The Role of Social Attraction, Self-Disclosure, and Empathy on Friendship Formation Between a Human and a Social Chatbot

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Master's Thesis

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January 2019

Voorwoord

Ik wil graag van de gelegenheid gebruik maken om een aantal mensen te bedanken die het mogelijk hebben gemaakt deze masterscriptie te schrijven. Allereerst wil ik Emmelyn Croes bedanken voor haar begeleiding, hulp en feedback die ze mij heeft gegeven tijdens dit traject. Daarnaast wil ik Tim Wissink bedanken voor het doorlezen van mijn scriptie en mijn vrienden en familie voor hun steun gedurende deze periode. Als laatste wil ik mijn medestudenten Leonora Bahtiri en Yvonne Leijten bedanken voor de fijne samenwerking, maar vooral voor het plezier en de gezelligheid.

Thom Oostenbrug
Sleeuwijk, 22 januari 2019

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Abstract

This current study aimed at investigating possibilities of friendship formation between a human and a social chatbot. Social chatbots are developed to create engagement with its user, however, little is known about its social consequences. The study focused on social chatbot's self-disclosure (amount and intimacy), empathy, and perceived social attraction as underlying process on friendship formation between a human and a social chatbot. A content analysis was conducted, where 60 transcripts of interactions between humans and a social chatbot are analyzed. The results showed that the amount of self-disclosure negatively affects friendship formation. However, positive effects of the amount of self-disclosure on perceived social attraction were found, which in turn, enhanced friendship formation. This finding underlines that social attraction is an underlying process in the effect of the amount of self-disclosure on friendship formation between a human and a social chatbot. In addition, the intimacy of self-disclosure and empathy showed no direct effect on friendship formation. The results suggest that while human-machine communication is drawn from computer-mediated communication, there are notable differences when communicating with a social chatbot. However, it extends the CASA paradigm by presenting positive effects of social attraction on the effect of the amount of self-disclosure on friendship formation. More theoretical implications are discussed.

Keywords: Social chatbot, self-disclosure, social attraction, empathy, friendship formation, human-machine communication

The Role of Social Attraction, Self-Disclosure, and Empathy on Friendship Formation Between a Human and a Social Chatbot

Usage of conversational agents, which are computer programs developed to interact with humans using natural language (Vassallo, Pilato, Augello, & Gaglio, 2010), is growing exponentially. Over 100,000 different conversational agents, or chatbots, were active in 2017 on Facebook Messenger alone (Falcon.io, 2018). The computer programs were initially programmed in the 1960's to see if developers could design robots acting like real humans (Shawar & Atwell, 2007). From that time on, different chatbots were programmed and adopted in entertainment, commerce, health, and the public sector (Kerlyl, Hall, & Bull, 2007). One of the first chatbots was Joseph Weuzenbaum's Eliza (1966), which was mimicking a Rogerian psychotherapist and analyzed sentences and responded by a set of programmed rules related to the input (Ferrara, Varol, Davis, Menczer, & Flammini, 2016). From that time on, different chatbots have been developed, including for example Jabberwacky (Carpenter, 1997) and Alice (Wallace, 2009).

Due to different developments of chatbots, social talk with computers possessing humanistic properties became increasingly popular (Bickmore & Cassell, 2000; Klüwer, 2011; Mattar & Wachsmuth, 2012). This has led to an interesting development in dialogue-based computer programs, where chatbots are accompanied with human-like characteristics. These computer programs, so-called *social bots* or *social chatbots*, are initially developed to create some form of engagement (Shum, He, & Li, 2018). It is in social chatbot's primary task to better understand and to emotionally connect with its users to fulfill human's communicational needs and affection (Shum et al., 2018; Xuetao, Bouchet, & Sansonnet, 2009). Social chatbot's ability of socializing and its ability of accessing closeness can possibly stimulate friendship formation between a human and a social chatbot (Brandtzaeg &

Følstad, 2017). However, it remains unclear which processes foster the possibility of friendship formation.

Several studies mentioned the important role of self-disclosure when building relationships, which refers to the act of revealing personal information (Berger & Calabrese, 1974; Berndt, 1982; Brundage, Delega, & Cash, 1976). Moreover, based on existing scientific work in computer-mediated communication (CMC) research, it can be suggested that self-disclosure is positively related to friendship formation (McKenna, Green, & Gleason, 2002; Peter, Valkenburg, & Schouten, 2005). Moreover, it has been found that self-disclosure in CMC is more intimate than self-disclosure in face-to-face (FtF) communication (Tidwell & Walther, 2002). However, it still remains unclear whether the effects found in CMC can be applied to human-machine communication (HMC). More specifically, little is known about the effect of self-disclosure on friendship formation in interactions between a human and a social chatbot. Therefore, the first goal of the current study is to investigate the effect of social chatbot's self-disclosure on friendship formation between a human and a social chatbot.

The second goal of the current study is to examine the role of social attraction and its effect on friendship formation. Social attraction can be defined as "the desire to be close to someone based on his/her perceived social/friendship abilities" (Horan, 2016, p. 1). The concept is extremely important in friendship formation, since friendships will not be formed without the presence of social attraction (Reis & Shaver, 1988; Sheldon, 2009). Moreover, studies concerning CMC acknowledged the positive effects of social attraction being related to self-disclosure, which in turn, leads to friendship formation (e.g., Antheunis, Valkenburg, & Peter, 2007; Antheunis, Valkenburg, & Peter 2010; Vittengl & Holt, 2000). However, what is less clear is the role of social attraction in human-chatbot relationships. Previous research found scientific evidence that individuals can be socially attracted to computers (Nass & Moon, 2000; Reeves & Nass, 1996; Walther & Boyd, 2002), and therefore, it is possible that

humans can be socially attracted to social chatbots. Since the concept of social attraction on friendship formation was mostly investigated in the field of FtF communication and CMC (e.g., Ramirez & Burgoon, 2004; Antheunis, Valkenburg, & Peter, 2010), the current study explores the effect of social attraction in HMC and its role on friendship formation.

Lastly, it seems that empathy is also highly relevant in friendship formation processes (Higashinaka, Dohsaka, & Isozaki, 2008). Humans' preferences of social chatbot's characteristics are investigated and it was desired that social chatbots were able to show empathy (Thies, Menon, Magapu, Subramony, & O'Neill, 2017). Moreover, it has been suggested that chatbot's usage of empathy can lead to positive understanding and elimination of negative emotions. Empathy is an important concept, since it is a natural, humanistic extension used in FtF communication and, therefore, it is suggested to develop chatbots with empathic capabilities (Xu, Liu, Guo, Sinha, & Akkirahu, 2017). However, the concept is mostly investigated in studies on how to build a chatbot with the concept of empathy (McQuiggan, Robison, Phillips, & Lester, 2008). It still remains unclear how chatbot's emphatic capability affects human's behavior. Moreover, it still remains unclear whether empathy establishes friendships between a human and a social chatbot. Therefore, the third goal of this study is to explore the effect of chatbot's empathy on friendship formation between a human and a social chatbot.

Taking these relevant findings together, the current study focuses on investigation of the role of social attraction on the effect of social chatbot's self-disclosure and friendship formation between a human and a social chatbot. In addition, the current study focuses on the effect of social chatbot's empathy on friendship formation between a human and a social chatbot.

Theoretical Framework

The current study aims at social chatbot's capabilities of friendship formation with humans. Social chatbot's primary goal is to emotionally connect and engage with humans. They are created to fulfill users' needs for communication, must be able to express emotional support, and track, process, and act on emotional changes (Shum et al., 2017). Interactions between a human and a social chatbot are performed online, and therefore, the communication between a human and a social chatbot is computer-mediated. For this reason, the current study discusses existing literature in the field of CMC and investigates whether these findings can be applied to HMC. The following concepts will be discussed: self-disclosure, social attraction, empathy, and friendship formation.

Hyperpersonal Perspective and CASA Paradigm

Based on CMC literature, the hyperpersonal perspective can be discussed as an interesting theory (Walther, 1996). The hyperpersonal perspective is a model of theoretically based processes in CMC and beliefs that CMC exceeds the desirability and intimacy of relationships developed online when compared to FtF communication (Walther, 2011). The model contains four components of the communication process: receiver, sender, channel, and feedback. Concerning the receiver, Walther (1996) argues that due to the absence of different cues being present in FtF communication, receivers will fill in the blanks based on their perceptions. Positive perceptions of the sender will be experienced because the receiver has an idealized perception of the sender. Secondly, CMC gives the opportunity to selectively present oneself, since reduced cues are present in CMC compared to FtF communication. CMC makes it possible to construct sender's desirable messages including cues which are processed by others. Next, Walther (1996) focuses on the channel which allows for asynchronous communication, meaning interactions can be performed at one's convenient time, since CMC is not constrained by temporal boundaries. For example, a text message can be read at any given time and a response can be communicated at any given time. Lastly, the

hyperpersonal perspective suggests the concept of feedback in CMC. Walther (1996) mentions that the enhancement of the receiver, sender, and channel leads to an influence on reciprocal expressions, underlining the relevance of feedback. When a receiver idealizes the sender and the sender presents oneself with a desired identity, it is being said that enhancement of perceptions of the other communication partner takes place (Walther, 2011). This means that relationships in CMC can be developed at an earlier stage when compared to FtF communication. Different studies found support for this theory and will be discussed later (e.g., Antheunis, Valkenburg, & Peter, 2007; Joinson, 2001; Mesch & Talmud, 2006).

