated higher as well (r (34) = .78, p < .001). Solidarity and likeability also share a positive correlation, with participants rating their partner higher on both scales. (r (34) = .81, p = < .001). Estimated English proficiency of the partner has a positive correlation with communicative success rating (r (34) = .65, p = .012), meaning that participants rate their partner higher in terms of proficiency when they've felt that communication went smoothly. Estimated English proficiency also displays a positive correlation with solidarity (r (34) = .70, p = .005), indicating that if a partner is deemed as solidary, his/her proficiency in English is rated higher as well. No correlations were found for task performance and self-estimated English proficiency.

5. Discussion and conclusion

This study aimed to investigate whether visibility and first language sharedness affect the task performance, perceived communicative success, and personal evaluation of another person. It did so by utilizing a task to stimulate dialogue and cooperativity.

Overall, the results of this study yielded few significant findings. The major significant finding was that likeability was rated lower when participants were communicating without visibility. While visibility did affect likeability rating, it did not significantly affect solidarity or communicative success ratings. Furthermore, the effect of visibility on likeability was only significantly present for the pairs that shared their first language. No significant effect was found for participants that had different first languages. The correlation analysis resulted in several correlation findings. Likeability, solidarity and communicative success correlated positively. Higher degrees of rated likeability resulted in higher rated solidarity and communicative success. Higher levels of solidarity also correlated with higher rated communicative success. Estimated English proficiency of the partner also positively correlated with solidarity and communicative success.

These findings partly align with the findings by Schweitzer et al. (2017), who argued that participants are more interested in one another when there is no visibility, attributing these findings to more attention being paid to the contents of the conversation. Simultaneously, it contradicts studies by Boyle et al. (1994), Lapidot-Lefler and Barak (2011) and Hall et al. (2019) who argue that non-verbal cues are vital in communication. One could argue the lack of visibility places less emphasis on physical appearance, and rather places it on voice and apparent personality. This assumption is speculative, however. More research is needed to confirm this idea. Additionally, visibility not significantly affecting solidarity ratings, nor communicative success ratings confirm the idea that current research still disputes the role of visibility on communicative success. This dispute is evident in the contractionary findings by Bailenson (2021) and Boyle et al. (1994), along with Brennan and Enns (2015) However, given that likeability was only partially affected, these findings might not be surprising.

The lack of significance in the findings could likely be explained by the low number of participants, along with an uneven distribution of said participants amongst the conditions. Due to the low sample size, the findings are possibly not generalizable. Another possible explanation for the lack of significant results regarding visibility could be the similarity in age, and an uneven balance of genders. A study by Hummert, Gartska, Ryan and Bonnesen

(2004) argued that young people communicate differently with people that are much older than they are. This is confirmed in another study by Verhage, Schuurman and Lindenberg (2021), who found that communication between students and elderly is much more formal compared to communication between two students within the same age range. In this study, the oldest participant was aged 26, which is not much older than the mean age of the participants. Furthermore, the participants were predominantly female. A different balance of male to female participants could have yielded different results according to findings by Boileau (1982), Mills (1988) and Kakol-Dworak (2018), whose studies have found communication between people of the same and opposite genders to differ.

Language sharedness showed no significant effects on the dependent variables of this study. The communicative success does not seem to be affected by the language background of participants, either positively or negatively. Again, this could be the result of the limited number of participants, but it could also be explained by the languages present. For this study, Dutch and German native speakers were selected. However, not only are the Dutch and German languages fairly similar in structure (Willemyns, 2013), according to Hofstede's (2011) cultural dimensions, the Dutch and Germans share many similarities when it comes to cultural behaviour. This could mitigate possible differences between various conditions of language sharedness. More extreme effects could be present when more distant languages (e.g. combining a Germanic language with a Latin or Slavic language). The linguistic structure of Germanic languages, for instance, align more with the English languages compared to Latin or Slavic languages (Konig & Auwera, 2013; Robinson, 2019). This linguistic distance could affect English proficiency, and therefore yield more extreme differences in individual English proficiency. This in turn would affect non-native communicative success. These assumptions, however, are speculative and more research is necessary to confirm or deny such an effect.

