

# Biased polar questions in Sign Language of the Netherlands Methods

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## 1 Introduction

In this document, we report on the materials and procedure used in a production experiment to investigate the manual and non-manual marking of biased polar questions in Sign Language of the Netherlands (NGT), conducted by Marloes Oomen and Floris Roelofsen as part of the NWO-funded project “I can’t hear you—could you repeat the question in sign language please?” (PI: F. Roelofsen; grant number: VI.C.201.014).

In a role-play setting, adult native or early signers of NGT were prompted to ask questions to two confederates, whose responses introduced different original speaker bias and contextual evidence (positive, negative, neutral). These exchanges were intended to trigger a target question directed toward the second confederate at the end of each role play.

We provide a description of the experimental stimuli in Section 2, the studio where recording took place in Section 3, and the experimental procedure in Section 4. Details about the participants in the study can be found in Section 5. Section 6 discusses the data set.

## 2 Stimuli

Questions were elicited from participants in a role-play setting where they interacted with two members of our research team, who we refer to as confederates A and B. Both are deaf and early acquirers of NGT. During the experimental sessions, the confederates were referred to as *Ria* (confederate A) and *Tom* (confederate B) to contribute toward the sense of a role-play setting. The confederates signed pre-scripted utterances in response to participant productions prompted by stimulus materials projected on a laptop screen. The confederates’ utterances were intended to introduce original speaker bias (confederate A) and contextual evidence (confederate B).

We created six situations (one used as practice trial) designed to elicit polar questions from participants with different kinds of bias. The situations were loosely based on selected scenarios from Domaneschi et al.’s (2017) study on bias in polar questions in spoken German and English. For each situation, there were seven experimental conditions with different combinations of speaker bias and contextual evidence (Table 1), which we refer to as variations. Only double positive and double negative evidence combinations were not included in the study, as it is unnatural to ask a question in such cases.<sup>1</sup> All situations are represented in English in Appendix A.

Each trial, i.e. each variation within a situation, was structured in the same way as illustrated by Figure 1. This visualization was also printed out and hung in the studio where the experimental sessions took place. Each variation within a situation consisted of three short interactions between the participant and

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<sup>1</sup>Domaneschi et al. (2017) tested six experimental conditions in their study, also excluding the combination of negative speaker bias and neutral contextual evidence. However, while it is indeed somewhat unnatural to ask a question in such a setting, it is not impossible, and so we decided to include this condition as well.

Contextual evidence	Original speaker bias		
	Positive	Neutral	Negative
Positive			
Neutral			
Negative			

Table 1: Experimental conditions.

confederate A (first interaction) and confederate B (second and third interaction). Below, we further explicate the structure of a trial with the use of one example from one situation. We represent the contexts and exchanges in written English, but the only language used during the experimental sessions was NGT. Context videos in NGT are available at <https://doi.org/10.21942/uva.21695150> and recordings of confederate utterances (which were scripted) can be found at [ADD](#). All target responses from our participants (final participant utterance in each trial) are publicly available at <https://doi.org/10.21942/uva.21666203>.