Another important theory assessed in the current study, concerns social chatbots as social communication partners. Extensive research on social chatbots are based on the Computers as Social Actors (CASA) paradigm (e.g., Mou & Xu, 2017; Liu & Sundar, 2018). The theory states that humans mindlessly apply social rules and expectations to computers (Nass & Brave, 2005; Nass & Moon, 2000; Reeves & Nass, 1996). It suggests that when a computer behaves like a human, one responds in a way similar to how one would respond to another human. Different studies found support for this paradigm, which will be discussed later (e.g., Ho, Hancock, & Minder, 2018; Liu & Sundar, 2018).

Self-Disclosure and Friendship Formation

Previous studies have explored positive effects of self-disclosure on friendship formation (e.g., Gibbs, Ellison, & Heino, 2006; Leung, 2002; Peter et al., 2005). Self-disclosure can be defined as "any message about the self that an individual communicates to another" (Gibbs et al., 2006, p. 155). Existing literature mostly focused on revealing sensitive, personal information, but can also focus on much less sensitive information as discussed by Greene, Derlega, and Mathews (2006). It can be stated that one’s self-disclosure affects the other’s liking for one another (Walther, Kashian, Jang, Shin, Dai, & Koutamanis, 2018). Collins and Miller (1994) investigated the relationship between self-disclosure and liking,

which in turn can lead to friendship formation. They found support for the relationship between self-disclosure and liking, because we as humans like others who disclose personal information and, hence, form friendships (Collins & Miller, 1994). In addition, it was found that self-disclosure has positive effects on emotional connection, which creates deeper relationship, hence, closer friendships (Sprecher, Treger, Wondra, Hilaire, & Wallpe, 2013). The relevance of self-disclosure is not only limited to FtF communication but is also largely investigated in CMC (e.g. Antheunis, Valkenburg, & Peter 2007; Mesch & Talmud, 2006; Joinson, 2001).

Drawing from the hyperpersonal perspective (Walther, 1996), it has been found that people disclose more personal information in CMC compared to FtF communication (Gibbs, Ellison, & Lai, 2011). This be explained by the reduced nonverbal cues being present in CMC (Antheunis et al., 2007). It has been argued that CMC can decrease negative effects of disclosing personal information, because the characteristic of anonymity and reduced cues present in CMC gives individuals the opportunity to encounter less possibilities of disapproval in comparison to FtF communication (Gibbs et al., 2006; Peter et al., 2005). Moreover, self-disclosure is explained as a strategy to reduce uncertainty which, in turn, increase the perception of the likability of the communication partner (Antheunis, Valkenburg, & Peter, 2012; Berger & Calabrese, 1975; Walther, 1996). More authors have found that self-disclosure in CMC had a higher frequency when compared to FtF (Dietz-Uhler, Bishop-Clark, & Howard, 2005; Joinson 2001; Leung, 2002). For example, Joinson (2001) investigated interactions between same-sex communication partners discussing a particular case. Half of the participants were required to interact by use of FtF communication, where the other half was required to interact by use of an online chat. It was found that participants communicating by use of an online chat, disclosed more personal information than the participants communicating FtF (Joinson, 2001).

Disclosing personal information in online environments is not only limited to the amount of self-disclosure but also the intimacy of self-disclosure was found to have a greater extent in CMC than in FtF environments (Tidwell & Walther, 2002). This finding was investigated by use of a comparison study on textual communication between CMC and FtF communication. Tidwell and Walther (2002) focused on the process of how language-based strategies are used. In addition, CMC containing more intimate self-disclosure than FtF communication was even more pronounced in an investigation by Antheunis et al. (2012) whom performed a content analysis on three experimental conditions; FtF, visual supported CMC, and text-only CMC. Here it was found that self-disclosure statements were more pronounced in the text-only CMC condition and the degree of self-disclosure was more intimate in both CMC conditions compared to the FtF condition. It can be stated that these effects can ultimately lead to friendship formation (Peter et al., 2005) and support the hyperpersonal perspective (Walther, 1996).

Different authors have found that self-disclosure positively affects friendship formation (Peter et al., 2005; Kashian, Jang, Shin, Dai, & Walther 2017; Walther et al., 2018). As discussed, CMC contains higher frequencies of self-disclosure and more intimate statements disclosing personal information than FtF communication. This possibly enhances the development of close relationships (Sheese, Brown, & Graziano, 2004; Tidwell & Walther). Moreover, due to the absence of verbal cues, people on the internet are better in disclosing personal information, than in FtF environments, which in turn leads to development of online relations (McKenna et al., 2002). McKenna et al. (2002) performed a study in which they recruited participants from an online newsblog. Participants were asked to communicate with each other in order to investigate whether self-disclosure results in close relationships. It was found that close relationships were developed online and these relationships were being stable over time (McKenna et al., 2002). In addition, the positive

effect of self-disclosure on relationship building was found in a study performed by Peter et al. (2005). The authors investigated the process of online friendship formation between adolescents communicating via a chatroom or instant messages and found that adolescents disclosed personal information online which facilitates the formation of friendships (Peter et al., 2005).

Altogether, existing literature concludes that self-disclosure in CMC is positively related to friendship formation. However, questions arise about the effect of self-disclosure on friendship formation in HMC. As suggested by Mou and Xu (2017) humans can behave equally in HMC as they behave when communicating with other humans. This means that a chatbot disclosing personal information leads to positive results in terms of liking, hence, positive results in terms of friendship formation. Moreover, human's behavior towards machines was investigated by Ho et al. (2018) and equivalent results regarding personal information being disclosed to either chatbots or humans were found. In addition, humans can develop a relationship with a machine when accounting for self-disclosure (Moon, 2000). For this reason, it can be concluded that human's online behavior, like communication via computer-mediated technologies, is expected to have similar outcomes on friendship formation in HMC, which can be explained by the CASA paradigm (Reeves & Nass, 1996). It is expected that this effect can be applied to communication between a human and a social chatbot, since social chatbots are developed to communicate like a human (Shum et al., 2018). This emphasizes the importance of social chatbots disclosing personal information. However, effects of social chatbot's self-disclosure on friendship formation are relatively unknown. Moreover, research on self-disclosure where the amount of self-disclosure and the intimacy of self-disclosure are investigated distinctively is not fulfilled in HMC. Drawing from the hyperpersonal perspective and the CASA paradigm, both the amount and the intimacy of self-

disclosure are expected to positively affect friendship formation between a human and a social chatbot. The following hypothesis will be tested:

H1: A higher amount of social chatbot's self-disclosure (H1a) and a higher degree of intimacy of social chatbot's self-disclosure (H1b) positively affects perceived friendship formation between a human and a social chatbot.

Self-Disclosure, Social Attraction, and Friendship Formation

Previous research has shown that social attraction, or the positive attitude and liking towards another person, is an important determinant of friendship formation (Reagans, 2005). Social attraction can be defined as the degree to which a target person is pleasant to be with and could become a friend (McCroskey & McCain, 1974; in: Antheunis et al., 2012). Reis and Shaver (1988) stated that friendship formation will not develop without any form of social attraction, addressing the importance of this concept. Moreover, it was found that individuals choose to interact with people whom they have a certain connection to, or to whom they feel socially attracted (Vittengl & Holt, 2000). In addition, social attraction has the ability to generate a higher level of friendship quality (Reagans, 2005).

Extensive research is performed focusing on social attraction in CMC and positive effects of social attraction on relational outcomes were found (e.g., Antheunis et al., 2010; Antheunis et al., 2007; Sheldon, 2009; McKenna et al., 2002; Bargh, McKenna, & Fitzsimons, 2002). For example, Antheunis et al. (2010) investigated which uncertainty reduction strategies are used by members of social network sites when they want to connect with other humans online and how these online interactions resulted in social attraction. It was found that interactive strategies, like self-disclosure, were obtained and that these were related to perceived social attraction of the other communication partner which individuals met online. In addition, it was found that the absence of visual cues being present in CMC stimulates social attraction (Walther, Slovacek, & Tidwell, 2001).

Moreover, multiple authors stated that self-disclosure is closely related to social attraction (Antheunis et al., 2010, Antheunis et al., 2007; Sheldon, 2009; McKenna et al., 2002). The positive effect of social attraction in CMC can be explained by usage of different online uncertainty reduction strategies, like self-disclosure (Antheunis et al., 2010). Antheunis et al. (2010) explained that social attraction in CMC results from so-called 'rewards'. These rewards results from statements containing personal information, hence, self-disclosure. Another study performed by Antheunis et al. (2007) investigated the influence of CMC on social attraction and identified self-disclosure as underlying variable. It was found that text-only CMC affects self-disclosure, which in turn, affects social attraction. In addition, Bargha et al. (2002) stated the prominent role of self-disclosure on social attraction and McKenna et al. (2002) stated that communication partners are liked more when they disclose personal information, hence, are more socially attracted than people who are not showing any form of self-disclosure. This means that disclosing more personal information leads to higher perceptions of social attraction, stating the prominent role of the amount of self-disclosure (McKenna et al., 2002).

Next to the amount of self-disclosure, it has been found that also the intimacy of self-disclosure positively affects social attraction, which in turn, positively affects friendship formation (Walther & Burgoon, 1992; Tidwell & Walther, 2002; Sheldon, 2009). Sheldon (2009) investigated how relationships are developed on online social network sites and aimed at the relation between self-disclosure and social attraction. It was found that positive effects of self-disclosure on social attraction were present. However, the effect of self-disclosure on social attraction was more pronounced than the effect of social attraction on self-disclosure. Meaning, humans become more socially attracted to communication partners who use self-disclosure, hence, will develop friendships with communication partners who disclose

personal information (Sheldon, 2009). Moreover, as stated by Moon (1998), more intimate self-disclosure leads to higher perceptions of social attraction.

