Radboud Universiteit

Gaze Aversion and Response Preference in Dutch Face-to-Face Conversation: A Corpus Study

Yne Persyn

Student nr.: s1091484

Date: 07/07/2023

Course: Master's thesis LET-TWM400

Supervisor: Judith Holler

The work submitted here is the sole responsibility of the undersigned, who has neither committed plagiarism nor colluded in its production.

Signed:

Word count: 10 042 (not including appendices)

ACKNOWLEDGEMENTS

The Communication in Social Interaction (CoSI) group at the Max Planck Institute for Psycholinguistics in Nijmegen gave me the opportunity to complete my internship and thesis there. This Master's thesis was made possible with the help of several people within in this research group. I am grateful to my supervisor, dr. Judith Holler, who helped me with all my questions, and my daily supervisor, dr. Alex Emmendorfer, who guided me through any difficulties with the statistical analyses. They both devoted a lot of time and efforts in the process of writing this thesis and taught me a lot about doing scientific research in the field of psycholinguistics.

TABLE OF CONTENTS

ABSTRACT

People use language in a multimodal way when engaging in face-to-face social interactions. Gaze behavior and direction play several important roles in this regard. The current study investigates the connection between gaze behavior and response preference. This topic has been studied in English but remains unexplored in Dutch. Therefore, this study is meant to fill the gap in the literature on gaze behavior and response preference in Dutch. Even more so, this study goes beyond the scope of existing literature by applying additional analyses. More specifically, the aim is to investigate three research questions based on a corpus containing dialogues between Dutch speakers. Firstly, the difference in gap duration between preferred and dispreferred responses is under study. Secondly, we investigate the connection between the number of occurrences of gaze maintenance and gaze aversion, and response preference. Lastly, we aim to relate the specific directions of the gaze aversions – upward, downward, sideward, and diagonally – to either preferred or dispreferred responses. We found that, in general, like speakers of English, Dutch speakers have the tendency to delay their dispreferred responses in comparison to preferred responses. Additionally, like English speakers, they also display a higher number of gaze aversions during dispreferred responses. The third research question revealed that downward and sideward gaze aversions are mainly connected to preferred responses. On the other hand, a bigger proportion of dispreferred responses was connected to diagonal and upward gaze aversions. The current study is meant to give better insights into the topics of gaze behavior and response preference in a language other than English. Moreover, the aim is to build on previous research by implementing the aforementioned additional analyses. The results from this study improve our understanding of nonverbal cues in social interaction, which can in turn contribute to our comprehension of social dynamics and interpersonal relationships. Lastly, this study could be replicated in various languages, allowing for a comparison of the relationship between gaze behavior and response preference across various cultures.

Keywords: gaze behavior; response preference; corpus study; Dutch speakers; social interaction

1. INTRODUCTION

When engaging in social interaction, people use language in a multimodal manner (Holler et al., 2018; Perniss, 2018). They use their hands to make gestures corresponding to what they are saying, express emotions and thoughts with their facial expressions, and display various body movements. These visual cues are closely linked to the message being expressed and to language as a whole. They can affect how utterances are interpreted and their overall meaning, as well as corroborate or clarify the meaning. On occasion, visual signals may even supplant an utterance's meaning entirely. Consider, for example, the simple act of nodding in response to a question, which carries its own meaning – namely, to indicate agreement or affirm what was said. Moreover, visual signals often convey the meaning of an utterance in a more efficient way. For instance, communicating the expression "over there" is more efficient when it is combined with the gesture of pointing in a specific direction with the finger. Therefore, multimodal communication has been suggested to be more effective than unimodal language use (Holler & Levinson, 2019).

The effectiveness of multimodal communication can be attributed to multiple factors, one of which is the multifunctionality of visual signals. For example, research has shown that eye-contact and gaze direction can have various functions, such as gathering feedback on the other person's reactions, or information-seeking, among others. Thus, the importance of one's gaze cannot be underestimated. Moreover, gaze direction can also indicate certain feelings and preferences. These indications, in turn, have been shown to affect the other interactant's comprehension of what is said, or will be said (Kendrick & Holler, 2017). However, different gaze directions or movements not only influence the other interactant's understanding of what is said or will be said but may also be related with the preference of one's answer to (polar) questions. Namely, questions often have preferred and dispreferred responses. Preferred responses align with the questioner's conversational expectations and are prioritized over dispreferred responses. Dispreferred responses, on the other hand, are in contrast with the questioner's social and conversational expectations. This connection between gaze direction and response preference has been explored in English in prior research conducted by Kendrick & Holler (2017). They discovered that gaze aversions are notably more frequent during dispreferred responses to polar questions, than during preferred responses. Moreover, extensive research has been conducted on gaze behavior and response preference as separate processes within the English language (Argyle & Dean, 1965; Degutyte & Astell, 2021; Holtgraves, 2010; Jongerius et al., 2020; Kendrick & Holler, 2017; Pomerantz, 1984; Robinson, 2020; Senju & Johnson, 2009; Stivers & Robinson, 2006). However, no research on the topic of gaze behavior, response preference, or the connection between the two has been undertaken in Dutch. For this reason, it remains unclear whether the same phenomena appear among native Dutch speakers. Consequently, the current study will investigate the relationship between gaze direction and response preference among native speakers of Dutch. Moreover, additional analyses on the timing of responses and the specific directions of gaze aversions will be performed. These analyses are meant to build on existing research, as they have not yet been performed in the Dutch language.

1.1. LITERATURE REVIEW

1.1.1. PREFERENCE ORGANIZATION

The notion of preference organization in conversation has been the subject of research for a long time, with some of the earliest papers dating back to the 1970s. It was first discussed in 1974 by Sacks et al. and further developed by Pomerantz in 1984. However, despite a long history of research into preference organization, the concept of preference still causes confusion, and is often confounded with an individual's personal desires, subjective sentiments, or psychological preferences (Pillet-Shore, 2017: 2). Robinson (2020) defines the notion of preference as a collection of standards and behaviors that promote or prioritize specific interactional outcomes over others (p. 198). Thus, within the field of Conversation Analysis (CA) the term 'preference' does not refer to one's personal preferences (Bilmes, 1988), but rather to a fixed set of conversational norms to which we all unconsciously and intuitively adhere. Because of the existence of preference organization, responses can be considered preferred or dispreferred. Robinson (2020) describes preferred answers as "responsive actions that are cooperative, affiliative, or otherwise harmonious" whereas dispreferred responses can be defined as "actions that are uncooperative, disaffiliative, or otherwise discordant" (p. 198). He claims that by suppressing dispreferred answers and encouraging preferred ones, preference organization allows interactants to minimize interpersonal conflict and build solidarity.

1.1.2. FACE AND POLITENESS

Since preference organization involves the avoiding of conflict and building of solidarity, it is also connected with the notions of face and politeness. For instance, dispreferred responses can be seen as face-threatening actions (FTA), as they are not in line with the questioner's conversational preferences and expectations (Bousfield, 2007: 9). Dispreferred responses can often be recognized by the inclusion of hesitations and particles, making them longer and more complex than preferred responses. These markers are intended to justify or minimize the face-threatening nature of the dispreferred response (Bögels et al., 2020: 767) and are often strategically placed within a turn to postpone the expression of disagreement until the end of the turn (Lerner, 1996: 304). Bousfield (2007) also notes that in the case of an assessment, for example, agreement is the preferred response, as disagreement is considered a face-threatening act (FTA) and thus the dispreferred response (Brown & Levinson, 1987, as cited in Bousfield, 2007: 9). The use of these delaying design features allows the questioner to reformulate their question, so that a preferred response becomes more likely. This demonstrates that individuals who receive polar questions tend to consider their own responses indicating disagreement or disconfirmation as unfavorable. As a result, they may postpone providing such dispreferred responses, giving the questioner more time to modify their question (Pillet-Shore, 2017: 18). Moreover, recipients sometimes choose to answer a question preemptively, before the questioner has finished talking. This act of anticipatory completion is another strategy that is used to convert a dispreferred action into a preferred action. Before the questioner can produce an action that would elicit a dispreferred response, the respondent completes the turn in such a way that a preferred response can be provided (Lerner, 1996: 313).

1.1.3. PREVIOUS FINDINGS ON RESPONSE PREFERENCE

Many studies have focused on the notion of response preference in English, ranging from the timing and construction of preference (Kendrick & Torreira, 2015) to reply comprehension on the side of the questioner (Holtgraves, 2010). Kendrick & Torreira (2015) state that preferred responses tend to arrive more quickly after the question than dispreferred ones, and that they take a simpler form. Dispreferred responses, on the other hand, arrive significantly later and take the form of more complex constructions. They are often prefaced or include qualifications or accounts (p. 256). Moreover, Kendrick & Torreira (2015) discovered that after a time span of approximately 700 ms, the probability of encountering a dispreferred response is significantly greater than that of encountering a preferred response. However, it should be noted that Kendrick & Torreira stress the lack of verification for the systematic difference in timing between these different types of responses. That is, while their findings indicate that preferred responses generally arrive earlier and that there is a higher likelihood of dispreferred responses after 700 ms, they did not observe a consistent difference in timing between preferred and dispreferred responses. For this reason, one cannot assume that "timing alone could serve as a reliable signal of the responding action" (p. 256).