The correlation analysis did yield a couple of significant findings. Most notably, the correlation between likeability, solidarity and communicative success rating confirms the present effects explained by the Communicative Accommodation Theory (Giles, 2008), which argues that adjustments in communication styles towards the dialogue partner positively affects communicative success and interpersonal relationships. Estimated English proficiency also positively correlates with communicative success rating. This can be explained by the effect where once a partner can explain him/herself in a more proficient manner, it is easier for the recipient to understand. These correlations might also be affected

by the lower number of participants, so more future research is needed in order to confirm these patterns.

This study contained some major limitations which affected the results. As mentioned earlier, the lack of participants overall harms generalizability and affects significance, possibly severely. Secondly, the participant pairs are distributed unevenly across the conditions. Some conditions contained more participants, where other conditions only contained a few participants. This unbalance could affect both the significance and the means. Thirdly, there are many languages and cultures in the world, with many different origins. This study only looked at native Dutch and German speakers, both originating from the Germanic culture and language. This limits the scope in which these results are representative of the overall effects of visibility and language sharedness.

For future research, more emphasis needs to be placed on a larger participant pool in order to generate more accurate data. Even within the same language group, a higher number of participants could have affected the results of this study. Additionally, to improve generalizability, different languages with a higher linguistic distance should be studied. The results of Dutch and German only apply to people of Germanic linguistic backgrounds. To gain more insight on the overall effects of language sharedness and visibility, other languages and cultures need to be involved. Both due to semantic and linguistic structures, as well as different meanings of nonverbal cues.

While this study did find correlations between dependent variables, most notably likeability, solidarity and communicative success, the majority of the results were not significant. However, despite these findings, given the research of previous studies, the effects of visibility and language sharedness might still differ depending on linguistic backgrounds. With the ever-growing importance of online platforms, as well as the establishment of English as a lingua franca, more research into this field is of vital importance for us to understand the effects of visibility and language on communicative success. If we can understand the effects, we can use that knowledge to create more awareness of the importance of visibility and language in public. Such knowledge can be utilized in organizational, educational and informal contexts to improve communicative effectiveness. Furthermore, it would provide more insight into the actual influence of visibility and language sharedness on communicative success on a scientific level. As their roles are currently debated by experts within the field, more research could yield more definite findings and mitigate contractionary results. Until then, the role of visibility and language sharedness in communicative success will remain

inconclusive. This study has found a few effects of visibility, as well as correlation with visibility, solidarity and communicative success. However, more research is necessary in order to be able to generalize such findings.

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Appendices

Appendix A. Pre-screening questionnaire

Introduction text for the pre-questionnaire:
Hello! Welcome to the pre-screening survey for our experiment. We are five Communication and Information Studies / International Business Communication students from Radboud University in Nijmegen. We are doing this study as part of our Bachelor thesis. In this questionnaire, we ask you some general questions, how well you would rate your English proficiency and if you would be available for a short Zoom experiment in the period between Thursday 18 November and Wednesday 1 December. During the Zoom experiment, you will work on a task together in English with one other person.
Your answers will be handled confidentially and only disclosed to the research team (for scheduling purposes).

[Pre-screening questionnaire]

- Gender
    - o Male
    - o Female
    - o Other
- Age
    - o Open field
- Study level
    - o VWO Abitur
    - o MBO Realschule
    - o HBO Fachhochschule
    - o WO Hochschulabschluss
- Native language
    - o Dutch
    - o German
- Are you proficient in any other language(s) besides your first language and English? If so, please list them below:

  …..
- Self-estimated proficiency (1-6 Likert)
    - o I would describe my English writings skills as:

  - I would describe my English reading skills as:
  - I would describe my English speaking skills as:
  - I would describe my English listening skills as:

- Do you have access to a computer with a webcam in the period between Thursday 18 November and Wednesday 1 December?
  - Yes, I have access to a computer with a webcam
  - Yes, I have access to a computer, but not with a webcam
  - No, I don't have access to a computer

- Please enter your email address below

Appendix B. Post-Zoom survey

Hello! Thank you for participating in our experiment. Filling in the following questionnaire is the final step in the experiment. Again, there are no right or wrong answers. Fill in what applies most to you.