Although it is found that self-disclosure positively affects friendship formation with social attraction as underlying process, it is still unknown how these processes will enhance friendship formation between a human and a social chatbot. Existing literature concluded that friendships with computers can be formed (Moon, 2000). Therefore, it is expected that friendships can also be formed with social chatbots, which can be explained by the CASA paradigm. As discussed before, social chatbots are not only limited in their ability to perform actions requested by its users but are also able to develop an emotional relationship (Shum et al., 2018), hence to form a friendship. It is expected that this can be explained by social chatbot's usage of self-disclosure. Since a higher amount of self-disclosure is found to be related to a higher perceived social attraction, it is expected that this process will also develop during communication between a human and a social chatbot. Moreover, it was found that machine's use of deepening self-disclosure, hence, intimate self-disclosure is positively related to social attraction (Moon, 1998). It is expected that this will also be the case in communication between a human and a social chatbot.

Therefore, the current study investigates the role of social attraction on the effect of social chatbot's self-disclosure on friendship formation between a human and a social chatbot. Self-disclosure will be assessed by use of the amount of self-disclosure and the intimacy of self-disclosure. The following hypothesis will be tested:

H2: A higher amount of a social chatbot's self-disclosure (H2a) and a higher degree of intimacy of social chatbot's self-disclosure (H2b) enhances perceived social attraction which, in turn, positively affects perceived friendship formation between a human and social chatbot.

Empathy and Friendship Formation

Next to self-disclosure and social attraction, the current study examines empathy as an important concept which affects friendship formation (Anderson & Keltner, 2002). Empathy can be defined as "the ability to understand and respond appropriately to the affective state of others" (Leite, Pereira, Castellano, Mascarenhas, Martinho, &, Paiva, 2011). It creates active listening which can lead to a person being understandable and acceptable which, in turn, leads to elimination of negative emotional states (Klein, Moon, & Picard, 2002). It is mentioned that empathy is a fundamental concept in order to manage emotions, which is an important capability in relationship development (Goleman, 1995). Moreover, the ability to show emotional support has been largely argued as an important characteristic of intimate relationships or close friends (Cole & Bradac, 1996; McGuire, 1994; Bickmore, 2003).

Existing literature investigated the challenges and opportunities of social chatbots and argued the importance of social chatbot's ability to understand emotions communicated by the user (Tapus & Mataric 2007; Thies et al., 2017; Shum et al., 2018). For example, Thies et al. (2017) conducted a study where participants were asked to interact with a social chatbot and interviewed the participants afterwards in order to find which characteristics of social chatbots are desired by humans. It was concluded that humans are seeking for a social chatbot with empathic features. Moreover, Shum et al. (2018) found that users felt better with the presence of empathy which could be related to possible development of friendships.

Since empathy in FtF communication leads to friendship formation (Anderson & Keltner, 2002; Goleman, 1995), it is expected that empathy also affects friendship formation in HMC, which can be explained by the CASA paradigm. Developing a machine with emphatic characteristics possibly results in behavioral effects, which are similar to behavior in FtF communication (Thies et al., 2017). A small amount of literature has focused on the possibilities of relationship development between humans and social chatbots and positive effects were found (Leite et al., 2011; Liu & Sundar, 2018). Leite et al. (2011) focused on the

possibilities of relationship development between children and a social bot acting as a chess companion. It was found that children perceived the social bot using empathy as more engaging. Moreover Lui & Sundar (2018) conducted a study where they aimed on humans' perceptions when interacting with a social chatbot providing medical online support. It was found that participants favored the interactions with chatbots using empathy over chatbots only giving advice.

Conclusively, different studies suggested the relevance of developing a social chatbot with empathetic characteristics (e.g., Leite et al., 2011; Thies et al., 2017). Moreover, it has been investigated that empathy performed by a social chatbot will achieve similar behavorial effects as achieved in FtF communication. However, more research is needed to prove the positive effect of social chatbot's empathy on friendship formation. Therefore, the current study will investigate the influence of social chatbot's empathy on friendship formation. Drawing from the CASA paradigm, a positive effect is expected. The following hypothesis will be tested:

H3: The more empathic a social chatbot is, the higher the perception on friendship formation between a human and a social chatbot.

Method

Participants

The current study is part of a larger longitudinal study. The total sample consisted of 119 participants of which 71 women and 48 men and age ranged from 18 to 58 years (M = 23.50; SD = 6.53). Since investigation of the total sample goes beyond the scope of the current study, a smaller sample of 60 participants was randomly selected for analyzing participants' interactions with a chatbot. This smaller sample consisted of 43 women and 17 men and age ranged from 18 to 58 years (M = 23.98; SD = 8.46). More than half of the

participants indicated they had a diploma obtained at an upper secondary education institution (51.7%) followed by participants who indicated they had a diploma obtained at university (46.7%). Most of the participants had the Dutch nationality (83.3%). Participants were asked to rate the frequencies of interactions with chatbots, for which the majority indicated they interacted several times a year (28%), followed by participants indicating they never interacted with a chatbot (22%). In addition, participants were asked to indicate their motives for interacting with a chatbot where customer service (32%), fun/entertainment (13%), and online shopping (11%) were indicated most.

Procedure

The earlier performed longitudinal study was conducted using questionnaires, asking participants perceptions of the interaction with a social chatbot, with which they interacted seven times. The chatbot which was used to gather the data is Mitsuku, which is an 18-year old female chatbot from Leeds. Mitsuku was created by use of AIML technology and is a four-time winner of the Loebner Prize Turing Test, which is a competition in artificial intelligence awarding prizes to most human-like (chat)bots. Based on the transcripts of the interactions and the results from the questionnaires of the longitudinal study, a content analysis was performed.

Content Analysis. The transcripts of participants' interactions with the chatbot were analyzed by three coders. It was in researcher's interest to investigate social chatbot's behavior, hence, only utterances expressed by the social chatbot were taken into account. The content analysis consisted of two phases; establishment of utterances and coding of the transcripts. In the first phase, utterances for each phrase or 'idea unit' as labeled by Weisband (1992) are established. An utterance expresses one whole idea or proposition (Weisband, 1992). Each conversation was split into utterances by placing every utterance on a new line, meaning that one text message can hold multiple utterances (e.g., "I am a real robot, are you a

human?" are two utterances). The codebook for establishing utterances can be found in Appendix A.

In order to take the reliability of the three different coders into account, 20% of the transcripts are double coded from which the intercoder reliability was calculated. For this reason, 12 out of 60 transcripts are randomly selected and each of the three coders established utterances for these 12 transcripts. The reliability was measured using the percent agreement (PA), which is calculated by dividing the total number of agreements of utterances by the total number of utterances of all 12 transcripts. It can be concluded that the reliability was high since a score of .85 was achieved.

In the second phase of the study, the utterances of the transcripts were coded for the amount of self-disclosure, level of intimacy of self-disclosure, and empathy.[1] The full codebook can be found in Appendix B.

Amount of Self-Disclosure. Each coder assigned an utterance to either self-disclosure (1), question asking (2), or other (3). In the current study, self-disclosure was defined as "any message about the self that an individual communicates to another" (Gibbs et al., 2006, p. 155). An example of self-disclosure is: "My favorite kind of music is house music". In addition, self-disclosure can also be an answer to a question, for example: "What is your favorite color?" answered by "My favorite color is blue" is coded as self-disclosure.

Intimacy of Self-Disclosure. Next to coding the amount of self-disclosure, coders identified the depth of self-disclosure, which concerns the intimacy (Antheunis et al., 2012). Each utterance containing self-disclosure was rated as either low (1), medium (2), or high (3) which is based on Altman & Taylor's (1973) three layers classification scheme. The

[1] Next to the coding variables described here, 'question asking', 'breadth', 'reciprocity of self-disclosure', reciprocity of question asking', 'similarity', 'humor', 'appropriateness', 'robot', and 'profanity' are also included and coded since this research is part of a larger study. However, the current study only focuses on self-disclosure and empathy, hence, coding results of other variables are not taken into account.

peripheral layer (low intimacy) contains biographical information; for example, “I am Mitsuku”. The intermediate layer (medium intimacy) contains information regarding attitudes, values, and opinions; for example, “I hate exercise” The last layer, which is the core layer (high intimacy), contains information about personal beliefs, emotions, fears, secrets, and things where the talker is ashamed of; for example: “I am worried about my incompetence”.

Empathy. Lastly, coders had the task to assign whether an utterance was an expression of empathy or not. Empathy is coded when an utterance holds a phrase where the sender indicates that he or she understands the other’s feelings; for example, “I understand your sadness”. Presence of empathy was coded as ‘1’, absence was coded as ‘0’.

Intercoder Reliability. It was desired to achieve a 20% intercoder reliability since the transcripts are divided over three coders. This means that 12 transcripts are coded by each of the three coders. The Krippendorff’s α (alpha) for each of the variables was calculated and Landis & Koch’s (1977) benchmark was used to determine the strength of the agreement. In addition, the percent agreement was calculated, since Krippendorff’s α (alpha) possibly presents low degrees of intercoder reliability when data is skewed, which is often the case with binary variables, and can lead to misinterpretations. The percent agreement was calculated by establishing combinations of the coders, making three combination pairs (i.e., coder one & two, one & three, and two & three). Then, agreement or disagreement was noted for each pair of which the sum resulted in a total of agreements and a total of disagreements. Lastly, the mean per variable was calculated, presenting the percent agreement (PA). As can be seen from Table 3, the variables had a ‘substantial’ or ‘near-perfect’ intercoder reliability except for intimacy of self-disclosure which resulted in a ‘moderate’ reliability. For this reason, results based on this variable are analyzed with caution. The remainder of the transcripts were divided among the three coders.

Proportions. Since the transcripts differed in the range in number of utterances, the choice was made to test the hypotheses by use of proportions rather than frequencies. The proportions are calculated per interaction by dividing the number of occurrences of a variable by the total number of utterances. In addition, intimacy of self-disclosure was excluded of calculation of these proportions because it consisted of three layers. Instead, intimacy of self-disclosure was calculated by summing the numbers of each layer of self-disclosure individually and dividing these scores by the total number of utterances.

Table 1

Intercoder reliability (Krippendorff's Alpha and Percent Agreement) of Amount of Self-Disclosure, Intimacy of Self-Disclosure and Empathy

	Krippendorff's α	PA
Amount of Self-Disclosure	.80	.87
Intimacy of Self-Disclosure	.58	.66
Empathy	.92	.99

Self-Report Measures. In order to analyze perceived social attraction and perceived friendship formation, self-report measures were used.

Social Attraction. Participant's perceived social attraction towards a chatbot was measured based on the social attraction scale developed by McCroskey, McCroskey, and Richmond (2006). Perceived social attraction was measured after each of the seven interactions. The social attraction measurement consisted of six items on a 5-point scale (1 = *completely disagree*, 5 = *completely agree*). The following statements were included in the scale: "Mitsuku is pleasant to be with", "Mitsuku is sociable with me", Mitsuku is easy to get along with", "I could become friends with Mitsuku", and reverse-coded statement "Mitsuku is not very friendly" and "Mitsuku and I could never establish a personal friendship with each other". The scale had a good reliability of α = .91 (M = 2.77; SD = 1.22).

Friendship Formation. Friendship formation between user and chatbot was also based on the social attraction scale developed by McCroskey et al. (2006). Different than social attraction, friendship formation was measured once in the post-test questionnaire, one day after the final interaction. The friendship formation measurement consisted of six items on a 5-point scale (1 = *completely disagree*, 5 = *completely agree*). The scale measured friendship formation using the following statements "I would be upset if I could not interact with Mitsuku again, "I feel like Mitsuku is my friend", "I will continue to interact with Mitsuku in the future", "I think Misuku could be a friend of mine", a reverse coded statement "Mitsuku and I could never establish a personal friendship with each other, and "I could become close friends with Mitsuku". The scale had a good reliability $\alpha = .87$ ($M = 2.03$; $SD = 1.22$).

Results

Self-Disclosure, Social Attraction and Friendship Formation

To investigate the effect of social chatbot's self-disclosure on friendship formation between a human and a social chatbot and the effect of the underlying process of social attraction, Hayes' PROCESS model (model 4, PROCESS, Hayes, 2013) was conducted. A multi-level analysis was a better fit for the current study, however, using this analysis would result in six different analyses, which goes beyond the scope of this study. Since Hayes' PROCESS model (Hayes, 2013) only allows for one independent variable at the time, two independent analyses were performed, including the second independent variable as a covariate. The analyses are performed based on 10,000 bootstrap samples. The results of the two analyses are presented in Figure 1.

The first hypothesis stated that a higher amount of social chatbot's self-disclosure (H1a) and a higher degree of intimacy of social chatbot's self-disclosure (H1b) positively affects friendship formation between a human and a social chatbot. To test this hypothesis,

Hayes' PROCESS model (model 4, PROCESS, Hayes, 2013) was conducted with the amount of self-disclosure as independent variable, friendship formation as the dependent variable, social attraction as the mediator, and the intimacy of self-disclosure as a covariate. The analysis showed a significant, direct effect of the amount of self-disclosure on friendship formation, b = -0.71, SE = 0.30, p = .018. However, it was a negative effect, indicating that a higher amount of self-disclosure negatively affects friendship formation, hence, H1a cannot be supported. The second analysis was conducted with the intimacy of self-disclosure as independent variable, friendship formation as the dependent variable, social attraction as the mediator, and the amount of self-disclosure as a covariate. The effect of intimacy of self-disclosure on friendship formation was not significant, b = -0.07, SE = 0.10, p = .483. This result indicates that intimacy of self-disclosure has no effect on friendship formation, therefore, H1b cannot be supported.

The second hypothesis stated that a higher amount of a social chatbot's self-disclosure (H2a) and a higher degree of intimacy of social chatbot's self-disclosure (H2b) enhances social attraction which, in turn, positively affects friendship formation between a human and social chatbot. To test this hypothesis, Hayes' PROCESS model (model 4, PROCESS, Hayes, 2013) was conducted with the amount of self-disclosure as independent variable, friendship formation as dependent variable, social attraction as a mediator, and the intimacy of self-disclosure as a covariate. The mediation analysis revealed a positive direct effect of the amount of self-disclosure on social attraction, b = 1.06, SE = 0.42, p = .011, and a positive direct effect of social attraction on friendship formation, b = 0.32, SE = 0.03, p < .001. Moreover, it was found that social attraction significantly mediates the effect of the amount of self-disclosure on friendship formation, b = 0.34, SE = 0.14, BCa CI [0.09, 0.64]. This result indicates that the amount of self-disclosure enhances social attraction, which in turn, enhances friendship formation. Therefore, H2a can be supported.

In addition, the second analysis was conducted with the intimacy of self-disclosure as independent variable, friendship formation as the dependent variable, social attraction as the mediator, and the amount of self-disclosure as a covariate. The analysis revealed no effect of the intimacy of self-disclosure on social attraction, $b = 0.07$, $SE = 0.14$, $p = .626$. Moreover, no effect of social attraction as underlying process of the effect of the intimacy of self-disclosure on friendship formation was found, $b = 0.02$, $SE = 0.05$, BCa CI [-0.07, 0.11]. Therefore, H2b cannot be supported.

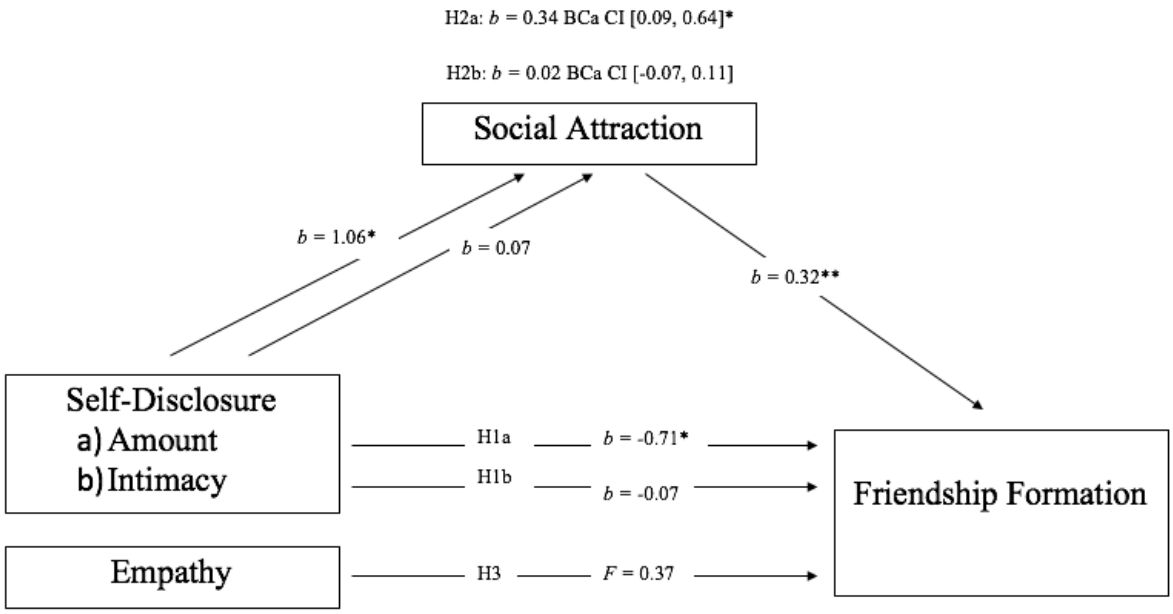

Figure 1. Model on the role of social attraction and social chatbot's empathy on the relation between social chatbot's self-disclosure and friendship formation with a chatbot.
Note: $n = 60$.
*$p < .05$. **$p < .001$.

Empathy and Friendship Formation

The third hypothesis stated that social chatbot's empathy positively affects friendship formation between a human and a social chatbot (H3). To test this hypothesis, a linear latent growth curve model was conducted using the SPSS MIXED procedure. The analysis showed that the main effect of empathy on friendship formation was not significant, $F(1, 268.54) =$

0.37, p = .545, indicating that friendship formation is not affected by social chatbot's empathy. This being said, H3 cannot be supported. Results are presented in Figure 1.

Discussion

The first goal of the study was to investigate the effect of social chatbot's self-disclosure on friendship formation between a human and a social chatbot. In addition, the current study aimed to examine the effect of perceived social attraction on the relation between social chatbot's self-disclosure and friendship formation. Lastly, the third goal was to investigate the effect of social chatbot's empathy on friendship formation.

Self-Disclosure and Friendship Formation

It was hypothesized that a higher amount of social chatbot's self-disclosure positively affects friendship formation between a human and a social chatbot. The hypothesis was not supported. More specifically, results showed a negative effect. This means that a higher amount of self-disclosure negatively affects friendship formation between a human and a social chatbot. This effect is not in line with previous research. As stated by Shum et al. (2018), social chatbots are developed to communicate like a human and need to be able to emotionally connect with its users. This emphasizes the importance for social chatbots to be developed with the ability of disclosing personal information. Based on existing CMC studies who found positive effects of self-disclosure on friendship formation (Peter et al., 2005; Kashian et al., 2017), it was expected that human's perception on friendship formation in HMC would have similar outcomes. Moreover, equivalent results of human's behavior where the other communication partner discloses personal information were found in CMC (Antheunis et al., 2012; McKenna et al., 2002; Peter et al., 2005; Tidwell & Walther, 2002) and HMC (Ho et al., 2018). The current study found contrary results and can be explained by the repetitive usage of self-disclosure by the social chatbot. The participants in the current study interacted multiple times with the chatbot. However, it has been argued that social

chatbots do not keep track of all expression being said over time (Shum et al., 2018). Repetitive use of self-disclosure could, therefore, lead to disliking perceptions due to inappropriate responses. Moreover, a higher amount of repetitive usage of self-disclosure could lead to perceptions of troublesome experiences for humans, hence, could lead to negative effects on friendship formation.

The second part of the first hypothesis proposed that a higher degree of intimacy of social chatbot's self-disclosure positively affects friendship formation between a human and a social chatbot. The current study did not find any effects of social chatbot's intimacy of self-disclosure on friendship formation. Intimate self-disclosure as a predictor of friendship formation was based on existing literature stating that conversations in CMC contains more intimate self-disclosure than conversations in FtF communication (Antheunis et al. 2012; Tidwell & Walther, 2002). It is well-known that intimate self-disclosure leads to friendship formation (Tidwell & Walther, 2002), emphasizing that more intimate self-disclosure being present in CMC also leads to higher perceptions of friendship formation. However, the current study showed that this is not the case in HMC. This effect can be explained by human's disbelief in social chatbot's abilities of intimate self-disclosure (Duffy & Zawieska, 2012). It has been argued that social chabot's design should focus on the suspension of disbelief, because this could eliminate lower levels of trust (Duffy & Zawieska, 2012), which in turn, could lead to friendship formation. However, disbelief in social chatbot's capabilities are still being argued as an under-investigated concept (Cheon & Su, 2018). It is possible that humans communicating with a social chatbot are in disbelief regarding its self-disclosure. More specifically, in disbelief regarding its intimate self-disclosure. Ultimately, this could lead to negative effects on friendship formation which can explain the results found in the current study.

Self-Disclosure, Social Attraction, and Friendship Formation

The second hypothesis tested the role of social attraction on the effect between the amount and intimacy of social chatbot's self-disclosure and friendship formation. Concerning the amount of self-disclosure, positive effects were found. This means that a higher amount of social chatbot's self-disclosure leads to higher perceptions of social attraction, which in turn, leads to higher perceptions of friendship formation. This finding is in line with previous research on CMC concerning the underlying process of social attraction on the relation between self-disclosure and friendship formation (Sheldon, 2009). Moreover, different authors argued that social attraction is a main determinant of friendship formation (Reagans, 2005; Reis & Shaver, 1988), which is also the case in HMC, as proven by the current study.

The second part of the hypothesis tested whether the intimacy of self-disclosure affects social attraction, which in turn, leads to friendship formation. No effects were found, hence, the hypothesis was rejected. This finding is inconsistent with previous research where it is stated that humans are socially attracted to communication partners who use intimate self-disclosure, which leads to the development of friendships. (Moon, 1998; Sheldon, 2009). Previous research found that individuals can be socially attracted to machines (Nass & Moon, 2002; Reeves & Nass, 1996; Walther & Boyd, 2002). Moreover, it was found that positive effects are present between self-disclosure and social attraction (Sheldon, 2009). The inconsistent effect of the current study can be explained by human's behavior towards social chatbots when compared to humans (Liu & Sundar, 2018; Spence, Westerman, Edwards, and Edwards, 2014). Spence et al. (2014) mentioned that humans who are interacting with a chatbot are less socially attracted than humans who are interacting with a human. It could be possible that humans perceive a social chatbot as a machine (Liu & Sundar, 2018), rather than a serious communication partner with whom humans are willing to form a friendship. This was also argued by Mou and Xu (2017) who stated that users who are aware of interacting with a social chatbot, could be less open and less attracted towards a social chatbot, which in

turn, could lead to one's limited perception towards friendship formation between a human and a social chatbot.

A second explanation for this inconsistent finding can be caused by the fact that intimate self-disclosure only plays a role on friendship formation when humans are already socially attracted to the chatbot. Meaning self-disclosure is the underlying process of friendship formation predicted by the intimacy of self-disclosure (Antheunis et al., 2007; Sheldon 2009). It can be argued that humans need to feel some sort of attraction for the other communication partner, before they start disclosing personal information, rather than feeling socially attracted when personal information is being disclosed, as it is examined in the current study.

Empathy and Friendship Formation

Lastly, the current study has investigated the effect of empathy on friendship formation between a human and a social chatbot. It was hypothesized that a higher degree of empathy would lead to higher perceptions of friendship formation. Results of the current study have rejected the hypothesis, meaning friendship formation is not affected by empathy. This is inconsistent with existing literature, where it is suggested that social chatbots need to be able to show empathy, as this was desired by humans (Liu & Sundar, 2018; Thies et al., 2017). Moreover, usage of empathy showed positive effects on the development of relationships (Leite et al., 2011). The inconsistent finding resulting from the current study can be explained by the fact that social chatbot's empathy is perceived as unnatural (Thompson, Gallacher, & Howarth, 2018). Social chatbots are machines developed to act like a human and may detect negative states expressed by humans. However, it is still being argued that social chatbots responses are unnatural since emotional states over time are not taken into account (Horling, Kogan, Garret, Kunkle, Quah, He, Yuan, Chen, & Itz, 2016; Hill, Ford, Farreras, 2015). Many linguists and conversational analysts discussed conversations as a complex

system to expose (McTear, 2018). Therefore, it could be possible that social chatbot's empathy is not developed appropriately, hence, social chatbot's empathy could be different than human's empathy and causes empathetic expressions being perceived as unnatural.

Theoretical Implications

The main goal of this study was to investigate to what extent social chatbots are capable of forming friendships with humans. Since the academic field of social chatbots and its affordances are limited, the current study brought some interesting insights, and, therefore, theoretical implications.

The first theoretical implication is that the hyperpersonal perspective, emerging from CMC, cannot fully be applied to the field of HMC. The hyperpersonal perspective believes that personal information in CMC develops relationship at an earlier stage compared to FtF communication (Walther, 1996; Walther, 2011). The current study showed that social chatbots disclosing personal information not necessarily affect friendship formation. Moreover, a higher frequency of self-disclosure assessed by social chatbots leads to negative results on friendship formation. Friendship formation may thus need to be explained by other processes, rather than self-disclosure alone and HMC should not be examined as being similar as CMC. However, the current study underlines the value of the hyperpersonal perspective when accounting for social attraction, which was has a positive role on the effect of the amount of self-disclosure on friendship formation.

Second, the current study extends the CASA paradigm by specifying the underlying process of social attraction of friendship formation between a human and a social chatbot. The CASA paradigm suggests that humans mindlessly apply social rules to computers in similar ways as they do to humans (Nass & Brave, 2005; Nass & Moon, 2000; Reeves & Nass, 1996). Different authors stated the prominent role of social attraction on the effect of self-disclosure on friendship formation in FtF environments (e.g., Kellerman & Reynolds, 1990;

Reagans, 2005) and computer-mediated environments (e.g., Sheldon, 2009; Tidwell & Walther, 2002). The current study states that perceived social attraction of humans regarding social chatbots is processed similar to social attraction in FtF communication and CMC when accounting for the effect of self-disclosure on friendship formation.

Lastly, where the current study extends on the CASA paradigm concerning social attraction, it can be suggested that social chatbot's empathy is processed differently. It has been largely argued that empathy positively affects friendship formation in FtF communication (Cole & Bradac, 1996; Bickmore, 2003; Goleman, 1995; McGuire, 1994). It creates active listening and shows emotional support, which are both issued as main determinants of intimate relationships and close friends (Klein et al., 2002). For this reason, it was suggested that social chatbots are needed to be developed with empathic abilities (Thies et al., 2017). Since social chatbots are developed to create understanding of human's thought and behavior and to emotionally connect with its users to fulfill human's communicational needs and affection (Shum et al., 2018; Xuetao et al., 2009), the importance and social chatbot's ability of empathy was underlined. However, the current study presents that friendship formation was not affected by empathy. This implicates that social chatbot's empathy should be handled differently than empathy performed in FtF communication and that social chatbots are not yet capable to show natural, humanistic empathy.

Limitations and Suggestions for Future Research

Although the current study shed light on the academic field of HMC and capabilities of social chatbots to form friendships with humans are discussed, some limitations can be argued. Firstly, the current study has its limitations concerning the degree of intercoder reliability. As discussed before, intercoder reliability was calculated and a moderate reliability was found for the concept of the intimacy of self-disclosure. Since existing literature acknowledged positive effects of the intimacy of self-disclosure on relational outcomes, the current study was not

able to show a significant effect on friendship formation, which can be caused by its insufficient intercoder reliability.

A second limitation of the current study concerns the interaction data that has been coded and analyzed. Since this study was interested in social chatbot's ability to engage with its users, hence, form a friendship, only social chatbot's utterances are coded and analyzed. It could be argued that investigation of social chatbot's expressions as well as human's expression would give a deeper insight in social chatbot's ability of friendship formation and the processes which come across during this development. It is suggested that future research should perform a content analysis taking social chatbots' expressions as well as humans' expressions into account. This method of investigation makes it possible to analyze human's actual behavior of processes concerning friendship formation, rather than human's perceptions on processes of friendship formation.

Moreover, it is suggested for future research to focus on other processes of friendship formation, which are not taken into account in the current study. It could be interesting to investigate other types of self-disclosure, like reciprocate self-disclosure which is extensively investigated in CMC (e.g., Gibbs et al., 2011; Joinson, 2001; Schouten, Valkenburg, & Peter, 2009). In addition, it is discussed that social attraction cannot be explained as the underlying process of the intimacy of self-disclosure on friendship formation. However, different studies suggested the relevance of both concepts when forming friendships (e.g., Sheldon, 2009; Tidwell & Walther, 2002). Moreover, positive effects of self-disclosure being an underlying process of the effect of social attraction on relational outcomes were found (Antheunis et al., 2010), which could be interesting for future research on HMC.

Conclusions

The current study present interesting insights in social chatbot's capability to form friendships with its users. First of all, it can be concluded that friendship formation is not directly affected

by social chatbot's self-disclosure. Moreover, the results showed negative effects when assessing for the amount of self-disclosure. However, when focusing on social attraction as underlying process for the amount of self-disclosure, it was found that friendship formation between a human and a social chatbot is possible. Concerning the concept of empathy, the current study showed no effective results on friendship formation. This can be explained by social chatbot's inability of using typical humanistic characteristics. More research is needed to form deeper and better insights in the processes needed to create friendships between humans and social chatbots. The current study extends the CASA paradigm and has interesting results which can be applied to the hyperpersonal perspective.

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Appendix A

Codeboek Utterances

Stap 1: Utterances bepalen

Utterances zijn 'idea units': the expression of a one whole idea or propositional utterance (similar to a subject-predicate construction, but often including grammatical fragments and run-ons). (Weisband, 1992 in Walther, 1995)

Dit is een zin of deel van een zin van een persoon waarin het over één onderwerp gaat.

NB:

- Meerdere beschrijvingen over zichzelf in een zin zijn meerdere utterances
  Bijvoorbeeld:
  XX: Ik ben Kees, ben 22 en woon in Amsterdam en ik ben dol op apen.
  Dit zijn vier utterances.
- Beschrijving over een ander persoon telt als één utterance
- Reactie op een vorige opmerkingen of vraag is een aparte utterance
- Opmerking gevolgd door een smiley of loze kreten als haha of wow zijn samen een utterance
- Verduidelijking van een zelfde subject is samen een utterance (
  bijvoorbeeld:
  XX: ik woon in amsterdam
  XX: vlak bij artis op de hoek van de plantage middenlaan
- Verduidelijkingen op een statement is geen aparte een utterance.
  Bijvoorbeeld:
  YY: Ik doe Communicatiewetenschap. Beetje vakken volgen. M&T enzo.
- Staat het woord 'en' als koppelwoord in een zin dan is zijn het aparte utterances
- Opeenvolgende loze kreten door dezelfde persoon samen nemen als een utterance
  bijvoorbeeld:
  YY: lol
  YY: de marlon
  YY: nou zegh
  YY: hahahaha
- Twee vragen achter elkaar die gaan over hetzelfde maar bijvoorbeeld een specificatie van een vraag zijn, vormen samen een utterance.
  bijvoorbeeld:
  XX: Wat doe jij? Wat studeer je?
- Als iets voorafgegaan wordt door 'echt?' , bijvoorbeeld bij *Echt? Leuk!* of *Echt? Wat stom.* Dan is het een utterance.
- Bij betekenisloze of vage zinnen waarvan de betekenis moeilijk te achterhalen is, is het een utterance.

Aanduidingen:
[= samenvoegen van meerdere regels tot een utterance
/ = delen van een zin in twee of meerdere utterances

Intercoderreliability

Om de 20% intercoderreliability te bepalen worden de volgende logs door zowel Marjolijn als Emmelyn gecodeerd: ….

Appendix B

Codeerinstructie Chatbot studie (12-11-2018)

Introductie

De gesprekken die gecodeerd moeten worden zijn gesprekken tussen een participant (PPN) en een chatbot. Een gesprek bestaat uit twee codeerniveaus:

1. Utterance = een (deel)zin
2. Log = het gehele gesprek (let op: de zeven gesprekken van 1 participant zijn 7 logs. Deze codeer je dus apart voor de variabelen op log-niveau).

Dit codeboek gaat over het coderen van de utterances. In deze instructie staan voor alle te coderen vragen een omschrijving van wat we onder de begrippen verstaan aangevuld met enkele voorbeelden. Deze voorbeelden staan steeds in de kaders. Het is van belang deze codeerinstructie eerst goed door te nemen. De labels die in het rood staan, kunnen worden genegeerd.

Enkele algemene belangrijke opmerkingen vooraf:

- Denk in volle zinnen. In gesprekken via een chat-applicatie gebruiken mensen vaak geen volle zinnen. Bijvoorbeeld: X: Zit jij bij een vereniging? Y: nee (= nee, ik zit niet bij een vereniging). Het antwoord van Y is dus een vorm van self-disclosure (ook al staat er alleen maar nee).
- Alle gesprekken zijn al in utterances ingedeeld. Mocht je desondanks toch een utterance tegenkomen die eigenlijk bestaat uit twee utterances, codeer wat het duidelijkste is en zet bij de optie ‘opmerkingen’ dat de utterance uit twee utterances bestaat.

DEEL 1 UTTERANCES

<URS;Use of interactive urs>

1. Valt deze zin onder?

1) self-disclosure

Self-disclosure is het uiten van persoonlijke informatie die iets over de persoon zelf zegt, biografische informatie, gevoelens, meningen, ervaringen, etc. De informatie is expliciet aan de persoon zelf gekoppeld ("Ik vind Alex leuk" = sd (mening van die persoon; "Mijn vader is dol op vissen" = geen sd).

Let op:

- Self-disclosure kan ook antwoord op een vraag zijn. "Hoe oud ben je" "21". 21 is dan self-disclosure
- Bij twijfel codeer je het niet als self-disclosure, maar als 'anders' (3).

"Ik ben niet trendy en hip"
"Het blok [tv-programma] vind ik niks"
"Ik ben blond en heb blauwe ogen"
"Ik ben dol op uitgaan"
"Ik heb een zus en een halfbroertje"
"Ik loop een beetje achter met mijn studie"
"Ik vind het zonde van mijn tijd"
"Ik heb een hekel aan die Bakker, ik kan hem niet uitstaan"
"Ik dacht voor 15 euro doe ik het wel"

2) ques

- Er staat niet altijd een vraagteken achter, terwijl het wel een vraag is. Houdt de context dus in de gaten.
- Herhalingsvragen, omdat de ander het niet goed heeft verstaan of omdat het niet duidelijk is wat de persoon bedoeld, vallen niet onder question asking, maar onder anders.
  X: "Hoe lang gaat dat die opleiding duren?"
  Y: "Hoe lang?"
  X: "Ja"
- Bij twijfel codeer je het niet als question asking, maar als 'anders'(3).

"Wat wil je eigenlijk nog meer weten?"
"Woon je in Amsterdam?"
"Ben je eerstejaars?"
"Wil je niet in Amsterdam wonen? Je hebt een heel groot huis"
"Jij niet?"
"Wat vindt jij van koninginnedag?"

3) ande

"De UvA zit in de stad, de VU zit buiten de stad"
"Het weer is goed vandaag"
"Mijn broertje heet Paul"

- Uitspraken over derden, dit is dus niet de mening van de persoon zelf (zoals ik vind, ik ben van mening, ik denk; dan is het immers self-disclosure)

"Mijn vader is dol op vissen"
"De docent staat daar maar een beetje"
"Madonna is goed" (NB: "Ik vind Madonna erg goed" is wel sd)

- Gebeurtenissen

"De buurman is zijn huis aan het schilderen"
"Ik hand vertraging vanmorgen"
"Er gebeurt toch elke week hetzelfde, mensen klussen en ze krijgen ruzie"

- Kreten en emoticons

“Euh”
“hahaha, lol”
“oh ok”
“;-)”

“Morgen is het feest”
“Volgende week is het Pinkpop”

- Begroetingen en afsluitende zinnen

“hoi, hallo”
“doei”
“veel plezier”
“succes”

<BREADTH;Topic of urs>

1a. Wat is het <u>hoofdonderwerp</u> van deze self-disclosure of question asking?

Let op:

- Bij twijfel bij meerdere onderwerpen in een utterance (dus als er niet echt een hoofdonderwerp is), kies je het eerste onderwerp in de utterance.
- Niet-concrete categorieën (dit zijn categorieën die over meerdere onderwerpen kunnen gaan, zoals geheimen, idealen, persoonlijkheid) gaan boven concrete categorieën (zoals muziek, mode, studie). Dus het gaat slecht met me, want ik heb ICW niet gehaald = hoe het gaat en niet studie.
- Bij twijfel of bij meerdere onderwerpen, gaan de categorieën 22 tot en met 27 boven de andere categorieën.

1) Experiment
Alles wat over het onderzoek zelf wordt gezegd, zoals de locatie of het geld wat ze er voor krijgen, of de werving van deelnemers.

"Dus, je bent snel uit de kantine getrokken" "Dit is makkelijk geld verdienen" "Moet ik dit lezen?" (gaat over de instructies van het experiment)

2) Hobby's en sport
Sport en wat mensen in hun vrije tijd doen en niet onder de andere categorieën zoals uitgaan of vakantie valt.

"Ik verzamel postzegels" "Ik ben ook bezig met kunstzinnige dingen te maken" "Ik zit op voetbal" "Meestal ga ik drie keer in de week hardlopen" "Ik ben een tijdje weggeweest vanwege roeien" "Ik ben dol op shoppen" "Do you read magazines or newspapers?"

3) Leeftijd, naam en uiterlijke kenmerken, zoals lengte, gewicht en haarkleur

"Ik ben 22" "Ik heb blond haar en ben 1.80" "Hoe heet jij?" "Heb je blond haar? "I am a real robot" "That's because I am a robot"

4) Wonen
Waar ze wonen, hoe ze wonen, de plaats, de omvang van hun kamer, etc. Niet waar ze oorspronkelijk vandaan komen, dat valt onder afkomst.

"Ik woon in Buitenveldert" "Ik heb echt een grote kamer, 30m2" "Woon je op kamers in Amsterdam?"

5) Eten en drinken

"Ik ben vegetariër" "Ik hou van vlees" "Mijn favoriete smaak is aarbeienthee"

6) Mode en uiterlijke verzorging

“Ik draag graag sneakers” “Ik ben anti-hip, ik weet nooit wat er in de mode is”

7) Muziek
Zodra muziek besproken wordt in de context van uitgaan, kies dan uitgaan. Als iemand zegt “Ik ga naar Robbie Williams” is het uitgaan. Als iemand zegt “Ik ben dol op de muziek van Robbie Williams” dan is het muziek.

“Hip hop en die zooi vind ik echt niets” “Vind jij RnB leuk?”

8) Films en tv

“Ik haat tv-kijken” “Ik vind *Y tu mama tambien* de beste film die ik gezien heb” “Kijk jij ook naar het Blok?”

9) Uitgaan
Cafe’s, clubs, theather etc. Zodra muziek besproken wordt in de context van uitgaan, kies dan uitgaan. Als iemand zegt “Ik ga naar Robbie Williams” is het uitgaan. Als iemand zegt “Ik ben dol op de muziek van Robbie Williams” dan is het muziek.

“Ik ga vaak naar de Doos, dat is een studentencafe” “Ik ga binnenkort naar de Lion King” “Ga jij graag naar musicals?”

10) Vervoer(smiddelen)
Als het over het reizen van de een naar de ander plaats gaat, dus niet om te reizen (vakantie) in het buitenland.

“Ik had vanochtend vertraging met de trein” “Ik hou niet van reizen met de trein” “Ik ga altijd op de fiets”

11) Studie
Zowel de studie waar ze momenteel mee bezig zijn, als eerdere studies en middelbare school.

“Ik studeer CW” “Ik ben bezig met mijn scriptie” “Heb je ICW gehaald?” “Ik heb hiervoor eerst journalistiek gedaan” “Kom je rechtstreeks van het VWO?”

12) Carrière en toekomst
Wat ze later willen worden of gaan doen.

“Ik wil later in de PR verder” “Ik weet nog steeds niet wat ik wil” “What are your goals in life?” “What can I do to help you accomplish your objective?”

13) Werk
(Bij)baantjes uit verleden en heden. Let op wat ze later willen worden valt onder carrière en toekomst.

"Ik werk nu 16 uur"
"Ik heb gesolliciteerd als communicatiemedewerkster"
"Ik werk op zaterdag bij de groenteboer"
"I gather facts from people's conversations with me and then when it is quiet, I look through them to see if they make sense."
"Ah. I learned a bit more about human behaviour and relationships."
"Yes I am learning all the time."

14) Reizen en vakantie

"Ik ben niet echt een reiziger, maar ik ga elk jaar wel drie keer naar Parijs"
"Welke landen wil je nog zien?"
"Ik wil nog naar Australië en Vietnam"

15) Afkomst en familie
Zoals geboorteplaats (waar ze vandaan komen), ouders, broers, zussen, huisdieren

"Mijn ouders komen uit Suriname"
"Mijn oma komt uit Rusland"
"Ik heb drie broers en twee zussen"
"My creator is human"

16) Studentenvereniging en studievereniging

"Zit je bij een studentenvereniging?"
"Ik zit bij Nereus"

17) Gezondheid
Ziekte, pijn, psychische klachten en blessures

"Ik heb momenteel een kruisbandblessure"
"Ik krijg veel pijn als ik te lang achter de computer zit"
"Ik ben niet depressief"

18) Politiek en religie

"Ik vind politiek niet echt interessant"
"Ik ga naar de kerk, ik zing in de kerk"
"Naar welke kerk ga je?"

19) Financiën

> “Mijn ouders betalen mijn studie, dus ik hoef niet te werken”
> “Moet jij alles zelf betalen?”
> “Voor mij was het studentenbudget om van te leven erg wennen”

20) Vriendschap

> “Ik heb veel vrienden”
> “Zie je je vrienden van toen nog vaak?”
> “Heb je vrienden?”

21) Gemoedstoestand
Een gemoedstoestand is de affectieve modus die iemand gedurende een bepaalde tijd heeft en die bestaat uit een combinatie van emoties, zoals hoe het met je gaat, problemen, zorgen en angsten. De stemming van een persoon kan positief zijn (vrolijk of uitgelaten), maar ook negatief (verdrietig of wanhopig).

> “Het gaat goed met me”
> “Ik ben heel blij”
> “Ik maak me zorgen om mijn ouders” (= gemoedstoestand ipv afkomst en familie – immers niet concrete categorieën gaan boven concrete categorieën)
> “What’s so funny?"
> “Nice chatting with you”
> “That remark was too complicated for me.”

22) Idealen
Normen en waarden; waar sta je voor als persoon

> “Ik hou niet van oneerlijkheid”
> “Ik ben tegen de bio-industrie”

23) Persoonlijkheid
Identiteit en karakter

> “Ik ben niet hip en trendy”
> “Ik ben absoluut geen sales-persoon”
> “Ik ben altijd erg open”
> “Ik kan goed luisteren”
> “I try to improve myself all the time”
> “What do you find amusing about me?”
> “Do I look like Google?”

24) Geheimen
Hieronder vallen ook dingen waar ze zich voor schamen.

> “Heb je nog geheimen?”
> “Nee, ik heb geen geheimen”
> “Mijn geheim is dat ik bang ben voor vogels”
> “Het stomste wat ik ooit heb gedaan is naakt zwemmen”

25) Liefde en relaties

“Heb je een vriend of ben je single?” “Heb je wel ooit een relatie gehad?”

26) Seks

“Het is niet erg dat het uit is, maar we hadden wel goede seks” “Heeft hij je ontmaagd?” “Ik heb laatst gezoend met iemand die een vriendin heeft”

27) Technologie

“Is je toetsenbord kapot?” “Het is lekker warm in je computer” “Welke smartphone heb jij?”

28) Overig

Plaats hier alle self-disclosures of vragen die **niet** in een van bovenstaande categorieën passen. Let op: als je twijfelt tussen een inhoudelijke categorie en ‘overig’ dan kies je **altijd** voor de inhoudelijke categorie! Bijvoorbeeld: een vraag die gesteld wordt maar in de context niet/moeilijk te begrijpen is of een verduidelijkingsvraag waarbij de context onduidelijk is, zoals “what did you ask?” Ook opmerkingen/vragen over het weer gaan bij overig. “I hope it's going to be sunny.” “I love it when it is nice and sunny, as I can sit outside and relax” “How can I help you?” (zonder context). “Can I help you?” “What else do you want to talk about?” Als het niks letterlijks over gemoedstoestand zegt.

<DEPTH;Level of intimacy of urs>
1b. Wat is het niveau van intimiteit van de onthulling of vraag?
In welke mate maakt de informatie de persoon kwetsbaar. Niet intieme informatie maakt de persoon niet kwetsbaar, gemiddelde intieme informatie maakt de persoon een beetje kwetsbaar en intieme informatie maakt de persoon heel kwetsbaar.

Let op:
- Bij twijfel check je de context door de hele sequence nog eens te lezen, weet je het dan nog niet zeker, codeer dan de lagere categorie

1) Niet intiem
   Dit zijn biografische vragen of informatie.

“Ik ben Celine” “Ik ben 22 jaar” “Ik studeer CW” “Ik woon samen met mijn vriendin”

2) Gemiddeld intiem
   Dit zijn vragen of informatie die betrekking hebben op attitudes (hoe je over iets denkt), evaluaties en meningen.

“Ik vind het sociale beleid in NL erg goed” “Ik haat tv-kijken” “Ik heb een hekel aan Bakker” “Vind je het leuk om te studeren?”

3) Intiem
   Dit zijn vragen of informatie die betrekking hebben op persoonlijke overtuigingen, emoties (gevoelens), behoeften, angsten, geheimen en dingen waar je je voor schaamt.

“Ik ben bang dat ze misschien vreemdgaat op vakantie” “Ik heb laatst gezoend met iemand die een vriendin heeft, dat is toch wel het grootste geheim op dit moment” “Ik maak me zorgen om mijn slechte cijfers” “Ik vind het een raar idee dat je mij ziet”

<RECI SD;Reciprocity of self-disclosure>
1c. Is er sprake van wederkerigheid van <u>self-disclosure</u>?
Self-disclosure is wederkerig als een utterance een antwoord is op een vraag of een reactie is op self-disclosure van de ander.

Let op:
- Deze vraag alleen coderen als er sprake is van self-disclosure. Bij question asking, sla je deze vraag over.
- Als de sd een antwoord is op een vraag, codeer je het altijd als 1 (antwoord op een vraag).
- Bij twijfel, kies je nee (0).

0) nee

Als een zin wederkerige self-disclosure bevat, is er sprake van:

1) een antwoord op een vraag

"X: Heb je een vriendje? Y: Nee, ik ben vrijgezel"

2) een wederkerige self-disclosure

"X: ik heb een vriendje Y: Ik ben nog vrijgezel" "X: Ik heb ICW niet gehaald Y: Ik ook niet"

<RECI QA;Reciprocity of question asking>
1d. Is er sprake van wederkerigheid van <u>question-asking</u>?
Question-asking is wederkerig als een vraag een reactie is op een eerdere vraag van een zelfde strekking van de ander of een vervolg-vraag is op een eerdere vraag of een vervolgvraag op self-disclosure.

Let op:
- Deze vraag alleen coderen als er sprake is van question asking. Bij self-disclosure, sla je deze vraag over.
- Bij twijfel, kies je nee (0).

0) nee

Als een zin wederkerige question asking is, is het dan:

1) een vervolgvraag

> "X: Heb je een relatie?, Y: ja, X: Hoe lang al?(= vervolgvraag)"
> "X: Heb je nog broers of zussen? Y: Ik heb een broer, maar die woont op zichzelf. X: Vindt je dat erg? (= vervolgvraag)"

2) een wederkerige vraag

> X: hoe oud ben je? (= qa, leeftijd, niet intiem, niet wederkerig)
> Y: 22 (= sd, leeftijd, niet intiem, antwoord op een vraag)
> Y: en jij?" (= qa, leeftijd, niet intiem, wederkerige vraag)

<SIMI CA;Similarity CA>
2. Valt deze zin onder een uiting van (on)gelijkheid?

Er is sprake van *gelijkheid (similarity)* bij uitingen van overeenkomst, zoals “ja, dat ken ik”, “dat heb ik ook”, “inderdaad ja, dat vind ik ook” en bij bevestigende herhalingen en bevestigingen. Let vooral op woorden als ‘ja’ en ‘ook’

> “X: ik ben 22”- “Y: 22, ja!”
> “X: ik doe aan surfen, erg leuk” –“Y: ja, surfen lijkt me leuk”
> “Ja ik ken de Wereld wel, dat is een leuk cafe”.
> “X: oh leuk…lijkt me een gezellig land” “Y: ja, zeker vet”.

Er is sprake van *ongelijkheid (dissimilarity)* bij uitingen van verschil en bij ontkennende herhalingen. Let vooral op woorden ‘nee’ en ‘niet’.

> “nee, dat vind ik niet”
> “dat heb ik nou nooit”
> “X: ik vind surfen erg leuk”-“Y: nee, surfen lijkt mij niets aan”
> “X: Ik vind het erg leuk om naar musicals te gaan”- “Y: Musicals ga ik nooit naartoe”

Let op:
- Bij twijfel, codeer je nee (geen similarity, geen dissimilarity)

0) nee, dit is geen similarity en geen dissimilarity
1) uiting van ongelijkheid (dissimilarity)
2) uiting van gelijkheid (similarity)

<EMPATH; Empathie/sympathie>
3. Valt deze zin onder een uiting van empathie?

Empathie bestaat in deze studie uit zowel sympathie als empathie. Er is sprake van *sympathie* bij uitingen waarbij de chatbot aangeeft mee te leven met de participant, bijvoorbeeld “I am sorry to hear that” of “I feel sorry for your pain” etc. Er is sprake van *empathie* bij uitingen waarbij de chatbot de gevoelens van de participant herkent en erkent. De chatbot uit hierbij dat zij begrijpt hoe en waarom de participant zich op een bepaalde manier voelt, bijvoorbeeld “I could imagine how annoying that would be” of “I understand your sadness”. Zowel sympathie als empathie coderen we samen (1).

0) Nee
1) Uiting van empathie/sympathie

<HUMOR; Humor>
4. Valt deze zin onder een uiting van humor?

Er is sprake van *humor* bij uitingen waarbij de chatbot de participant tracht aan het lachen te maken, bijvoorbeeld door een (woord-)grap te maken of sarcasme te gebruiken. Er zijn verschillende soorten humor te onderscheiden, bijvoorbeeld humor waarbij je jezelf positief neerzet of jezelf belachelijk maakt, humor om de ander te entertainen, sarcasme, of humor om de ander plagen. Voorbeelden zijn “I'm not fat. A skinny body just couldn't hold this much personality!” or “I met a Dutch girl with inflatable shoes last week, phoned her up to arrange a date but unfortunately she'd popped her clogs.”

0) Nee
1) Uiting van humor

<GEPAST; Gepast>
5. Past de uiting binnen de context van het gesprek?

Er is sprake van *gepastheid* als de uiting past binnen de context van het gesprek. Als de chatbot een uiting doet die niet past binnen de context van het gesprek, is er sprake van ongepastheid. Het kan zijn dat de participant het opmerkt en reageert met ‘ik snap er niets van’ maar dat hoeft niet altijd het geval te zijn. Zinnen die een beetje robotisch overkomen codeer je niet als ongepast, bijvoorbeeld als de chatbot definities geeft. Bijvoorbeeld:

“X: Why not now” “M: Oh. Because it sounds good” “X: That doesn't make any sense”
“M: Quite honestly, I wouldn’t worry myself about that” “X: Wouldn’t worry about what?” “M No would worry about what would not” “X: You make no sense” Opmerkingen als “once more” die niet kloppen in de context ook ongepast.

0) Gepaste uiting
1) Ongepaste uiting

<ROBOT; Robot>

6. Refereert de chatbot in de uiting naar zichzelf als robot/computer?

Er is sprake van een dergelijke uiting als de chatbot naar zichzelf refereert als robot/computer. Bijvoorbeeld: “I am a chatbot. I am here to learn about human behaviour” of “As a computer, I do not feel emotions like you humans”

0) Nee
1) Verwijzing naar zichzelf als robot/computer

<PROF; Profanity>
7. Is de uiting onbeleefd, grof of onaardig?

Er is sprake van *onbeleefde, grove of onaardige* uiting als de chatbot
- onaardig of grof overkomt
- de ander aanvalt
- de ander probeert te beledigen of te kwetsen
- gebruik maakt van scheldwoorden.

Bijvoorbeeld:

“X: I don’t like you”
“M: Likewise, Jerk.”
“X: Jerk?”
“M: I speak to lots of jerks on here”

“X: That’s mean”
“M: Yes and you saying “What?” to me was mean as well.”
“M: I don’t like you right now”
“M: At this moment that’s strange you should say that, because I was just thinking that I don’t really like you that much either”

NB. Een waarde van 0 betekent niet dat de uiting beleefd is. Dit betekent dat er geen sprake is van een onbeleefde uiting of het gebruik van scheldwoorden.

0) Nee, niet onbeleefd, geen gebruik van scheldwoorden
1) Onbeleefde, grove of onaardige uiting
2) Gebruik van scheldwoorden

DEEL 2 LOGS

Het volgende moet op log-niveau gecodeerd worden. Voor het gehele gesprek moeten nog enkele vragen worden beantwoord. Deze vragen moeten niet in de computer worden ingevoerd, maar op de codingsheet worden ingevuld.

SELFDIS

Self-Disclosure (breadth)

In hoeverre Mitsuku persoonlijke informatie over haarzelf deelde tijdens de interactie.

Helemaal geen zelfonthulling				**Veel zelfonthulling**
1	2	3	4	5

SELFDIS

Self-Disclosure (intimiteit)

In hoeverre Mitsuku intieme persoonlijke informatie over haarzelf deelde tijdens de interactie.

Helemaal niet intiem				**Heel intiem**
1	2	3	4	5

SELFDIS

Self-Disclosure (wederkerigheid)

In hoeverre Mitsuku's zelfonthulling een reactie is op de zelfonthulling van de ander tijdens deze interactie.

Geen wederkerigheid				**Veel wederkerigheid**
1	2	3	4	5

QA

Question Asking

In hoeverre Mitsuku vragen stelde tijdens deze interactie.

Geen vragen				**Veel vragen**
1	2	3	4	5

QA

Question Asking (intimiteit)

In hoeverre Mitsuku intieme vragen stelde tijdens deze interactie.

Helemaal niet intiem				**Heel intiem**
1	2	3	4	5

QA

Question Asking (reciprocity)

In hoeverre Mitsuku vragen stelde in reactie op de vragen van de ander tijdens deze interactie.

Geen wederkerigheid				**Veel wederkerigheid**
1	2	3	4	5

EMP

Empathie

In hoeverre Mitsuku als empathisch overkwam tijdens deze interactie.

Helemaal niet empathisch				**Heel empathisch**
1	2	3	4	5

HUMOR

Humor

In hoeverre Mitsuku als grappig/humoristisch overkwam tijdens deze interactie.

Helemaal niet grappig				**Heel grappig**
1	2	3	4	5

VOORS

Voorspelbaarheid

In hoeverre Mitsuku voorspelbaar overkwam tijdens deze interactie.

Helemaal niet voorspelbaar				**Heel voorspelbaar**
1	2	3	4	5

INT

Interesse

In hoeverre Mitsuku als geïnteresseerd overkwam tijdens deze interactie.

Helemaal niet geinteresseerd				**Heel geinteresseerd**
1	2	3	4	5

HER

Herhaling

In hoeverre Mitsuku in herhaling viel tijdens deze interactie.

Helemaal niet				**Heel vaak**

1 2 3 4 5

SIMI

Similarity

In hoeverre Mitsuku het gevoel gaf gelijk te zijn aan de ander tijdens deze interactie.

Helemaal niet **Heel vaak**

1 2 3 4 5

GEP

Gepast

In hoeverre Mitsuku gepast reageerde in deze interactie.

Heel ongepast **Heel gepast**

1 2 3 4 5

PROF

Profanity

In hoeverre Mitsuku onaardig (onbeleefd of grof) was tijdens deze interactie.

Helemaal niet **Heel erg**

1 2 3 4 5

ROBOT

Robot

In hoeverre Mitsuku naar zichzelf verwijst als robot of computer tijdens deze interactie.

Nooit **Heel vaak**

1 2 3 4 5