Conversely, the effect the timing of a response has on the listener's expectations has also been studied. Bögels et al. (2020) claim that listeners expect a preferred response after a short gap of 300 ms, and that they only start expecting a dispreferred response later on in the gap. However, they contend Kendrick and Torreira's claim that 700 ms forms some kind of threshold after which dispreferred responses become more likely. The effect found by Bögels et al. emerges well before the 700 ms mark into the gap. They conclude that listener's expectations evolve gradually over the course of the gap (p. 776) rather than change abruptly at the 700 ms mark. Thus, even as a gap unfolds, expectations seem to be adjusted based on the increasing duration of the silence, illustrating the dynamic nature of comprehension (p. 777).

Next to the English language, Japanese has also been studied on the topic of response preference (Tanaka, 2005). This study argues that the timing of social actions, such as making a request or offering help, is influenced by the grammatical structures used in Japanese, and that the organization of preferences in discourse can reflect social dynamics. The research suggests that the study of grammar can provide insights into how social actions are performed and coordinated in interaction in a particular language.

Holtgraves (2010) has studied reply comprehension, considering it from the perspective of the questioner. His findings suggest that preference organization plays a crucial role in communication. He argues that it is essential for language users to be able to recognize and respond appropriately to conversational preferences in order to achieve effective communication. His findings revealed that participants exhibited significantly faster verification of the paraphrase of a dispreferred response when the reply included a prefatory "well" (1,534 ms) compared to when it did not (p. 93). This finding is in line with Kendrick & Torreira's statement that dispreferred responses take the form of a more complex construction. Additionally, his study showed that participants were faster to verify indirect (face-threatening) targets than neutral targets. Moreover, it was also found that if the reply contained a 'well'

marker, participants were significantly faster to verify the face-threatening interpretation of a reply than when it did not. These findings suggest that the perception of conversational preferences is affected by both the timing and content of responses.

1.1.4. GAZE AND ITS INTERPERSONAL FUNCTION

As mentioned before, eye-contact and gaze direction can have various different functions in social interaction. The primary function of gaze is its interpersonal function, which involves gathering information and feedback on the other interactants' reactions. For instance, Argyle & Dean (1965) claim that people are more likely to look at the other person when they are listening, or when the topics that are discussed are less personal. In relation to this, interactants tend to engage in more eye-contact when they are cooperating rather than competing. Thus, eye-contact decreases in cases where there is tension or strain in the relationship. Another situation in which gazes are generally averted according to Argyle & Dean (1965), is when a speaker has to think and thus experiences a higher cognitive load. In those cases, the extra input of eye-contact is distracting, which is why the gaze is averted.

Argyle & Dean (1965) also found evidence for the equilibrium theory, which states that eye-contact is reduced when proximity between the two interactants is greater, and vice versa. Therefore, when passing a stranger on the street, people feel comfortable to maintain eye-contact as long as they perceive the distance between them to be large enough. Goffman (2016) reports that once the boundary of approximately 2.5 meters is exceeded, the level of anxiety will rise, and the gaze will be averted (Goffman 2016, as cited in Argyle & Dean, 1965: 296). Of course, all of these tendencies vary across cultures. For example, Argyle & Dean (1965) assert that Americans typically feel comfortable standing at a distance of 45 to 50 cm when talking, while people from Latin America and the Middle East still feel at ease standing at a much closer proximity (p. 294). Similarly, there might be a cultural difference between Dutch speakers and English speakers in regard to gaze aversion and its connection to response preference, which would be of importance for the current study. Thus, the topic of the conversation, cognitive load, and physical distance are all in some way related to eye contact and gaze behavior. The next section will focus on the relation between gaze behavior and response preference.

1.1.5. PREVIOUS FINDINGS ON THE RELATION BETWEEN GAZE DIRECTION AND RESPONSE PREFERENCE

Previous research has focused on the relation between gaze direction and response preference in the English language. Kendrick & Holler (2017) recorded and analyzed conversations between English speakers. They claim that an overwhelming majority of dispreferred responses are delivered with gaze aversion, whereas only a small proportion of preferred responses display gaze aversion (p. 26). In relation to the timing of preferred and dispreferred responses, they found that most of the preferred responses began with gaze maintenance, whereas gazes were mostly averted at the beginning of dispreferred responses. However, their findings indicate that averted gazes do indicate a greater likelihood that the following response will be dispreferred, but *when* the gaze is averted does not. That is, even

though most gazes were averted at the beginning of a dispreferred response, the moment at which a gaze is averted is not related to the likelihood of the response being a dispreferred response. However, they assert that it would be premature to assume that gaze direction is primarily organized in relation to sequences of talk. Namely, gaze direction can function at either the level of sequence organization or the level of preference organization, depending on the context in which it occurs (p.29). Thus, the main conclusion from this study is that gaze maintenance and gaze aversion, as visual cues, do not have a fixed primary role, but gain significance as meaningful actions based on their specific interactional contexts and positions within the interaction.

1.1.6. GAP IN THE LITERATURE

The existing literature has focused on the separate notions of response preference and gaze behavior in the English language, with one study focusing on Japanese. Furthermore, the connection between these concepts has only been studied in English. However, research on preference organization, as well as its potential connection to gaze direction, has not gone beyond the scope of the English language. Thus, a significant gap exists in the literature regarding the interplay between gaze direction and response preference in other languages. Therefore, as an initial step towards bridging this research gap, the object of the current study is to examine the relationship between gaze direction and response preference in Dutch. Additionally, the current study will analyze question-response gap durations and the specific directions of gaze aversions. The choice for the Dutch language was made based on the availability of a Dutch conversational corpus. Moreover, any cultural differences between speakers of English and Dutch have the potential of influencing the perception of gaze direction. Hence, the results of the current study, and their comparison to the English results, could make for some interesting revelations.

1.2. CURRENT STUDY

The present study aims to investigate the following research questions:

- How does the timing of a response relate to response preference in social interaction in Dutch?
- How does the occurrence of gaze aversion relate to response preference in social interaction between native speakers of Dutch?
- What is the relationship between the specific direction of a gaze aversion – downward, diagonally, to the side, or upward – and response preference during social interaction?

All of these research questions will investigate social interaction between native speakers of Dutch.

I hypothesize that the timing of dispreferred responses will be slightly more delayed, in comparison to the timing of preferred responses. This phenomenon has been found in multiple previous studies (Bögels et al., 2015, 2020; Kendrick & Torreira, 2015), however, all of these studies focused on the English language while Dutch remains unexplored in this regard.

Secondly, I hypothesize that the gaze and response patterns exhibited by Dutch speakers will be similar to those displayed by English speakers, i.e., that gaze aversions are more frequent during dispreferred responses (Kendrick & Holler, 2017). However, I do expect some minor differences due to potential cultural divergences between speakers of English and speakers of Dutch. Regarding the third research question, I anticipate that certain directions of gaze aversions will generally be linked to preferred responses, while others will mostly pertain to dispreferred responses. As mentioned previously, people tend to avert their gaze as they experience a higher cognitive load, i.e., when they are thinking about what to say (Argyle & Dean, 1965). It is expected that certain directions of gaze aversions under study here – upward, sideward, downward, or diagonally – will be connected to this phenomenon. These directions would thus still be indicators of preferred responses, as the gaze aversion does not intend to signal a face-threatening act (FTA). Other directions of gaze aversions could reflect some form of shame or submission and would consequently be connected with dispreferred responses.

The primary goal of the current study is to find out if the same results that were found among English participants, can also be applied to Dutch participants. In other words, do they also display a slight delay for dispreferred responses? And do Dutch speakers also exhibit gaze aversion when providing a dispreferred response, but maintain eye contact with the questioner when giving a preferred response? Of course, there will always be cases in which people avert their gaze while giving a preferred answer. Namely, in the context of social interaction, a gaze can be averted in various directions, each potentially conveying distinct meanings. However, the specific meanings associated with the different directions of gaze aversion have remained understudied thus far. Previous research has only coded for 'aversion' but did not distinguish different directions of gaze aversions. For this reason, the third aim of the study is to fill this gap in the literature and discover whether certain gaze directions are associated with preferred responses, and others with dispreferred ones.

2. METHODOLOGY

2.1. MATERIALS AND PARTICIPANTS

The current study makes use of the Communication in Action (CoAct) corpus. It consists of 34 recorded dyads between 68 native Dutch speakers, 51 of which were female and 17 were male. None of the participants had any motoric or language problems, and they all had normal or corrected-to-normal vision. Their mean age was 23.10, with a standard deviation of 8 (M age = 23.10, *SD* = 8). All of the participants were required to be native Dutch speakers (Nota et al., 2021; ter Bekke et al., 2020).

The dyads held a conversation for 60 minutes, which was divided into three parts of 20 minutes. During the first part, they held a free conversation and were able to choose a topic to their liking. In the second part, the participants received three topics from which they could choose: privacy, social media, or language in teaching. If they had exhausted their chosen topic within the 20 minutes, they went on to one of the other two. In the third and last part of the conversation, participants were asked to discuss their ideal vacation which was feasible within

their own budget. Before starting this discussion, both participants were given two minutes of time to write down some ideas on a piece of paper. The goal was for the participants to plan a holiday that they would both enjoy (Nota et al., 2021; ter Bekke et al., 2020).

2.2. APPARATUS

The recorded conversations took place in a soundproof room situated at the Max Planck Institute for Psycholinguistics in Nijmegen, The Netherlands. Participants faced each other during the conversation and were seated at approximately 90 cm of distance from one another. Two video cameras (Canon XE405) were positioned to record frontal views of each participant, two cameras (Canon XF205 Camcorder) were positioned at a 45-degree angle to record the participants' bodies, two cameras (Canon XF205 Camcorder) were mounted on a tripod and recorded from a birds-eye view, while the last camera (Canon Legria HF G10) recorded the overall scene in which both participants were visible at the same time. The audio was recorded using two microphones (Sennheiser me-64) positioned near each participant. The resulting video and audio files were synchronized using Adobe Premiere Pro CS6 (MPEG, 25 fps) (Nota et al., 2021; ter Bekke et al., 2020). For the coding of the present study, only the frontal views of the participants were used, in order to get an optimal view of the participants' gazes.

2.3. PROCEDURE

As mentioned before, the CoAct Corpus consists of conversations that took place between two participants who were being recorded. They held conversations on three different topics, each conversation lasting 20 minutes. The corpus had previously been compiled and annotated for question-response sequences. Thus, the first step of the procedure for the current study was to select the relevant question and answer pairs in the corpus, and to subsequently annotate them for the variables of interest (gaze and preferences, see below). Only polar questions (questions to which the answer can be 'yes' or 'no') were selected for the present study. Polar questions which were asked with the intention of information-seeking were excluded, because there is no clear preference presented through these questions. Questions enquiring about someone's opinions, reasons, thoughts, etc. were included in the analysis. Additionally, questions that take the form of a proposal, invitation, request, or offer were also included in the selection. It should be possible to answer the questions with a preferred or dispreferred response. If a participant responded *dat weet ik niet* ('I don't know') or something similar, the question and response were not included. This selection process resulted in a total of 1182 question-response sequences being included in the current study.

The response to polar questions can often be a preferred or dispreferred response. Preferred responses are defined as responses that are unmarked and may save face for the questioner (Robinson, 2020). For example, accepting an invitation or an apology is a preferred response. On the other hand, dispreferred responses are marked in some way (Robinson, 2020). They can be face-threatening for the questioner and often carry a certain marker (for instance, *oh* or *nou*). Disagreeing with the questioner or declining an invitation are examples of dispreferred responses. When the recipient employed one of these features in their response, it

was coded to be either a 'preferred' or 'dispreferred' response, respectively. However, in some instances the preference of the response remained unclear, in which case it was indicated with 'ambiguous'. Lastly, the annotation '?' indicated that the response first seemed to be preferred, but actually was dispreferred (or vice versa). Such cases could often be recognized by the phrase *ja, maar* ('yes, but'). The opposite also occurred, with responses that first seemed to be dispreferred, but were preferred and could be recognized by the phrase *nee, maar* ('no, but'). However, these were not as frequent as the first type. The cases annotated with '?' were not included in the further analyses.

After the coding of the response preference, the gaze and its specific directions were annotated. The coded time window for the gaze started at the onset of the response, and ended at the last sound that was part of the response. The time window between the end of the question and the onset of the response was not taken into account. However, if the response started with certain hesitation markers, they were part of the coded time window. This time window corresponds to the one that had previously been isolated to represent the response. Seeing as the main interest of the present study is to investigate the responder's gaze during their response, the same time window was used. Firstly, four different instances of gaze were annotated. If the recipient was looking at the questioner for the whole duration of their response, the gaze was indicated to be 'static toward questioner'. Conversely, if the respondent's gaze was averted away from the questioner during their answer, the gaze was annotated to be 'static away from questioner'. However, one's gaze is not always static, it can be dynamic as well. A gaze was 'dynamic toward questioner' if the respondent's gaze during the answer was first averted away from the questioner but turned to the questioner (still during their response). On the other hand, if their gaze was first fixated on the questioner but then averted away during their response, this was indicated to be 'dynamic away from questioner'.

Secondly, the gaze aversions were allocated to one of six categories corresponding to its specific direction: 'up', 'down', 'side', 'diagonal', 'other', and '?'. 'Up' comprised all gazes above the line of a forward gaze, even if they were diagonal. 'Down' indicated that the participant was looking straight down. If a participant was looking sideways along the line of a forward gaze (either left or right), it was annotated as 'side'. 'Diagonal' referred to the gazes that went down, but diagonally (again, either left or right). A graphical representation of these gaze directions can be found in Figure 1. Gazes that were averted because of other distractions (e.g., looking at the nails, or itching the shoulder) were annotated as 'other'. Lastly, if it was unclear what was happening during a certain gaze aversion, it received a '?' as annotation. In some cases, the gaze went to several directions during one response. In these cases, it was annotated by indicating all of the directions separated by dashes. Furthermore, during some responses the gaze was averted at multiple, but separate, times. For instance, the participant was looking up, then towards the questioner, and then sideways. In these cases, all of the gaze aversions were annotated separately. However, only the first direction of the gaze aversion was considered in the analysis.

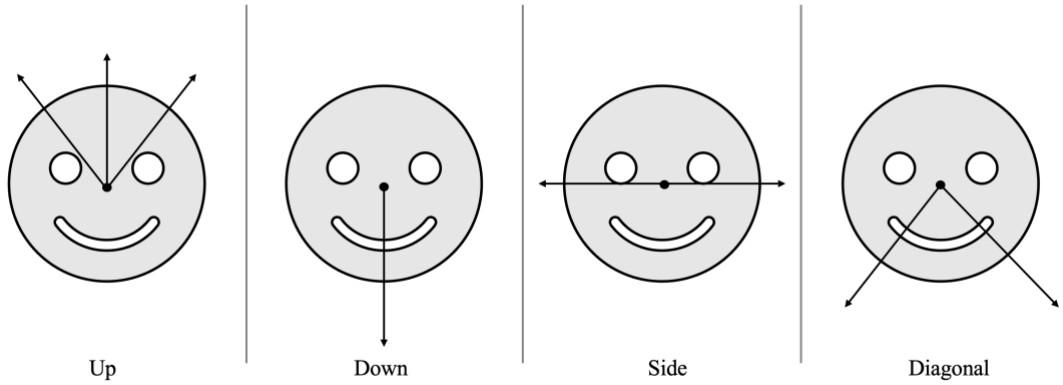


Figure 1. The four different directions of gaze aversion that were annotated in the corpus.

2.4. DESIGN AND STATISTICAL ANALYSIS

For the first research question, a linear mixed-effects model was carried out in order to compare the gap durations of preferred and dispreferred responses (GapDuration ~ Preference + (1 | Face:Dyad)). This model was run with the *lmer* function as implemented in the *lme4* package for *R*. GapDuration was the outcome variable and Preference was the predictor variable. The Face (indicating the responder) and Dyad variables were implemented as random factors. The second hypothesis was tested by running a logistic mixed-effects regression, which indicated whether or not there are more occurrences of gaze aversions during dispreferred responses (Preference ~ GazeDirection + (1 | Face:Dyad)). The *glmer* function that is implemented in the *lme4* package was used. This time, preference served as the outcome variable, while GazeDirection was the predictor variable. Face and Dyad were again included as random factors. Lastly, in order to link specific directions of gaze aversions to response preference, another logistic mixed-effects regression was run, this time with DirectionAversion as the outcome variable and Preference as the predictor variable (Preference ~ DirectionAversion + (1 | Face:Dyad)). Once more, the Face and Dyad variables served as random factors.

These analyses were done by using R (version 4.2.3 GUI 1.79 Big Sur ARM build) and RStudio (version 2023.03.0+386), and with the use of the following packages that were implemented in *R*: Matrix, lme4, lmerTest, ggplot2, dplyr, emmeans, and magrittr.

3. RESULTS

Table 1 contains the number of observations for all instances that were used for the statistical analyses.

Table 1. Number of preferred and dispreferred responses; direct and averted gazes; gazes averted upward, downward, diagonally, sidewards; and static and dynamic gazes.

	Question-response sequences		Gaze direction		Direction of aversion				Gaze dynamics	
	Preferred	Dis-preferred	Direct	Averted	Up	Down	Diagonal	Side	Static	Dynamic
Number of observations	883	299	642	479	105	117	156	101	791	330
Total	1182		1121		479				1121	

A total of 1182 question-response sequences were analyzed. In 61 instances, the direction and potential shift of the gaze was unclear, hence the difference with the total number of Gaze direction and Gaze dynamics. The data clearly indicate that the corpus contains a greater number of preferred responses than dispreferred responses. Additionally, most of the gazes were directed towards the questioner. When a gaze was averted, on the other hand, it had an almost equal probability of being averted in any of the four directions under study. However, most gazes were averted diagonally. Lastly, the biggest number of gazes were static, and thus did not move during the response.

3.1. RESPONSE PREFERENCE AND GAP DURATION

The first hypothesis stated that dispreferred responses have longer turn transitions than preferred responses. The difference in turn-gap durations was statistically significant in a mixed-effects regression model (β = -120.69, t = -2.87, p = .00418).

Figure 2 shows the distribution of the preferred and dispreferred responses in function of the gap duration in milliseconds. The black lines show the average gap durations for each preference. Firstly, there is clearly a bigger number of preferred responses than dispreferred responses. Additionally, a considerable number of responses arrived after a gap duration of less than 0 ms, and thus arrived before the question was finished, i.e., there was an overlap of question and response. Both preferred and dispreferred responses display this behavior, but dispreferred responses to a lesser extent on average.

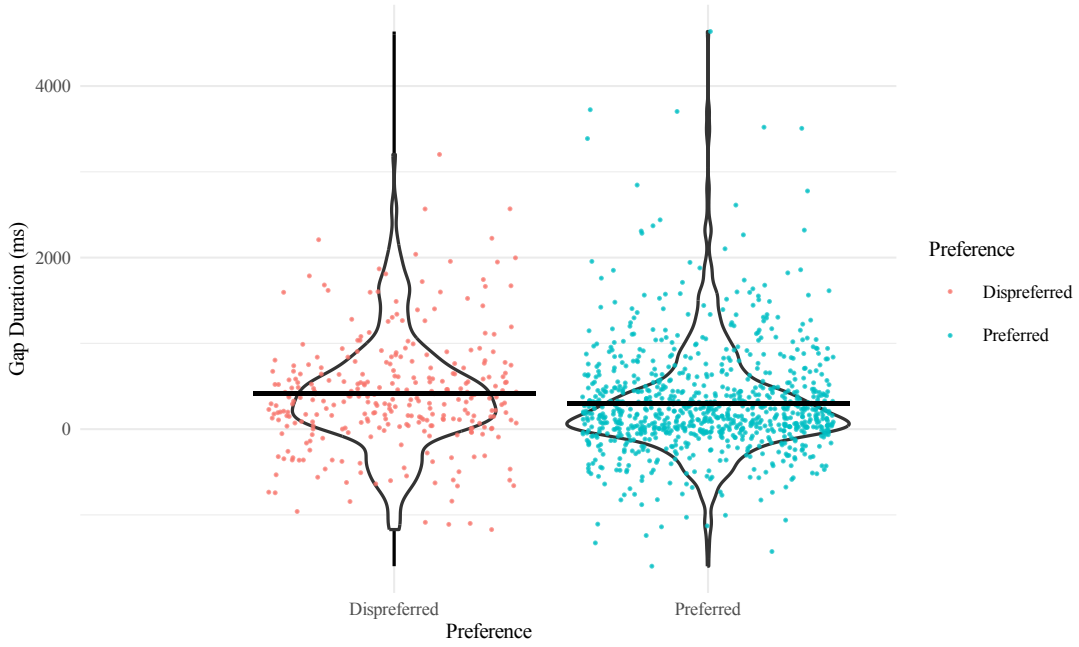


Figure 2. Distribution of Preferred and Dispreferred Responses in function of Gap Duration in milliseconds. Average Gap Duration represented by black lines.

Even though the average gap durations are close to one another, the difference is statistically significant. On average, dispreferred responses arrived after a gap duration of 414.29 ms, whereas the average gap duration for preferred responses was 293.60 ms. This finding is in accordance with what was hypothesized, i.e., that dispreferred responses arrive later than preferred responses. However, it is important to note that any potential hesitations and delaying markers (such as *nou*, *weet je*, *goh*) that are associated with dispreferred responses were included in the duration of the response for the present study. Thus, they are a part of the response itself. If the annotations had been made in such a way that the time window of the response did not include these particles, the gap duration for dispreferred responses would have been even bigger. Nonetheless, the fact that the result is significant, even with the hesitation markers included in the response, only corroborates the proof that dispreferred responses have longer turn-gap durations than preferred responses. Additionally, the fact that the present study was able to replicate the effect of response preference on gap duration suggests that the coding is reliable.

3.2. GAZE DYNAMICS AND GAP DURATION

In relation to the first hypothesis, one can hypothesize that there is an association between gaze dynamics and gap duration, i.e., that static gazes display shorter gap durations than dynamic gazes. In order to test this association, a linear mixed-effects regression was run. The predictor variable is the interaction between Preference and Gaze Dynamics, and the outcome variable is GapDuration. It gave a non-significant result on the interaction between preferred responses and static gazes (β = 170.63, t = 1.868, p = 0.06201). The results can be found in Table 2 and Figure 3.

Table 2. Linear mixed-effects model of the interaction between preferred responses and static gazes. SE = standard error; SD = standard deviation.

Fixed effects				
Variable	**Estimate (ms)**	**SE (ms)**	**T value**	**Pr(>|z|)**
Intercept	508.27	61.25	8.298	4.85e-16
PreferencePreferred	-223.79	72.52	-3.086	0.00208
GazeDyanmicstatic	-180.07	77.42	-2.326	0.02020
PreferencePreferred:GazeDyanmicstatic	170.63	91.34	1.868	0.06201
Random effects				
Groups	**Name**	**Variance**	**SD**	
Face:Dyad	Intercept	15768	125.6	
Residual		381468	617.6	

The estimates for preferred responses and static gazes in Table 2 indicate that preferred responses and static gazes have shorter gap durations than dispreferred responses and dynamic gazes respectively. However, the interaction between response preference and gaze dynamics surprisingly indicates that the gap duration is longer when the response is preferred and the gaze is static. All of the p-values are significant, except the one for the interaction between response preference and gaze dynamics. This could explain why the interaction seems to indicate the opposite of what the separate variables PreferencePreferred and GazeDynamicstatic indicated.

Like Figure 2, Figure 3 also demonstrates that dispreferred responses display a longer gap duration. This effect is mainly caused by the dynamic gazes, as they exhibit a notably longer gap duration compared to the static gazes. Interestingly, the static gazes during dispreferred responses do not have a significantly longer gap duration compared to the gazes during preferred responses. There is a substantial disparity in gap duration between dynamic and static gazes within the dispreferred responses. Conversely, within the preferred responses, this difference is considerably smaller or even negligible.

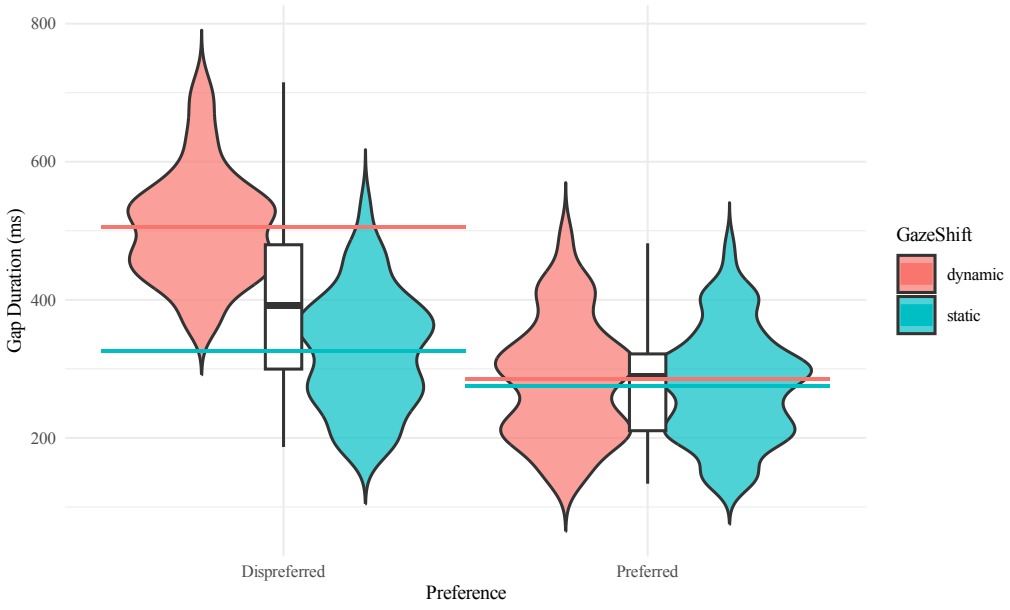


Figure 3. Gap Duration in milliseconds of Dispreferred and Preferred Responses for Dynamic and Static Gazes. The box plots provide the median and interquartile range of dynamic and static gazes for both dispreferred and preferred responses. The horizontal lines represent the mean of the violin plot of the same color.

3.3. RESPONSE PREFERENCE AND GAZE DIRECTION

The second hypothesis claimed that gaze aversions occur more frequently during dispreferred responses than during preferred responses. The mixed-effects logistic regression did not yield statistically significant effects for the fixed predictors ($\beta = 0.1303$, $SE = 0.1621$, $z = 0.804$, $p = 0.422$).

Figure 4 shows the proportions of preferred and dispreferred responses as a function of averted and direct gazes. The proportion of preferred responses with direct gazes is 75 percent, and the proportion of preferred responses with averted gazes is only a little smaller. Thus, there were only slightly more gaze aversions during dispreferred responses than during preferred responses. This difference was not reliable enough to yield a statistically significant result.

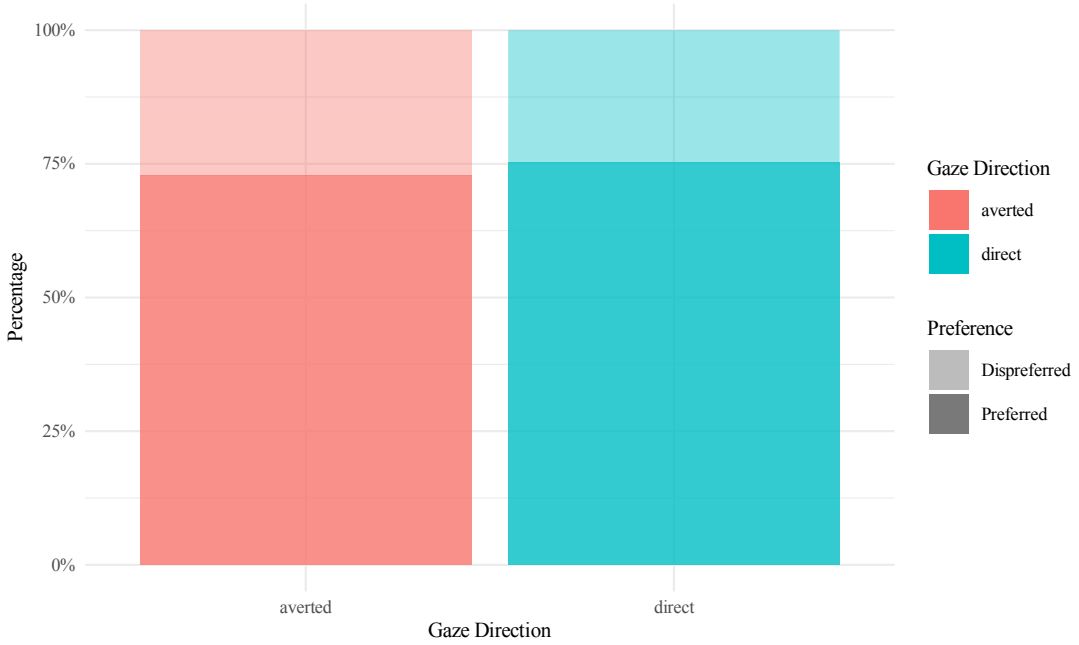


Figure 4. The Proportion of Preferred and Dispreferred Responses for Direct and Averted Gazes.

However, the non-significant result for the second hypothesis may be explained by the fact that the dynamic and static gazes were taken together. For instance, an averted gaze can either be a static averted gaze – averted for the whole duration of the response – or a dynamic averted gaze – when the gaze moved during the response, from looking at the questioner to looking at something else. Both the static averted gaze and the dynamic averted gaze were taken together in the data as 'averted', and the same goes for direct gazes. Thus, the second hypothesis can be refined by taking the potential movement of a gaze into account and thus by investigating the interaction between gaze dynamics and gaze direction, and the way they affect response preference. Another mixed-effects logistic regression was run, with Preference as the outcome variable and the interaction between gaze dynamics and gaze direction as the predictor variable, and this time, it yielded a statistically significant result ($\beta = 1.8083$, $SE = 0.3561$, $z = 5.078$, $p < .001$).

Table 3. Linear mixed-effects model of the interaction between static gazes and direct gazes. SE = standard error; SD = standard deviation.

Fixed effects				
Variable	**Estimate (-)**	**SE (-)**	**Z value**	**Pr(>|z|)**
Intercept	1.3452	0.2673	5.033	4.84e-07
GazeDynamicstatic	-0.5410	0.3123	-1.732	0.083198
GazeDirectiondirect	-1.0209	0.2906	-3.513	0.000442
GazeDynamicstatic:GazeDirectiondirect	1.8083	0.3561	5.078	3.82e-07
Random Effects				
Groups	**Name**	**Variance**	**SD**	
Face:Dyad	Intercept	0.1399	0.3741	

The estimate and p-value for the interaction between static gazes and direct gazes in Table 3 show that there is an interaction between gaze dynamics (static or dynamic) and gaze direction (direct or averted) and the way in which the two variables affect response preference, which can be seen in Figure 5.

In Figure 5, the interaction between gaze dynamics and gaze direction, and its effect on response preference is shown. The bottom left bar demonstrates that about 50 percent of direct gazes during dispreferred responses were static. Thus, about half of the time, gazes were directed towards the questioner for the whole duration of a dispreferred response, while the other half were dynamic and moved from somewhere else towards the questioner. From the upper left bar, it becomes clear that 75 percent of the averted gazes during dispreferred responses were static. This means that most gazes were averted for the whole duration of a dispreferred response. Conversely, the bar on the bottom right reveals that about 75 percent of direct gazes during preferred responses were static. I.e., most of the direct gazes during preferred responses were directed towards the questioner for the whole duration of the response, as was hypothesized. Lastly, from the upper right bar it becomes clear that about 60 percent of averted gazes during preferred responses are static. This means that about 60 percent of the gazes during preferred responses were directed away from the questioner for the duration of the whole response.

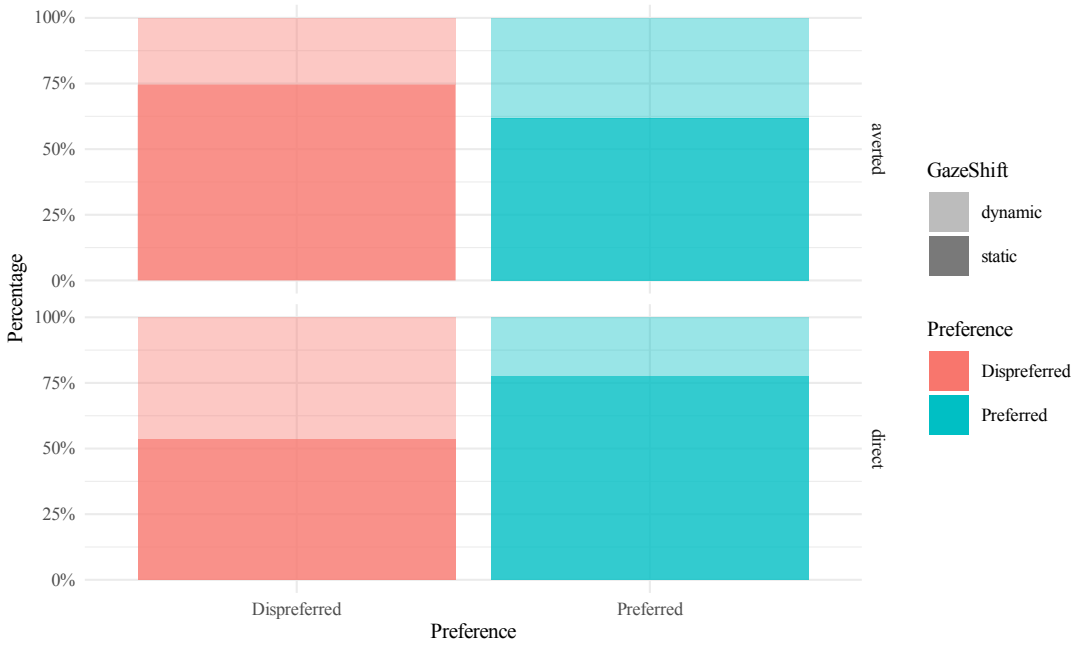


Figure 5. Simultaneous Effect of GazeDynamics and GazeDirection on Response Preference.

This figure demonstrates that when the influence of static and dynamic gazes is considered separately, the results are different than when they are taken together. Where the difference was not significant after the first logistic mixed-effects model, the new logistic mixed-effects model suggests that preferred responses receive considerably more direct static gazes than dispreferred responses do. On the other hand, dispreferred responses displayed a greater number of static averted gazes, which is what was hypothesized beforehand. Meanwhile, if a gaze was directed towards the questioner during a dispreferred response, it was more likely to be a dynamic gaze than during a preferred response. Likewise, the averted gazes during preferred responses were more often dynamic gazes than during dispreferred responses. This is also in line with the hypothesis that gaze aversions occur more frequently during dispreferred responses. Namely, a direct gaze during a dispreferred response, which is the opposite of what is expected, was first averted and only later directed towards the questioner. Similarly, an averted gaze during a preferred response, the contrary of what is expected, was first directed towards the questioner, as the hypothesis says, and only later averted. In other words, the static gazes behaved exactly as was expected, while the dynamic gazes first behaved as was hypothesized and only later in the response behaved differently.

3.4. RESPONSE PREFERENCE AND DIRECTION OF GAZE AVERSION

In the third and last hypothesis it was stated that specific directions of gaze aversions might relate to response preference in different ways. A mixed-effects logistic regression gave a statistically significant result for every specific direction (Diagonal: β = -1.0375, SE = 0.2146, z = -4.835, p < 2e-16; Down: β = -0.5984, SE = 0.2392, z = -2.502, p = .01235; Side: β = -0.7034, SE = 0.2618, z = -2.687, p = .00722; Up: β = -1.2403, SE = 0.2408, z = -5.152, p < .001).

Table 4. Logistic mixed-effects model of the association between the direction of the aversion (diagonal, down, side, up) and preference. SE = standard error; SD = standard deviation.

Fixed effects				
Variable	**Estimate (-)**	**SE (-)**	**Z value**	**Pr(>|z|)**
Intercept	1.6017	0.1219	13.141	<2e-16
Directionaversiondiagonal	-1.0375	0.2146	-4.835	1.33e-06
Directionaversiondown	-0.5984	0.2392	-2.502	0.01235
Directionaversionside	-0.7034	0.2618	-2.687	0.00722
Directionaversionup	-1.2403	0.2408	-5.152	2.58e-07
Random effects				
Groups	**Name**	**Variance**	**SD**	
Face:Dyad	Intercept	0.1418	0.3766	

The intercept in Table 4 represents the gazes that displayed no gaze aversion. The estimates for the other four directions of gaze aversion show that they are all less likely to be linked to a preferred response than gazes with no aversion. All of the corresponding p-values are below .05, indicating that the effects are statistically significant.

Figure 6 shows the proportions for preferred and dispreferred responses with no gaze aversion and for all of the possible directions of a gaze aversion – i.e., diagonal down, side, and up. This figure indicates that the proportion of preferred responses is highest when there is no gaze aversion, which had already been established in Table 4. Additionally, the proportion of preferred responses is biggest when the direction of the gaze aversion is either down or to the side. In comparison, the proportion of preferred responses is smaller for gazes averted diagonally or upwards.

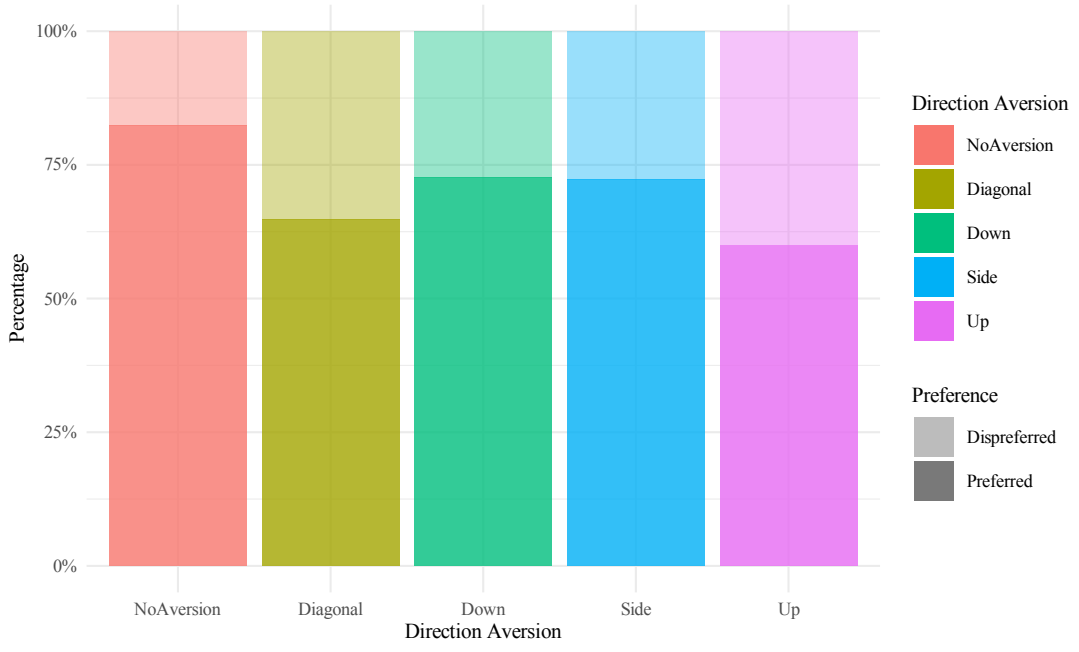


Figure 6. The Percentage of Preferred and Dispreferred Responses for each Direction of a Gaze Aversion (Diagonal – Down – Side – Up), as well as the relation to No Aversion.

4. DISCUSSION

The main aim of the current study was to investigate the relationship between response preference and gaze behavior. Some additional and more refined analyses were performed as well by, for example, investigating the relationship between gaze dynamics and gap duration, or the connection between response preference and the direction of the gaze aversion. These analyses are meant to provide new insights into the social dynamics of Dutch people in social interaction.

4.1. RESPONSE PREFERENCE AND GAP DURATION

Firstly, the findings for the first hypothesis revealed that dispreferred responses have, on average, slightly longer turn-gap durations than preferred responses, as was hypothesized. As mentioned in the introduction, several previous studies had found this effect among native speakers of English (Bögels et al., 2015, 2020; Kendrick & Torreira, 2015). The current study proves the same effect can be found among speakers of Dutch. On average, preferred responses were issued after 293.60 ms, while dispreferred responses had an average gap duration of 414.29 ms. This indicates that the average gap durations differ by 120.69 ms. These results are comparable to those found by Bögels et al. (2020). They concluded that listeners expect preferred responses after approximately 300 ms on average. However, they did not report a specific average gap duration for dispreferred responses, as they believe that listeners' expectations undergo a gradual evolution throughout the duration of the gap. Kendrick & Torreira (2015), on the other hand, did not find a specific average gap duration for preferred responses, but claim that the likelihood for dispreferred responses increases after the 700 ms mark. Despite that, they also state that the assertion that there is a systematic difference in the timing of preferred and dispreferred responses has not been confirmed. Nevertheless, the results from the current study support the hypothesis that dispreferred responses have longer turn-gap durations than preferred responses. Therefore, as the findings in the current study largely align with previous research, we are making progress towards confirming the tendency of dispreferred responses having longer gap durations.

It is also important to note that the results for the first hypothesis showed that both preferred and dispreferred responses sometimes arrived after a negative gap duration, and thus before the question was finished. For preferred responses, this behavior can be attributed to early agreement on the part of the responder, who then answers the question preemptively. In the case of dispreferred responses, on the other hand, these preemptive responses can be seen as an attempt to provide an opportunity for the questioner to alter their question so that a preferred response can be provided. However, in these cases, these attempts could be deemed unsuccessful since the questioner did not modify their question and thus a dispreferred response was necessary.

Building on the previous discussion, various potential explanations can be linked to the fact that, on average, dispreferred responses display a larger gap duration than preferred responses. For instance, the delayed response may be a strategy employed by the responder in order to save face for the questioner. The responder realizes that the answer they are about the

give is not in accordance with the questioner's conversational preference. They choose to delay their response, allowing the questioner some time to reformulate their question and create the opportunity for a preferred response. Another reason why dispreferred responses display a larger gap duration, is that they often include hesitation markers. In the current study, any potential hesitation or delaying markers were included in the time window of the responses. This method was also employed in previous studies (discussed in the literature review), such as Kendrick & Torreira (2015), who used four different measurements of timing, three of which included potential hesitation markers in the time frame of the response. Bögels et al. (2015) and Bögels et al. (2020), on the other hand, investigated the gap durations by extracting epochs from their electroencephalography (EEG) data from 500 ms before the offset of the initiating action until 1000 ms after the response onset. By not including any potential delaying markers in the duration of the response in the current study, the disparity in gap duration diminished. However, the observed difference remained statistically significant.

This significant result indicates that native Dutch speakers have the same tendency to delay dispreferred responses, just like speakers of English. Despite the inclusion of hesitation markers in the duration of the response, the difference in gap duration was still big enough to yield a significant result. This leads to the conclusion that the difference in gap duration would be even greater if they had been excluded from the response duration. Nevertheless, this result also demonstrates that, at least in the case of Dutch speakers, there is no need to exclude these markers from the response duration.

4.2. GAZE DYNAMICS AND GAP DURATION

In order to further investigate gap duration, gaze dynamics – i.e., static vs. dynamic gazes – was taken into account. This revealed that the larger gap duration among dispreferred responses is mainly associated with the dynamic gazes. Namely, the disparity between dynamic and static gazes is considerably bigger among the dispreferred responses than the preferred responses. Thus, when a receiver chose to move their gaze in several directions, they took a longer time to start their answer. During static gazes, on the other hand, the responses arrived significantly faster. Interestingly, the gap durations that static gazes displayed during dispreferred responses are surprisingly comparable to those displayed during the preferred responses.

4.3. RESPONSE PREFERENCE AND GAZE DIRECTION

Previous research (Kendrick & Holler, 2017) had shown that native English speakers are more likely to avert their gaze during a dispreferred response than during a preferred response. However, initially, there did not seem to be a correlation between gaze direction and response preference in the current study. I.e., the amount of gaze aversions was not substantially higher during dispreferred responses than during preferred responses. Based on this finding, it appears that Dutch speakers, even when providing dispreferred answers, are less likely to avert their gaze during dispreferred responses compared to English speakers. This could be attributed to various factors. For example, the potential Dutch cultural inclination towards directness and

straightforwardness in social interactions may have influenced their gaze behavior. Of course, there are also methodological differences between these two studies, the most important one being that the current study is a corpus study, whereas Kendrick & Holler (2017) employed eye-tracking glasses to extract their data. Nevertheless, given that this first analysis did not account for potential gaze movement, a second analysis was required.

This second analysis produced the expected results, providing evidence to support the hypothesis that the biggest number of gaze aversions are associated with dispreferred responses. If the potential movement of a gaze during a response is taken into account it becomes evident that the majority of gaze aversions occur during dispreferred responses, whereas eye contact is mostly maintained during preferred responses, as was hypothesized. However, dynamic and static gazes behave differently. The static gazes behave exactly as was expected, i.e., if a static gaze was direct it was most likely to be during a preferred response, whereas averted static gazes had a higher likelihood of occurring during a dispreferred response. On the other hand, dynamic gazes initially exhibit the expected behavior, but in the later stage of the gaze, they behave in a manner contrary to the expected pattern. Direct dynamic gazes – gazes that are first averted and then move towards the questioner – are most likely to happen during dispreferred responses. Thus, the recipient first averts their gaze during a dispreferred response, as would be expected, and only after a certain amount of time redirect their gaze toward the questioner. This behavior might be explained by the fact that people tend to avert their gaze during the most dispreferred part of the response, for example, the declining of an invitation by saying 'no'. After this clear declination, an explanation or account for the dispreferred response often follows, during which people may feel that they can redirect their gaze toward the questioner. Conversely, dynamic averted gazes – where the gaze is first directed towards the questioner and later averted – are mostly associated with preferred responses. Thus, they first maintained eye contact with the questioner during a preferred response, as would be expected, and then avert their gaze, which is against the expectations of gaze behavior during preferred responses. The opposite of the previous explanation may be true to account for this behavior. During the most important part of the response, for example, accepting an invitation, the gaze was directed towards the questioner. The remaining part of the response may involve additional accounts related to the question's topic, during which the questioner did not feel it was necessary to maintain eye contact. Thus, they averted their gaze.

4.4. RESPONSE PREFERENCE AND DIRECTION OF GAZE AVERSION

As previously mentioned, the majority of gazes did not exhibit any gaze aversion. However, a substantial portion still demonstrated gaze aversions. These could be averted in several different directions, i.e., diagonally, downwards, sidewards, and upwards. The anticipation was that certain directions of gaze aversions would mostly be associated with preferred responses (even though they were gaze aversions). This hypothesis was made based on the assumption that gaze aversions can be indicative of being in thought and could thus still be connected to preferred responses, as they do not intend to signal a face-threatening act (FTA) (Argyle & Dean, 1965). Conversely, other directions of gaze aversions could generally pertain

to dispreferred responses, as they may signal feeling of shame or submission towards the questioner, and thus a desire to break eye-contact.

The results revealed interesting patterns among the four different directions of gaze aversion, and their connection to response preference. The proportion of dispreferred responses was highest for diagonal and upward gazes, suggesting that these directions are more likely to precede face-threatening acts. Participants mostly averted their gaze diagonally or upward when they wanted to break eye-contact in order to save face for the questioner. However, it is worth emphasizing that the portion of preferred responses remains above 50%, even in these gaze directions. Thus, while there is a greater likelihood of a dispreferred response during diagonal and upward gaze aversions, more than half of the responses are still preferred responses. On the other hand, a considerable proportion of gaze aversions in the downward and sideward directions was observed during preferred responses, exhibiting a percentage of approximately 70% preferred responses. This could indicate that these gaze aversions are more likely to be linked to increased cognitive load. Namely, when people are engaged in deep thought or contemplating their response, they mostly choose to avert their gaze downward or to the side. Thus, these findings provide evidence for an interaction between the specific direction of a gaze aversion and response preference.

4.5. LIMITATIONS OF THE PRESENT STUDY

There are a few limitations to the present study. For instance, preference coding is a subjective matter and thus is prone to inter-rater variability. Unfortunately, there is currently no reliability analysis for these kinds of annotations. However, as mentioned before, the fact that the present study was able to replicate the effect of response preference on gap duration and the relationship between gaze behavior and response preference suggests that the coding is reliable. Secondly, the conversations between the participants were meant to be as natural as possible. However, the artificial setting may have influenced the authenticity of the dialogues. Namely, natural conversations do not normally take place in a room with seven cameras and two microphones, nor do they involve regular interruptions every 20 minutes to move on to the next topic. These factors could have influenced the naturality of the participants' conversations, which, in turn, might have influenced the results. For instance, if participants felt less comfortable in the room than during natural conversation, they may have been inclined to avert their gaze more frequently than they typically would. Thirdly, the results of the study may be more firmly grounded if it had been a behavioral or EEG study, as those results are not as subjective and thus less prone to inter-rater variability. Furthermore, behavioral and EEG experiments allow for better control over the experimental conditions, such as the duration and complexity of the stimuli. They also allow for real-time measurement of responses and brain activity, which can provide more detailed information about the relationship between gaze direction and response preference. Moreover, behavioral and EEG experiments can easily be replicated with different participants and under different conditions, which is not the case for a corpus study. However, behavioral or EEG studies are likely to create an even more artificial environment than a corpus study. We therefore believe that conducting a corpus research also makes for some interesting findings. Next, it is important to mention that the choice for the

directions of gaze aversions – upward, downward, sideward, diagonally – was arbitrary, since no previous research had been conducted on this topic. The choice for other directions may therefore generate different results. In future research, an alternative approach could involve combining the categories of 'down' and 'diagonal' to create a comparable space to 'up', in order to examine whether this would yield different findings.

Lastly, another limitation to the current study is the time window that was chosen for the gazes in the current study. This time window included everything from the start of the first sound of the response, until the last sound of the response, and thus was chosen because of its correspondence to the response. However, both the end of the question, as well as the potential gap between the question and response were excluded from the response time window. By not including these moments before the start of the vocal response, a lot of preference-related gaze shifts may have been left out of the analysis. This, in turn, may have influenced the results. For example, the gazes that were annotated to be static, may not have been static in the time frame that was excluded from consideration. Further research should be conducted to explore these overlooked time windows in order to improve our understanding of the dynamics between response preference and gaze behavior.

4.6. IMPLICATIONS FOR THE FIELD AND SOCIETY

The present study may have important implications for the field of multimodality and psycholinguistics, as well as society. Firstly, the results can identify the impact of visual cues, such as gaze direction, on language processing. This can improve our understanding of how people integrate and prioritize different forms of information when communicating. Second, examining the timing of the responses and the specific directions of the gaze aversions can contribute to our understanding of the cognitive mechanisms that underlie language production and comprehension. Furthermore, this study can have implications for society, particularly in the areas of communication and social interaction. Understanding how visual signals influence language processing can help inform the development of more effective and inclusive communication practices, particularly for those with communication difficulties or disorders. Moreover, the results can have implications for our understanding of nonverbal cues in social interaction, which can inform our understanding of social dynamics and relationships. Importantly, this study could also be replicated in various other languages. This would allow for a comparison of the connection between gaze behavior and response preference across several cultures and languages, other than Dutch and English. Lastly, the results of this study have the potential to considerably improve the humanization of AI's and robots.

5. CONCLUSION

The results found in the current study provide support for the first two hypotheses, i.e., that dispreferred responses have longer gap durations, and that gaze aversions mainly occur during dispreferred responses. With respect to the third hypothesis, we can conclude that there is in fact an interaction between the specific direction of a gaze aversion and response preference. Firstly, the previously found tendency of English speakers to delay dispreferred responses to polar questions was replicated in the present study. The Dutch participants also displayed longer turn-gap durations for dispreferred responses than preferred responses. Secondly, the inclination of English speakers to avert their gaze during dispreferred responses was also replicated among the Dutch participants. With the inclusion of potential gaze movement, clear differences were found in gaze behavior during preferred and dispreferred responses. Most importantly, direct gazes were mostly averted during dispreferred responses, while direct gazes were generally directed towards the questioner during preferred responses. Lastly, the analysis of the third research question ("What is the relationship between the specific direction of a gaze aversion – downward, diagonally, to the side, or upward – and response preference during social interaction?") provided proof for an interaction between the specific direction of a gaze aversion and response preference. Namely, downward and sideward gaze aversions were generally connected with preferred responses, exhibiting a proportion of approximately 70% of preferred responses. Diagonal and upward gaze aversions, on the other hand, exhibited a smaller proportion of preferred responses, and were thus more closely connected to dispreferred responses. Based on these findings, one may conclude that, despite some minor differences, the relationship between gaze behavior and response preference is generally consistent among both English and Dutch speakers.

This study gives more insight into the workings of gaze behavior and response preference among native speakers of Dutch, a field that was unexplored until now. In order to further explore this subject, future research could investigate the topic through behavioral experiments, or potentially by using EEG data, as previous studies have done in the English language. These methods are expected to give even more precise results and thus provide better understanding of the connection between gaze behavior and response preference in native Dutch speakers.

6. REFERENCES

Argyle, M., & Dean, J. (1965). Eye-contact, distance and affiliation. *Soins; La Revue de Référence Infirmière*, *28*, 289–304. https://doi.org/10.2307/2786027

Bilmes, J. (1988). The concept of preference in conversation analysis1. *Language in Society*, *17*(2), 161–181. https://doi.org/10.1017/S0047404500012744

Bögels, S., Kendrick, K. H., & Levinson, S. C. (2015). Never Say No … How the Brain Interprets the Pregnant Pause in Conversation. *PLOS ONE*, *10*(12), e0145474. https://doi.org/10.1371/JOURNAL.PONE.0145474

Bögels, S., Kendrick, K. H., & Levinson, S. C. (2020). Conversational expectations get revised as response latencies unfold. *Language, Cognition and Neuroscience*, *35*(6), 766–779. https://doi.org/10.1080/23273798.2019.1590609/SUPPL_FILE/PLCP_A_1590609_SM4630.DOCX

Bousfield, D. (2007). Impoliteness, preference organization and conductivity. *Multilingua*, *26*(1), 1–33. https://doi.org/10.1515/MULTI.2007.001/MACHINEREADABLECITATION/RIS

Brown, P., & Levinson, S. C. (1987). Politeness: Some Universals in Language Usage. *Cambridge University Press, Cambrdige*.

Degutyte, Z., & Astell, A. (2021). The Role of Eye Gaze in Regulating Turn Taking in Conversations: A Systematized Review of Methods and Findings. In *Frontiers in Psychology* (Vol. 12). Frontiers Media S.A. https://doi.org/10.3389/fpsyg.2021.616471

Goffman, E. (2016). On Face-Work. *Http://Dx.Doi.Org/10.1080/00332747.1955.11023008*, *18*(3), 213–231. https://doi.org/10.1080/00332747.1955.11023008

Holler, J., Kendrick, K. H., & Levinson, S. C. (2018). Processing language in face-to-face conversation: Questions with gestures get faster responses. *Psychonomic Bulletin and Review*, *25*(5), 1900–1908. https://doi.org/10.3758/s13423-017-1363-z

Holler, J., & Levinson, S. C. (2019). Multimodal Language Processing in Human Communication. *Trends in Cognitive Sciences*, *23*(8), 639–652. https://doi.org/10.1016/J.TICS.2019.05.006

Holtgraves, T. (2010). Preference Organization and Reply Comprehension. *Http://Dx.Doi.Org/10.1207/S15326950DP3002_01*, *30*(2), 87–106. https://doi.org/10.1207/S15326950DP3002_01

Jongerius, C., Hessels, R. S., Romijn, J. A., Smets, E. M. A., & Hillen, M. A. (2020). The Measurement of Eye Contact in Human Interactions: A Scoping Review. *Journal of Nonverbal Behavior 2020 44:3*, *44*(3), 363–389. https://doi.org/10.1007/S10919-020-00333-3

Kendrick, K. H., & Holler, J. (2017). Gaze Direction Signals Response Preference in Conversation. *Research on Language and Social Interaction*, *50*(1), 12–32. https://doi.org/10.1080/08351813.2017.1262120/SUPPL_FILE/HRLS_A_1262120_SM9379.PDF

Kendrick, K. H., & Torreira, F. (2015). The Timing and Construction of Preference: A Quantitative Study. *Https://Doi-Org.Ru.Idm.Oclc.Org/10.1080/0163853X.2014.955997*, *52*(4), 255–289. https://doi.org/10.1080/0163853X.2014.955997

Lerner, G. H. (1996). Finding" face" in the preference structures of talk-in-interaction. *JSTOR*, *59*(4), 303–321. https://www.jstor.org/stable/2787073?casa_token=CInc-RGKtWsAAAAA:q-kuNPk3P9qiE7SkwyRU7mMP9kamKTODO9PZDi7aN0yhU1X6MPpIEuyjIOToaM3UbzLB6sUXXka2eSdtUVS4tJEEpITLjAr-n0sAeIIOpABO_YYRlzCx

Nota, N., Trujillo, J. P., Holler, J., & Becchio, C. (2021). Facial Signals and Social Actions in Multimodal Face-to-Face Interaction. Brain Sci. 2021, 11, 1017. *Mdpi.Com*. https://doi.org/10.3390/brainsci11081017

Perniss, P. (2018). Why we should study multimodal language. *Frontiers in Psychology*, *9*(JUN), 1109. https://doi.org/10.3389/FPSYG.2018.01109/BIBTEX

Pillet-Shore, D. (2017). Preference Organization. *Oxford Research Encyclopedia of Communication*. https://doi.org/10.1093/ACREFORE/9780190228613.013.132

Pomerantz, A. (1984). *Agreeing and disagreeing with assessments: Some features of preferred/dispreferred turn shaped*. Wiley-Blackwell Publishing. https://scholarsarchive.library.albany.edu/cas_communication_scholar

Robinson, J. D. (2020). Revisiting Preference Organization in Context: A Qualitative and Quantitative Examination of Responses to Information Seeking. *Research on Language and Social Interaction*, *53*(2), 197–222. https://doi.org/10.1080/08351813.2020.1739398/SUPPL_FILE/HRLS_A_1739398_SM6855.DOCX

Sacks, H. (2020). On the Preferences for Agreement and Contiguity in Sequences in Conversation. *Language in Use: A Reader*, 8–22. https://doi.org/10.4324/9781003060994-2/PREFERENCES-AGREEMENT-CONTIGUITY-SEQUENCES-CONVERSATION-1-HARVEY-SACKS

Sacks, H., Schegloff, E. A., & Jefferson, G. (1974). *A SIMPLEST SYSTEMATICS FOR THE ORGANIZATION OF TURN-TAKING FOR CONVERSATION*. http://about.jstor.org/terms

Senju, A., & Johnson, M. H. (2009). The eye contact effect: mechanisms and development. *Trends in Cognitive Sciences*, *13*(3), 127–134. https://doi.org/10.1016/J.TICS.2008.11.009

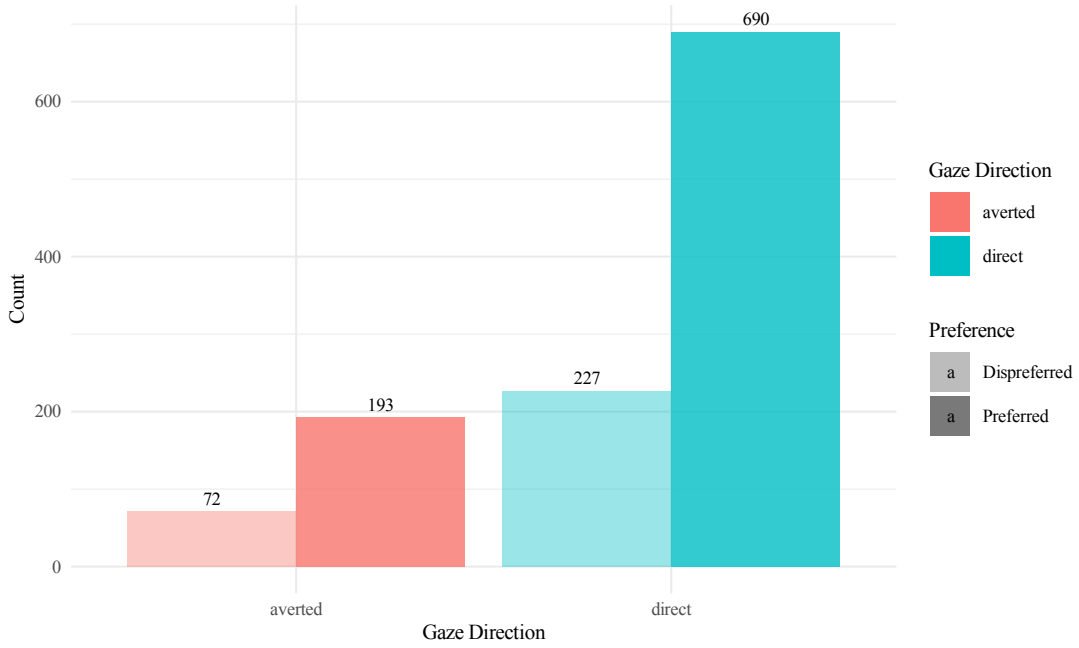
Stivers, T., & Robinson, J. D. (2006). A preference for progressivity in interaction. *Language in Society*, *35*(3), 367–392. https://doi.org/10.1017/S0047404506060179

Tanaka, H. (2005). Grammar and the "timing" of social action: Word order and preference organization in Japanese. *Language in Society*, *34*(3), 389–430. https://doi.org/10.1017/S0047404505050141

ter Bekke, M., Drijvers, L., & Holler, J. (2020). *The predictive potential of hand gestures during conversation: An investigation of the timing of gestures in relation to speech*. https://pure.mpg.de/pubman/faces/ViewItemOverviewPage.jsp?itemId=item_3239936

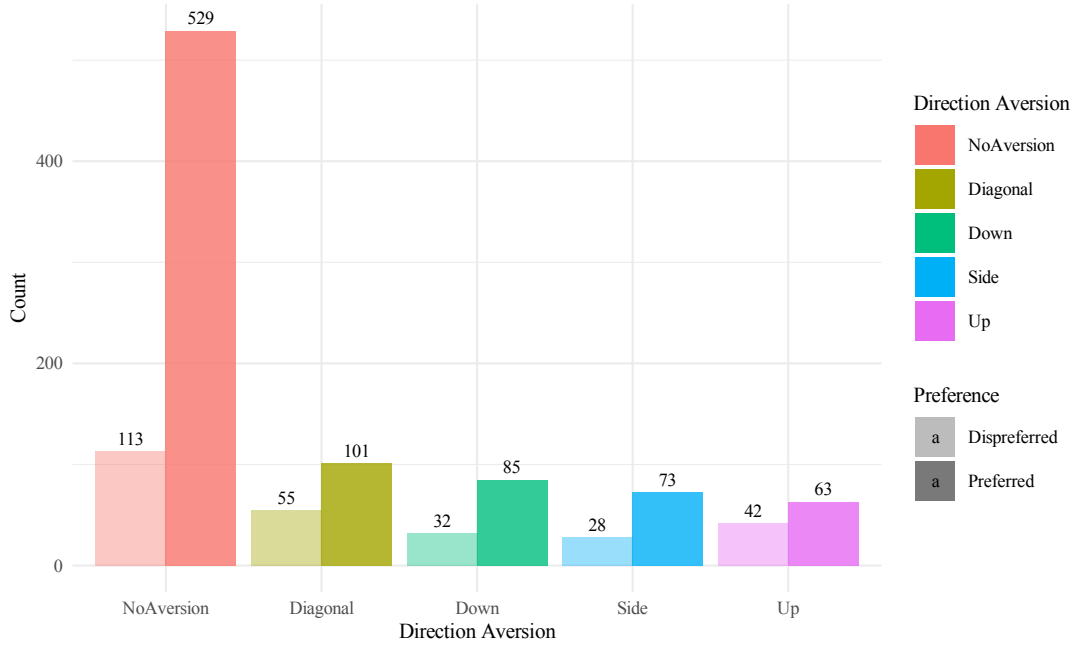
APPENDIX

Appendix A. The Count of Preferred and Dispreferred Responses for Direct and Averted Gazes.



In Appendix A, the counts for preferred and dispreferred responses as a function of averted and direct gazes are shown. The figure primarily shows that the number of both direct gazes and preferred responses are noticeably bigger than the number of averted gazes and dispreferred responses respectively.

Appendix B. The Count of Preferred and Dispreferred Responses for each Direction of a Gaze Aversion (Diagonal – Down – Side – Up), and for No Aversion.



Appendix B shows the same results that were displayed in Figure 6, but it shows the count of the variables instead of the proportions. It is immediately apparent that the majority of gazes did not display any aversion, especially for preferred responses.