[Participant]

- Participant ID

[Communicative Success rating]

- Together we have found this number of differences:
  - Open field - #
- *7-point Likert scales about communicative success:*
  - The conversation with this person went smoothly
  - Talking to this person was easy
  - I think this person understood what I was saying
  - There were no misunderstandings
  - I was able to help the other person when they were, for instance, stuck

[Likeability] 7-point Likert

- The person I worked with was:
  - Considerate
  - Pleasant
  - Friendly

[Solidarity] 7-point Likert

- The person I worked with was:
  - Similar to me
  - Cooperative
  - Benevolent/generous/caring

- Trustworthy

[Competence] 6-point Likert

- Listening
- Spoken interaction
- Spoken production

Closing text

You have now reached the end of our questionnaire. Thank you again for participating in our experiment. This helps us a lot.

Since you now have filled in the experiment, we can disclose the aim of our research. Via this experiment, we wanted to test whether there is a difference in communicative success when there is a shared language background when talking in English. That is, whether two Dutch persons or two German persons talk in English compared to when a Dutch participant and a German participant talk in English together. To have the communication to be as spontaneous as possible, we choose to let you and the other participant work together on a task, which was in this case the 'spot the differences' task. Another thing we are looking at is whether visibility plays a role in this experiment. That is to say, we are going to compare if there are differences whether you were able to see each other in Zoom (cameras on) or not (cameras off).

With the help of your participation, we can now see whether these things play a role in how successful communication can be and also because of that make a contribution to the existing body of research.

Appendix C. Ethics checklist

Checklist EACH (version 1.6, november 2020)

You fill in the questions by clicking on the square next to the chosen answer ☐

After clicking, a cross will appear in this square ☒

1. Is a health care institution involved in the research?

Explanation: A health care institution is involved if one of the following (A/B/C) is the case:

A. One or more employees of a health care institution is/are involved in the research as principle or in the carrying out or execution of the research.
B. The research takes place within the walls of the health care institution and should, following the nature of the research, generally not be carried out outside the institution.
C. Patients / clients of the health care institution participate in the research (in the form of treatment).

☒ No → continue with questionnaire

☐ Yes → Did a Dutch Medical Institutional Review Board (MIRB) decide that the Wet Medisch Onderzoek (Medical Research Involving Human Subjects Act) is not applicable?
☐ Yes → continue with questionnaire
☐ No → This application should be reviewed by a Medical Institutional Review Board, for example, the Dutch CMO Regio Arnhem Nijmegen → end of checklist

2. Do grant providers wish the protocol to be assessed by a recognised MIRB?

☒ No → continue with questionnaire

☐ Yes → This application should be reviewed by a Medical Institutional Review Board, for example, the Dutch CMO Regio Arnhem Nijmegen → end of checklist

3. Does the research include medical-scientific research that might carry risks for the participant?

☒ No → continue with questionnaire

☐ Yes → This application should be reviewed by a Medical Institutional Review Board, for example, the Dutch CMO Regio Arnhem Nijmegen → end of checklist

Standard research method

4. Does this research fall under one of the stated standard research methods of the Faculty of Arts or the Faculty of Philosophy, Theology and Religious Studies?