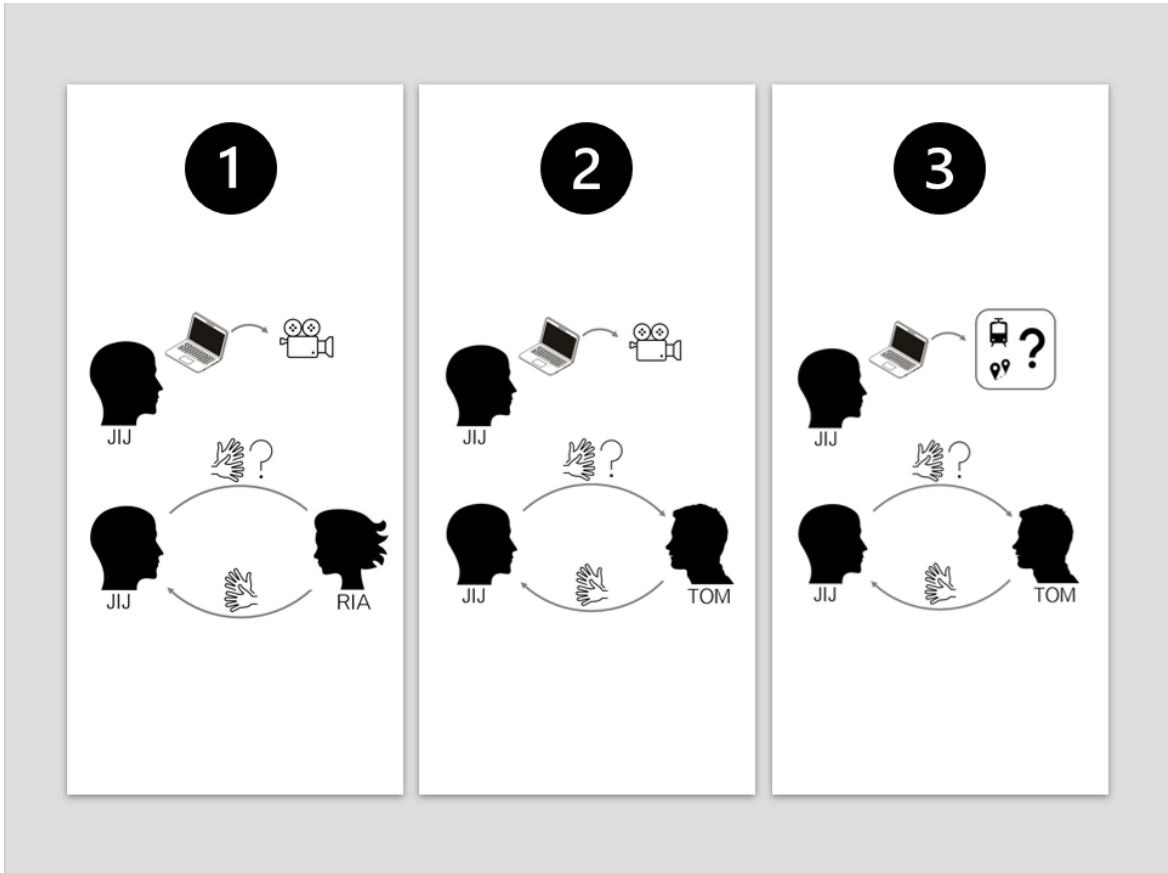


Figure 1: Visualization of the structure of each variation within a situation in the experiment. *Jij* = ‘you’ in Dutch. *Ria* and *Tom* are the confederates.

### 1. Introducing original speaker bias

To prompt the first interaction, where confederate A introduces original speaker bias, a pre-recorded context video was shown to the participant on a laptop, which was positioned on a table slightly toward the signer’s left (see Section 3 for details about the studio set-up). The video directly instructs the participant to ask a question to confederate A, who subsequently responds with a statement introducing either positive, negative, or neutral original speaker bias for the target question at the end of the third interaction. Content-wise, the target question is always either identical or almost the same as the question the participant is instructed to ask in this first exchange. In the example we are introducing here, the target question concerns whether or not Kim is a vegetarian. This is also the question the participant is prompted to ask – crucially, without any bias yet involved – in this first exchange to confederate A, who provides positive evidence that Kim is indeed a vegetarian:

*Context 1:* You're organizing a dinner. You've also invited Kim, but you don't know if Kim is a vegetarian. Ria knows Kim well. Ask her.

*Participant:* "Is Kim a vegetarian?"

*Confederate A:* "Yes, Kim is a vegetarian."

## 2. *Introducing contextual evidence*

The participant is then shown a second pre-recorded context video, directly prompting the participant to ask a different question to confederate B. The confederate responds with an utterance that provides positive, negative, or neutral contextual evidence for the target question. Note that the question asked by the participant in this second exchange, in contrast to the question in the first interaction, is not directly related to the target question. For example, in the continuation of our example from above, the participant is prompted to ask confederate B about how many meatballs they should prepare for their dinner party. Of itself, this has nothing to do the question of whether or not Kim is a vegetarian, but it does provide a hook for the confederate to provide comment on the status of Kim as a vegetarian or not. Indeed, in our example, confederate B responds in a way that makes clear that he believes Kim is *not* a vegetarian:

*Context 2:* You and Tom are cooking dinner together. You're making meatballs. Ask Tom how many meatballs you should make.

*Participant:* "How many meatballs should we make?"

*Confederate B:* "We should definitely make enough for Kim, she loves them!"

## 3. *Eliciting the target question*

In the final stage of each variation, the participant is prompted to ask another question to the second confederate in direct response to the confederate's reaction in the second stage. This third question is the target question, whose form is expected to differ depending on the information provided by the confederates in the first and second interactions. As noted before, in terms of content, the question is the same or similar to the first question asked to confederate A, but differs in terms of bias.

Participants were prompted with images with pictorial representations of concepts they were instructed they had to minimally include in the target question. In our example below, the concept 'vegetarian' is represented by the V label (logo for vegetarianism) with two small icons of an apple and corn; 'Kim' is represented with a silhouette of a woman's head and the word 'Kim' below it. The question mark on the right was intended to remind the participant that their response should come in the form of a question, not a statement. Any images that were unclear to the participant were explained during the practice round of each first variation within a situation (see Section 4 for more details on the experimental procedure).

In the situation we are discussing here, the intended target question is thus a variation of "Is Kim a vegetarian?". In our example, the participant had first received positive and then negative evidence on this matter, such that we might expect the target question to involve some expression of surprise, as well as negation. After the participant asked the target question, confederate B would always briefly respond. This response was unscripted and varied with each variation and each participant. Note that we chose to use picture prompts to trigger the target question in order to avoid having to use video recordings of signs, because the productions could influence participants in terms of e.g. lexical choices but also sign order. For that latter reason, we also placed the pictorial representations of concepts on top of rather than next to each other. However, we realized that this vertical alignment could still have an effect on constituent order. We therefore created two sets of picture prompts, where the top and bottom images on the left of the prompts were reversed (see Appendix A for all picture prompts). Two participants saw version 1 and four participants saw version 2 of the picture prompt set.<sup>2</sup>

<sup>2</sup>A seventh participant saw version 1 but was excluded from the study after collection of the data; hence the imbalance in the number of participants who saw each version.

Picture prompt:



Participant: “So Kim is *not* a vegetarian?”  
or  
“Isn’t Kim a vegetarian?!”  
or  
...

### 3 Recording studio

The experimental sessions took place at the sign language studio at the University of Amsterdam, which is equipped with studio lamps and a green screen. Figure 2 presents an overhead view of the studio set-up during the sessions.

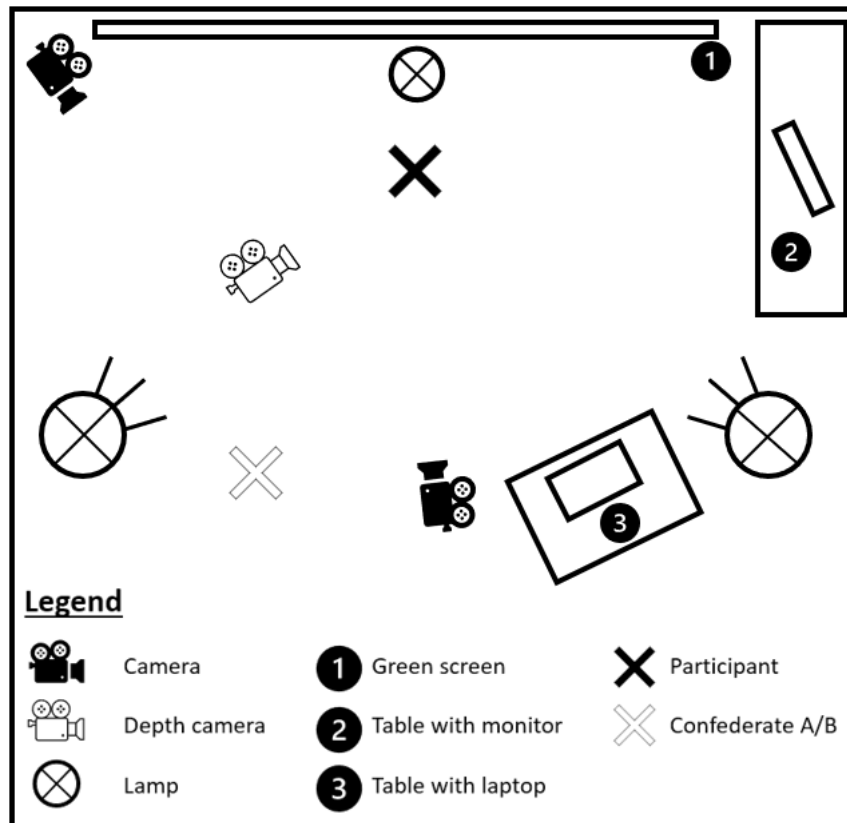


Figure 2: Overhead view of the recording studio setup.

Participants were stood in front of a green screen and a floor lamp shining upward onto the green screen. Participants interacted with two confederates, always one at a time, during the experimental trials. The confederate in dialogue with the participant would stand slightly toward the signer’s right, positioned exactly between two cameras on tripods: a Sony FDR-AX53 (Full HD) on the signer’s left (confederate’s right) and an iPhone with depth camera for 3D recording, positioned on the signer’s right (confederate’s left). A second Sony FDR-AX53 camera (top left corner in the figure) recorded the confederates. As

discussed in Section 2, confederates produced utterances following a script. They were recorded to make it possible for the researchers to do a double check when needed, e.g. in case of an unexpected participant response. The confederate recordings made during the experimental sessions are not publicly available, but we recorded the confederate’s utterances separately after the sessions. These recordings are available at [ADD](#). A confederate not in dialogue with the participant would stand at the back of the room and would not engage with the participant during that time.

In addition to the participant and confederates, there were two experimenters in the room. The first was stood behind a high table ((3) in Figure 2) with a keyboard and mouse connected to a laptop facing the signer (also on table (3)), and a monitor visible to both the confederates and the experimenter on a low table (2). The experimenter guided each session and was responsible for providing instructions, projecting the stimuli (see Section 2) on the laptop and monitor, as well as handling the participant camera. A second experimenter was positioned between the (confederate) camera and the studio lamp on the left in Figure 2, and was responsible for handling the confederate camera and depth camera. The experimenter also indicated the trial number on a poster on the wall as well as on a clapperboard, which was displayed in front of the cameras at the start of each trial.

## 4 Experimental procedure

Participants were welcomed at the sign language studio and were given a brief introduction by the lead experimenter. They were reminded that they would be recorded for the experiment, and that they had given permission (in writing, prior to the session) for the analysis and/or publication of the data. They were told that they were free to stop their participation experiment at any time or request for their data to be removed after the session.

They were then shown pre-recorded instruction videos in NGT on a laptop. Participants were told that they were going to participate in short role plays together with the confederates, who were introduced as ‘Ria’ and ‘Tom’ and referred to with initialized sign names, and that they had to ask these confederates a number of questions during the role plays. The sign name for ‘Kim’, which was used in two of the situations, was also introduced in the instruction video. The participants then witnessed two example role plays in real time, where the main experimenter (a hearing L2 signer of NGT) took the role of the participant and played two variations within the practice situation (see Appendix A).

Then, in another video, the structure of a role play was explicated with use of the visualization in Figure 1. Participants were instructed that they always had to ask *questions* to confederates, but that there were no restrictions on sign order or use of facial expressions. They were instructed to keep their productions brief, preferably a single sentence, and to sign them as naturally as possible. To help them get a sense of what we were after, the participants were then shown three examples of variations of the same question (content-wise), but with different use of facial expressions and other non-manual markers (e.g. headshake for negation). It was then explained that there are five different situations with seven different variations within each situation, as well as a practice situation. Participants were told that, within each situation, the context videos and picture prompts were always identical, but that the responses from the two confederates would differ from variation to variation. Participants were instructed to adapt their questions depending on the confederates’ utterances, meaning that they might want to ask the same question slightly differently for each variation within a situation.

After all instruction videos were shown, participants were given the opportunity to ask questions about the procedure, and were reassured that they could ask questions to the experimenters and confederates at all times. They were also told that breaks would be taken regularly, and that they could request to take a break at any time. Then the trial session commenced, which included several variations within the practice situation (see Appendix A). This allowed the participants to get used to the structure of each role play and to experience how each variation within a situation would slightly differ from each other and as a result may lead them to ask the final question in each variation in a different way. Generally, the practice phase took a fair bit of time, but once participants got the hang of the experimental procedure, the actual experiment would run quite smoothly. The main phase of the experiment began after the practice session and after participants had no more questions about the procedure. In total, all sessions lasted between 3 to 4 hours including breaks. Usually, instructions and practice session lasted about 1.5 hours, after which the tempo sped up considerably.

Remember from Section 2 that, in each trial, participants were presented with context videos preceding their first two interactions with the confederates. In practice, these context videos were not replayed over and over again. Rather, when the first variation within a new situation was introduced, participants would first take some time to absorb the information in the context videos and to remember the questions they

had to ask to the confederates. They would then do a practice run and only after that would we start recording. The context videos would not be shown anymore after this, unless the signer requested it. Each trial, then, consisted solely of interactions between the participant and the confederates, and laptop where videos and stimuli were presented would display just the picture prompt. This way of going through the trials worked well and generally made the participant’s interactions with the confederates feel more natural, both to the participant and the observing experimenters.

After all recordings were made, signers were thanked for their time and were given the opportunity to ask more about the study and to share how they experienced it. Generally, signers reported enjoying the session while also finding it quite intensive and sometimes challenging.

## 5 Participants

Participants were recruited via a video-recorded call for participants in a study on questions in NGT, placed on the Facebook page of the university’s sign language group. Eight deaf signers of NGT (2 male, 6 female) responded to the call. One of the male signers participated in a trial session which was intended to evaluate and optimize the experimental procedure and stimuli; the data resulting from this session were not analyzed and are not publicly available. The data from the other seven participants were recorded and subsequently annotated.

After we annotated all the data, we decided to exclude the data from one participant from the study. This signer had indicated in the participant survey that he began learning Sign Supported Dutch from the age of four (primary school) and only started learning NGT in high school. Because the participant indicated that he used NGT as his primary means of communication in daily life, the signer was allowed to participate in the study. However, the influence from Sign Supported Dutch was obvious in his signing, and his productions clearly diverged from those by the other signers. Since we are, at this stage, primarily interested in investigating how questions with different kinds of bias are marked by signers of NGT, we decided to exclude this participant from the study. Thus, the data of six of the participants, all women, were selected for analysis.

Each participant filled out a survey with questions about their (language) background before the start of the experimental session. Of the signers whose data was analyzed, two were between 18 and 29; one between 30 and 39, and three between 50 and 59 years of age. All signers self-identified as deaf, and one of the participants reported having a cochlear implant. Six of the signers are right-handed, one is left-handed, and one is ambidextrous.

All participants reported that they use NGT on a daily basis, and all except one indicated that they either acquired NGT from birth or within the first four years of life. One participant started learning NGT at primary school. There are five main variants of NGT connected to the locations of the (former) five deaf schools in the Netherlands in Groningen (North-East), Amsterdam (North-West), (Sint-Michiels)gestel (South), Rotterdam and Voorburg (both West) (Schermer, 2003; Schermer & Harder, 1986). All variants except one (Gestel) are used by the participating signers. Rotterdam (N=2) and Voorburg (N=2) are both represented twice, while the Groningen and Amsterdam variants are represented by one signer each.

All participants indicated that they use Dutch either on a daily basis or on most days. Other languages that were used by participants included English (‘most days’, N=1; ‘occasionally’, N=2) and American Sign Language (‘occasionally’, N=1). Four of the signers also reported that they occasionally make use of International Sign. All except one signer, whose parents are both deaf, have hearing parents. Approximately half of the hearing parents were reported to know little to no NGT; the reported signing skills of the remaining hearing parents ranged from ‘limited’ to ‘good’.

Participants were financially compensated for their time and travel costs. Informed consent was obtained from all participants for the processing, analysis, and online archiving of the video-recorded data by the researchers, as well as discussion of the data in academic publications in anonymized form. We also obtained consent from all signers except the trial participant for making the video-recorded data publicly accessible.

## 6 Data set

The data of all participants except the trial participant and the excluded signer can be found at <https://doi.org/10.21942/uva.21666203>. All files include a compilation of five target questions from the same participant and the same experimental condition, for the five situations represented in Appendix A. File names refer to the participant number, stimuli version (picture prompt set; see Section 2),

and experimental condition, where e.g. ‘PosNeut’ stands for positive original speaker bias and neutral contextual evidence. For all participants, there is also a file with ‘baseline’ questions; they include for each situation one question that was asked by the participant to confederate A at the beginning of each variation. Since these questions were asked without any bias yet involved, we considered these baseline or standard polar questions. For participants 03 to 07, we also elicited declarative versions of the target questions for each situation (e.g. ‘Kim is a vegetarian’); these are also included in the data set.

The data set comprises 52 files with five target sentences each, amounting to 260 constructions in total. All these sentences were annotated in ELAN Linguistic Annotator for manual and non-manual markers.

## References

- Domaneschi, F., Romero, M., & Braun, B. (2017). Bias in polar questions: Evidence from English and German production experiments. *Glossa: a journal of general linguistics*, 2(1), 26. 1–28. <https://doi.org/10.5334/gjgl.27>
- Schermer, T. (2003). From variant to standard: An overview of the standardization process of the lexicon of Sign Language of the Netherlands over two decades. *Sign Language Studies*, 3(4), 469–486.
- Schermer, T., & Harder, R. (1986). Lexical variation in Dutch Sign Language: Some implications for language planning. In B. T. Tervoort (Ed.), *Proceedings of the second european congress on sign language research* (pp. 134–141). NSDSK.

## Appendix A Situations

We created five situations and one practice situation. Video recordings of the contexts (two per situation) in NGT, as they were also shown to the participants, are available at <https://doi.org/10.21942/uva.21695150>. Confederate responses provide positive (+), neutral (0), or negative (−) evidence for the target question (final participant utterance).

### A.1 Practice situation: Is there a metro station nearby?

#### 1. *Original speaker bias*

*Context 1:* You recently moved to the center of Amsterdam. You would like to take the metro to Artis [zoo in Amsterdam]. You don't know if there's a metro station nearby. You meet Ria, who lives close to Artis. Ask her.

*Participant:* "Is there a metro station nearby Artis?"

*Confederate A:* + "Yes, there is a metro station close to Artis."  
0 "I don't know, I never take the metro."  
− "No, there's no metro station near Artis."

#### 2. *Contextual evidence*

*Context 2:* You're meeting your new neighbor Tom for the first time. Ask him whether he knows the way to Artis.

*Participant:* "Do you know the way to Artis?"

*Confederate B:* + "There's a metro station here around the corner. You should take line 51 to Weesperplein, which is close to Artis."  
0 "It's best to go by public transport."  
− "You can't take the metro, because there's no metro station near Artis. You should take tram 17."

#### 3. *Target question*

*Picture prompt:*



*Participant:* Variation on "Is there a metro station nearby?"

## A.2 Situation 1: Is Kim a vegetarian?

### 1. *Original speaker bias*

*Context 1:* You're organizing a dinner. You've also invited Kim, but you don't know if Kim is a vegetarian. Ria knows Kim well. Ask her.

*Participant:* "Is Kim a vegetarian?"

*Confederate A:* + "Yes, Kim is a vegetarian."  
0 "I don't know if Kim is a vegetarian."  
- "No, Kim is not a vegetarian."

### 2. *Contextual evidence*

*Context 2:* You and Tom are cooking dinner together. You're making meatballs. Ask Tom how many meatballs you should make.

*Participant:* "How many meatballs should we make?"

*Confederate B:* + "You don't have to make any for Kim, she is a vegetarian."  
0 "Let's make two for everyone, except for the vegetarians."  
- "We should definitely make enough for Kim, she loves them!"

### 3. *Target question*

*Picture prompt:*



(Version 1)



(Version 2)

*Participant:* Variation on "Is Kim a vegetarian?"

## A.3 Situation 2: Is the park open?

### 1. *Original speaker bias*

*Context 1:* You want to go to the Efteling [Dutch theme park] this weekend, but you're not sure it's open. You meet Ria, who has a subscription to the park. Ask her.

*Participant:* "Is the Efteling open this weekend?"

*Confederate A:* + "Yes, the Efteling is open this weekend."  
0 "It's open on Saturday but I don't know about Sunday. I never go on Sunday."  
– "It's open on Saturday but I think I read in the newspaper that it's not open on Sunday."

### 2. *Contextual evidence*

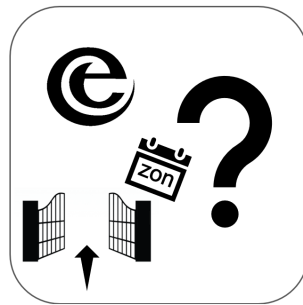
*Context 2:* Later that day, you meet Tom. He works at the Efteling. You know he has the weekend off. Ask him if he'd like to come to the Efteling with you this weekend.

*Participant:* "Do you want to go to the Efteling with me?"

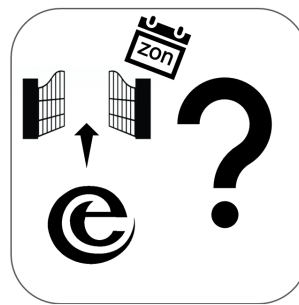
*Confederate B:* + "Fun! Shall we go on Sunday?"  
0 "I can't this weekend."  
– "The Efteling is only open on Saturday. I'm available then."

### 3. *Target question*

*Picture prompt:*



(Version 1)



(Version 2)

*Participant:* Variation on "Is the Efteling open this weekend?"

## A.4 Situation 3: Is entrance free of charge?

### 1. *Original speaker bias*

*Context 1:* You would like to visit the Veluwe [Dutch national park] tomorrow. You don't know if entrance is free of charge. Ria is a volunteer at the park. Ask her.

*Participant:* "Is entrance to the Veluwe free of charge?"

*Confederate A:* + "Yes, you don't have to pay a fee."  
0 "I don't know."  
– "No, a ticket costs 10 euros."

### 2. *Contextual evidence*

*Context 2:* A day later, you're at the Veluwe parking lot. You can't find the entrance to the park. At the parking lot, you meet Tom, another visitor to the park. Ask him.

*Participant:* "Do you know where the entrance is?"

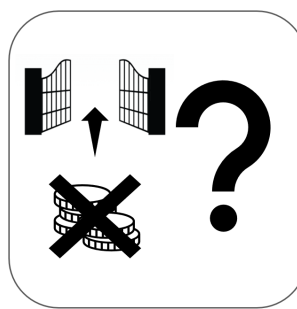
*Confederate B:* + "The entrance is there by the white flag. You don't need a ticket."  
0 "The entrance is there by the white flag."  
– "The entrance is there by the white flag, but you need to get a ticket at the ticket counter over there first."

### 3. *Target question*

*Picture prompt:*



(Version 1)



(Version 2)

*Participant:* Variation on "Is entrance free of charge?"

## A.5 Situation 4: Is Kim home?

### 1. Original speaker bias

*Context 1:* You're a student and you're living together with Ria, Tom, and Kim. You're planning to visit your parents this weekend. You know that Ria and Tom will also be away. You don't know if Kim will stay at home. Ask Ria.

*Participant:* "Will Kim stay at home?"

*Confederate A:* + "Yes, she needs to study all weekend."  
0 "I don't know if she'll stay at home."  
– "I thought Kim said she going to spend a weekend at sea."

### 2. Contextual evidence

*Context 2:* On Saturday morning, you unexpectedly have to return home early, but you forgot your keys. On the way home, you call Tom; you can't get a hold of Kim. Ask Tom if Kim could open the door for you.

*Participant:* "Can Kim open the door for me?"

*Confederate B:* + "Yes, I just talked to her and she's there."  
0 "I don't know. You should send her a text."  
– "Kim is away for the weekend."

### 3. Target question

*Picture prompt:*



(Version 1)



(Version 2)

*Participant:* Variation on "Is Kim home?"

## A.6 Situation 5: Is there a train at 9am?

### 1. Original speaker bias

*Context 1:* Tomorrow morning, you'd like to take the train from Amsterdam to Paris. You'd prefer to leave at 9am. But you don't know if there's a train at 9. Ria has a public transportation travel planner app on her phone. Ask her.

*Participant:* "Is there a train from Amsterdam to Paris at 9am tomorrow?"

*Confederate A:* + "Let me check. Yes, there's a train at 9am"  
0 "Oh, the app doesn't work, so I don't know."  
– "Let me check the app. No, I don't see a train at 9am."

### 2. Contextual evidence

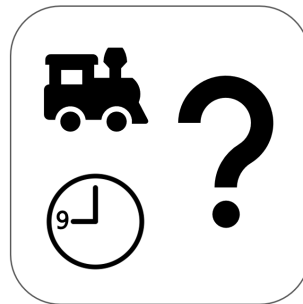
*Context 2:* You live close to the train station, so you decide to walk to the ticket counter to buy a ticket. Ask the ticket seller how much a ticket costs for the train to Paris tomorrow.

*Participant:* "How much does a ticket for the train to Paris tomorrow cost?"

*Confederate B:* + "For the 9 o'clock train, a ticket costs 100 euros."  
0 "It depends on what time you'd like to leave. There are multiple trains going tomorrow."  
– "There's only one train tomorrow, which leaves at 10am. A ticket costs 100 euros."

### 3. Target question

*Picture prompt:*



(Version 1)



(Version 2)

*Participant:* Variation on "Is there a train at 9am?"