☒ Yes → ..... 1. Standard evaluation and attitude research→ continue with questionnaire

☐ No → assessment necessary, end of checklist

Participants

5. Is the participant population a healthy one?

☒ Yes → continue with questionnaire

☐ No → assessment necessary, end of checklist → go to assessment procedure

6. Will the research be conducted amongst minors (<16 years of age) or amongst (legally) incapable persons?

☐ Yes → assessment necessary, end of checklist → go to assessment procedure

☒ No → continue with questionnaire

Method

7. Is a method used that makes it possible to produce a coincidental finding that the participant should be informed of?

☐ Yes → assessment necessary, end of checklist → go to assessment procedure

☒ No → continue with questionnaire

8. Will participants undergo treatment or are they asked to perform certain behaviours that can lead to discomfort?

☐ Yes → assessment necessary, end of checklist → go to assessment procedure

☒ No → continue with questionnaire

9. Are the estimated risks connected to the research minimal?

☐ No → assessment necessary, end of checklist → go to assessment procedure

☒ Yes → continue with questionnaire

10. Are the participants offered a different compensation than the usual one?

☐ Yes → assessment necessary, end of checklist → go to assessment procedure

☒ No → continue with questionnaire

11. Should deception take place, does the procedure meet the standard requirements?

☐ No → assessment necessary, end of checklist → go to assessment procedure

☒ Yes → continue with questionnaire

12. Are the standard regulations regarding anonymity and privacy met?

☐ No → assessment necessary, end of checklist → go to assessment procedure

☒ Yes → continue with questionnaire

Conducting the research

13. Will the research be carried out at an external location (such as a school, hospital)?

☒ No → continue with questionnaire

☐ Yes→ Do you have/will you receive written permission from this institution?

☐ No → assessment necessary, end of checklist → go to assessment procedure

☐ Yes → continue with questionnaire

14. Is there a contact person to whom participants can turn to with questions regarding the research and are they informed of this?

☐ No → assessment necessary, end of checklist → go to assessment procedure

☒ Yes → continue with questionnaire

15. Is it clear for participants where they can file complaints with regard to participating in the research and how these complaints will be dealt with?

☐ No→ assessment necessary, end of checklist → go to assessment procedure

☒ Yes → continue with questionnaire

16. Are the participants free to participate in the research, and to stop at any given point, whenever and for whatever reason they should wish to do so?

☐ No→ assessment necessary, end of checklist → go to assessment procedure

☒ Yes → continue with questionnaire

17. Before participating, are participants informed by means of an information document about the aim, nature and risks and objections of the study? (zie explanation on informed consent and sample documents).

☐ No→ assessment necessary, end of checklist → go to assessment procedure

☒ Yes → continue with questionnaire

18. Do participants and/or their representatives sign a consent form? (zie explanation on informed consent and sample documents.

☐ No→ assessment necessary, end of checklist → go to assessment procedure

☒ Yes → checklist finished

If you want to record the results of this checklist, please save the completed file.

If you need approval from the EACH due to the requirement of a publisher or research grant provider, you will have to follow the formal assessment procedure of the EACH.

Appendix D. Declaration of no fraud and plagiarism

Declaration of no fraud and plagiarism – Bachelor's thesis

Print and sign this Declaration of no fraud and plagiarism form and add it as the last appendix in the final version of the Bachelor's thesis that is submitted as a hard copy to the first supervisor.

Student
[First Name, last name, student number],

Thijs Meerveld, s4690230

Bachelor student of Communication and Information Studies at the Faculty of Arts of the Radboud University in Nijmegen, declares the following by signing this form:

a. I hereby declare that I am familiar with the faculty manual (http://www.ru.nl/stip/english/rules-regulations/fraud-plagiarism/) and with Article 16 "Fraud and plagiarism" in the Education and Examination Regulations for the Bachelor's programme of Communication and Information Studies.

b. I also declare that I have only submitted text written in my own words and that I have applied the rules of citing, paraphrasing, and referencing according to the Vademecum Reporting Research. I have acknowledged all material and sources used in its preparation, whether they be books, articles, reports, lecture notes, and any other kind of documentation.

c. I certify that this thesis is my own work, and that I have not submitted work that I have previously (in part) submitted for any other examination of this or another educational program without explicit consent of my thesis supervisor.

d. I declare that (my part of) the research data described in the thesis are obtained

empirically and processed with integrity and in a scientifically responsible manner.

Place and date: 09-01-2022, Ede

Signature: