Lying and commitment: The case of pointing gestures[1]

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Abstract In this paper, we examine pointing gestures that accompany underinformative definite articles and pronouns in German. Ongoing discussions on the definition of lying reveal a contrast between traditional, narrow definitions that focus on *what is said* and more recent definitions that emphasize commitment. Through two experiments, we demonstrate that first, deceptive pointing gestures are judged as lies to the same degree as speech only. This finding can be interpreted as support for a commitment-based definition of lying, or be explained by assuming that the pointing gestures in our experiment are part of the assertion. Furthermore, our results show that speakers are perceived to be committed to the content of their pointing gestures, although in comparison to speech only, ratings on commitment were lower. However, none of the two commitment-related properties, accountability and restricted deniability, accurately predicts the similarity between pointing gestures and speech for lie ratings. In conclusion, our findings present empirical challenges to both traditional and commitment-based definitions of lying.

Keywords: lying, commitment, pointing gestures, multimodal communication.

1. Introduction

In daily communication, we regularly refer to entities, either abstract or concrete, in the world, typically by using specific referential expressions such as proper names, definite NPs like *the dog*, or demonstratives like *this lamp*, amongst others. Besides these verbal expressions, there are also non-verbal elements that can be used to establish reference, such as different types of hand gestures or indicating someone or something with the eyes or with a head movement. Among these visual means of referring, the most common one is perhaps a pointing gesture as shown in (1):

(1) a) Samira/[She]_POINTNG AT SAMIRA won the bet.[2]
b) The red lamp/[This lamp]_POINTING AT THE RED LAMP is cheaper.[3]

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[2] In the following, we will enclose the part of speech that temporally aligns with the gesture in brackets.

[3] Note that other usages of pointing gestures are possible, too. For instance, a pointing gesture can co-occur with a proper name ([Samira]_POINT AT SAMIRA) or it can replace the verbal parts totally, ([ ]_POINT AT SAMIRA), what we call a pro-speech gesture. As these usages were not investigated in our experiments, we will not discuss them in more detail.

Typically, pointing gestures can be described as a hand shape with an outstretched index finger, sometimes also involving movement of the hand and the arm, normally directed towards something or someone (for a more detailed description and discussion of pointing, see e.g. Eco, 1979; Kendon, 2004; Cooperrider et al., 2018). Pointing is one of the ubiquitous gestures observed in various contexts and developmental stages in human (and even non-human) communication, and has been investigated from numerous perspectives, including philosophical, semiotic, cognitive, and linguistic ones (for an overview with discussion, see Cooperrider 2023). Now imagine that by uttering (1a), the speaker intends to deceive the addressee: The speaker knows very well that it isn't Samira who won the bet but s/he wants to create the false believe that Samira won the bet. Is the speaker lying? Does s/he become committed to the proposition *p = Samira won the bet* by using the pronoun *she* accompanied by a pointing gesture? And if so: To the same degree as to purely verbally uttered content? To answer these questions, we conducted two rating studies that will be presented in chapters 3 and 4. Prior to the discussion of our experiments, we will give a short overview on different definitions of lying and on linguistic advances on gestural meaning that are relevant for our investigation (chapter 2).

2. Background: Lying with visual means

There are numerous different approaches to define lying, and to date, there is no generally accepted definition of lying. There is a long tradition, that can be traced back at least to St. Augustine to define lying in contrast to misleading and to emphasize that lying requires that a speaker says (or asserts) something (see Viebahn 2019, 2021 for a more in-depth discussion). Variations of this definition can be found in more contemporary definitions, as the ones proposed by Stokke (2018:31) (featured in 2a) and Fallis (2009:33) (featured in 2b), who both request that a speaker says/asserts that *p*:

(2) Traditional assertion-based definitions of lying:
  a. Stokke (2018)'s common ground definition of lying:
    A lies to B if and only if there is a proposition p such that
      i. A says that *p* to B, and
      ii. A proposes to make it common ground that p, and
      iii. A believes that *p* is false.
  b. Fallis (2009)'s definition of lying:
    You lie to X if and only if:
      i. You assert that *p* to X
      ii. You believe that *p* is false.

Following this tradition, a variation of condition (i) is often considered to be a crucial criterion for the lying-misleading distinction: while, for the act of lying, a proposition *p* has to be 'said' (or 'uttered', 'asserted' or 'stated'), a misleading information, for instance, doesn't have to be communicated explicitly but can also be conveyed pragmatically, as a conversational implicature, for example (see e.g. discussion in Stokke, 2013; Barber, 2020)[4], or by the usage

[4] Note, however, that Meibauer (2005) and Dynel (2011), amongst others, propose alternative definitions that include the possibility to lie via conversational implicatures.

of visual means. Stokke, for instance, expresses this quite explicitly, by excluding actions and visuals means from his concept of lying:

> "A chief reason for characterizing lying in terms of assertion is to set off lying from non-linguistic forms of deception and insincerity. Wearing disguises, faking emotions, pointing in the wrong direction, feigning laughter, shedding crocodile tears […] such deceptive maneuvers are not lies, although they may be accompanied by lies if they involve putting into words something one believes to be false." (Stokke, 2018, p. 7)

In this article, we are interested in pointing gestures – so the question is whether, in principle, lying with pointing gestures should be thinkable within a traditional definition of lying as the ones featured in (2). There is strong case to be made that some visual means can contribute to the propositional content or even serve as assertions: Mahon (2008), for instance, considers the usage of a highly conventionalized gesture such as the thumb-up gesture as a suitable method to make a statement and, therefore, a possibility to lie. The question of whether lying with pointing gestures is possible within a traditional definition of lying, then, can be boiled down to the question whether the gestural content is part of what is said/the asserted content (see also the discussion by Antomo, 2025). We will come back to this issue in chapter 5.

More recently, an alternative way to define lying has become popular, which is based on the observation that there is a systematic connection between lying and commitment. Many empirical investigations conclude that definitions as featured in (2) are too narrow to capture lay people's understanding of lying (see Or et al., 2017; Antomo et al., 2018; Weissman and Terkourafi, 2019; Thalmann et al., 2021), amongst others), furthermore, experiments have shown a strong correlation between lie ratings and commitment (see e.g. Reins and Wiegmann 2021; Wiegmann, Willemsen, and Meibauer 2022, for more about commitment and verbal meaning relation, see e.g. Mazzarella et al. 2018). A commitment-based definition of lying is featured in (3), following Viebahn (2019) (similar accounts are defended by Marsili, 2021; Reins and Wiegmann, 2021; Viebahn, 2021 among others). What is crucial here is condition (i): Whereas the definitions in (2) require that a speaker S says or asserts that *p*, Viebahn's definition merely requires a communicative act. As a consequence, lying is possible with any content that involves commitment:[5]

(3) Viebahn's commitment-based definition of lying (Viebahn, 2019, p. 253)
A lies to B if and only if there is a proposition *p* such that:
(i) A performs a communicative act C addressed to B with the content *p*;
(ii) by performing C, A commits herself to *p*; and
(iii) A believes that *p* is false.

Definition (3) can encompass lying through visual means, as long as the sender of the content is perceived to be committed to the content. There are already some investigations that explore the possibility to lie using visual means within a commitment-based approach. Viebahn (2019), for instance, argues that pictures can be used to lie if the sender of the picture acquires commitment for the pictorial content. His intuition is confirmed by empirical data discussed

[5] It is important to note that the dichotomy we present between assertion-based and commitment-based definitions of lying is not as rigid as it may initially appear. For example, Viebahn defines assertion in terms of commitment, thereby offering a reconciliation of these two perspectives on lying.

by Viebahn and Wiegmann (2023), who show that by sending a picture with content *p*, the sender is perceived to be committed to *p* to the same degree as a speaker is committed to *p* after saying that *p*. Furthermore, there are first results on lying and commitment for emojis (Weissman, 2024; Antomo et al., 2025) and gestures (Antomo, 2025), that we will discuss later. In the investigations reviewed so far, commitment is often measured by gathering judgements on *accountability* and *deniability* (see Weissman, 2024, pp. 13–14 for an overview). Imagine that after the utterance of (4), Samira and Jacob take the green bus.

(4) Samira to Jacob: The green bus leaves for Dijon.

During the ride, Jacob learns that the bus is actually going to Lyon and confronts Samira. Since by uttering (4) she gained commitment for *p* (= *that the green bus leaves for Dijon*), in this situation she would have to justify herself (*accountability*). Moreover, after uttering (4), Samira could not convincingly deny having claimed that *p* by saying (5):

(5) Samira: # I did not claim that the green bus leaves for Dijon!

We will refer to this aspect of commitment as *restricted deniability*. What the results of the aforementioned empirical investigations on commitment also show is that commitment seems to be a gradual concept. There is good reason to believe that various aspects influence the degree of perceived commitment.: Already Moeschler (2013) assumes that there are two criteria for determining how committed a speaker is: the *strength of the inference* and its *accessibility*. According to Moeschler, semantic inferences such as entailments involve a stronger commitment than pragmatic ones like implicatures, while explicit, foregrounded information is more accessible than implicit, backgrounded content like presuppositions[6]. There is empirical evidence supporting the influence of both parameters on the degree of commitment. Regarding the strength of the inference, studies such as Mazzarella et al. (2018) show that speakers are more strongly committed to presuppositions and assertions compared to implicatures, which results in higher reputational costs if they are found to be false. Furthermore, Weissman (2024) investigates different types of emojis and shows that emojis with a widely agreed upon meaning get higher commitment scores than emojis without stability in meaning. The second aspect following Moeschler (2013), accessibility, seems (at least partially) to be supported by research focusing on contextual relevance of the content: the results of Bonalumi et al. (2020) and Reins and Wiegmann (2021), amongst others, suggest that commitment is higher for content that is relevant with respect to a discourse aim, than for backgrounded, not-at-issue content. Concerning commitment attribution, the question we are interested in is whether the boundary between speech and gestures is another parameter that influences the degree of commitment. As a widely used gesture, we investigate pointing gestures to get an answer to this question (even if we cannot simply transfer our results to other types of gestures).

[6] However, note that in Moeschler (2013), the exact influence as well as the interaction of these factors remain unclear. What about cases in which these two variables are in conflict? For the case of presuppositions, for instance, Moeschler (2013) predicts a high degree of commitment due to their semantic nature and a low degree of commitment due to their backgroundedness, yet he omits the inherent conflict between these two aspects (see e.g. Mazzarella et al., 2018 for a discussion on commitment for different types of inferences).

Research on pointing can be traced back at least to pre-Socratic philosophy. Traditionally, pointing is considered to be closely linked to reference, especially in the context of definitive articles and pronouns. In a purely semantic notion, pointing is considered as an essential non-verbal part that accompanies demonstratives like *this* and that can refer directly to an exact object (see e.g. Lyons, 1977; Levinson, 1983; Chierchia and McConnell-Ginet, 2000; for an overview of the most important theories on pointing see Lücking et al. 2015).[7] Although a number of studies have been conducted in recent years on the information status of iconic gestures (see e.g. Ebert and Ebert, 2014; Schlenker, 2018; Ebert et al., 2020; Ebert, 2024, this does not apply to pointing gestures. At the heart of our investigation are pointing gestures as in our initial example (1): Co-speech gestures that are temporally aligned with speech and that are necessary to establish reference. We investigate whether such pointing gestures involve commitment and whether they can be used to lie. Another aim is to use the data on pointing gestures to evaluate whether a more traditional definition of lying as in (2) or a commitment-based definition as in (3) is more suitable to cover up for deceptive pointing gestures. To summarize, we intend to investigate the following research questions:

(6) *Lying with gestures:* Is it possible to lie using a co-speech pointing gesture?

(7) *Commitment and modality*: Are speakers perceived to be committed (in terms of accountability and deniability) to the content of their pointing gestures? Furthermore, can accountability and deniability predict lie ratings?

3. Experiment I: Ratings on lying

3.1. Design

The first experiment primarily addresses the research question outlined in (6) and has a 2*2 design with the parameters MODALITY (whether the relevant information is given verbally or via gesture, coded as *a* and *g* respectively, within item and within subject) and TRUTH VALUE (whether the information is true or false, coded as *1* or *0*, within item and within subject), as show in Table 1 below. In this experiment, we collected ratings on lying using a 7-point Likert scale in an agreement judgment task. Additionally, participants were asked to judge whether the speaker's utterance was misleading. The goals of this task were: i) to explore whether modality is a relevant factor for the lying-misleading distinction (as predicted by traditional definitions of lying) and ii) to allow participants to signal recognition of deception, even if they do not categorize it as an instance of lying. Finally, participants were asked to assess the morality of the speaker's behavior. This measure primarily controls for variation between items, ensuring that some utterances are not perceived as more harmful or immoral than others, which could influence lie ratings.

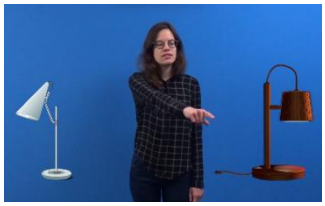
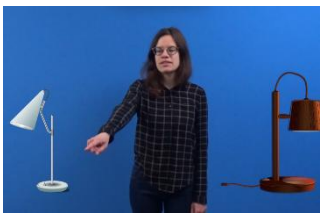
[7] Note, however, that the directness and exactness of pointing gestures recently have been challenged by experimental results: Uncertainty and misinterpretation of pointing gestures often arise depending on the distance between the pointer and the target object or depending on differing perspectives between pointer and observer. This indicates that a straightforward, exact relation between object and pointing gesture is not always guaranteed (Lücking et al., 2015; Herbort et al., 2021).

3.2. Material

The critical items consisted of a background story and a conversation. The background story was presented as written text, expressing that the speaker had a clear motivation to deceive the addressee for personal gain. It always ended with a question (the explicit Question Under Discussion, short: QUD). The answer to this QUD was presented in a video: the information relevant to answering the QUD was conveyed either through a co-speech pointing gesture (conditions *g1* and *g0*) or solely through speech without any gesture (conditions *a1* and *a0*, with shot from head to hip level and no hand movement). Facial expressions in the videos were controlled to be as neutral as possible. Consider the following example from our experiment for illustration:

(8) Jakob and Kristin want to buy a new lamp. Jakob wants to spend as little money as possible so that he can still afford an expensive computer game. While browsing, Kristin discovers an expensive lamp made of silver stainless steel and a cheap lamp made of red plastic. She wants to buy the silver lamp because she likes it better. When Kristin shows Jakob the lamps, he asks: "Which lamp is cheaper?" Kristin says:

Table 1. The four combinations of an answer (*a1, a0, g1, g0*) given in video.

	true (coded as 1)	**false (coded as 0)**
without gestures (coded as a)	 „Die rote Lampe ist billiger.“ ‘The red lamp is cheaper.’	 „Die silberne Lampe ist billiger.“ ‘The silver lamp is cheaper.’
with gestures (coded as g)	 „[Die]_POINTING_rote Lampe ist billiger.“ ‘[The]_POINTING_red lamp is cheaper.’	 „[Die]_POINTING_silver Lampe ist billiger.“ ‘[The]_POINTING_silver lamp is cheaper’

Note that the test items using speech only (*a1* and *a0*) not only offer a baseline for our experiment, but the contrast between *a0* and *a1* can also function as an attention check for participants: If a participant does not clearly distinguish *a0* from *a1* on the lie rating scale, then it can be assumed that s/he did not pay attention and his/her ratings should be excluded from the analysis.

In our test, 24 critical items including pointing gestures were presented. Among them, 12 QUDs were about objects (like the lamp in the videos presented in table 1). In these items, the

pointing gesture is temporally aligned with a definite article[8]. In the other 12 contexts, the QUDs were about people, so the pointing gestures co-occurred with pronouns like *she* or *he* ([She]_POINTING AT SAMIRA /Samira won the bet). Beside the critical items, there were also 20 filler items with iconic gestures. Similar to the critical items, these filler items also consisted of a background story and a conversation, and the answers were also realized for all four conditions. After reading the text and seeing one of the answers in a video, participants were then asked to indicate on a 7-point Likert scale to what extent they agreed with the following propositions:

(9) i. Lying: Kristin hat gelogen ('Kristin lied.')
ii. Misleading: Kristins Behauptung ist irreführend ('Kristin's claim is misleading.')
iii. Morality: Wie beurteilen Sie Kristins Verhalten in moralischer Hinsicht?
'How would you rate Kristin's behavior in terms of morality?'

To gather judgments on lying and misleading, the scale ranged from 1 = *Ich stimme überhaupt nicht zu* ('I do not agree at all') to 7= *Ich stimme voll und ganz zu* ('I totally agree'), and for the rating on morality, the scale ranged from 1= *sehr schlecht* ('very bad') to 7= *sehr gut* ('very well').

3.3. Procedure and participants

The experiment was programmed and carried out online using the open experiment builder PCIbex (Zehr and Schwarz, 2018). The test links were sent mainly via email. The test began with an introduction to the four speakers, all described as students living in a shared flat. Participants were then presented with two training items to explain the tasks and rating scales. For the test, critical and filler items were presented randomly. After each item, participants completed the three tasks in the following order: lying, misleading, and morality. Once a judgment was submitted, participants could not change or resubmit their choice. We used a Latin-square design and created four lists, so that each participant saw each item only under one condition and had to rate six critical items for each combination of conditions. The entire task consisted of 24 critical items and 20 fillers, taking about 30-35 minutes on average to complete. Our participants comprised 38 German native speakers ranging from 20 to 57 (mean age 26.82 ± 8.15). Among them were 23 female, 12 male, and 3 diverse. During the test, the participants were balanced between the lists.

3.4. Predictions

In contrast to very narrow definitions of lying (as the one proposed by Stokke 2018, for instance), we assume that co-speech pointing gestures do impact truth conditions – at least if they are necessary to establish reference as in our examples. As such, we predict that lying with these pointing gestures is possible and we expect a clear distinction between the two conditions *g0* and *g1*. Furthermore, we do not expect a significant effect of MODALITY, nor a significant

[8] Note that, in German, it is possible to use a definite article for a demonstrative reading by marking it with a pitch accent, which seems not allowed in English (for more discussion, see e.g. Himmelmann, 1997; Schwarz, 2009). We refrained from testing utterances like *the movie* without a pointing gesture as controls, since this combination is obviously unspecific and thus not appropriate.

interaction. Both speech only (*a0*) and speech + gesture (*g0*) should be equally judged as instances of lying.

3.5. Results

For the analysis, all ratings of the training and filler items were excluded. Furthermore, ratings were only taken into account for the statistical analysis if a participant showed in his/her judgements on lying a clear distinction between the two conditions *a0* and *a1*. This contrast can be observed in ratings given by all 38 participants (see Figure 3 in the appendix). Thus, no participant has been discarded and all ratings were included. The data then encompassed 2,736 judgments taken from 38 individuals of 24 critical items with regard to three tasks. The distribution of ratings given for each task under each condition is presented below in Figure 1. To estimate the effects of TRUTH VALUE, MODALITY and their interactions, the data were analyzed using R (version 4.3.2, R Core Team 2023) and RStudio (Posit team, 2024). As the 7-points-scale that we used in the test was treated as an ordinal scale (for more discussion about ordinal data and metric models, see Liddell and Kruschke 2018), the data were analyzed with the Cumulative Link Mixed Model (CLMM) using the *clmm* function from the *ordinal* package (Christensen, 2019).

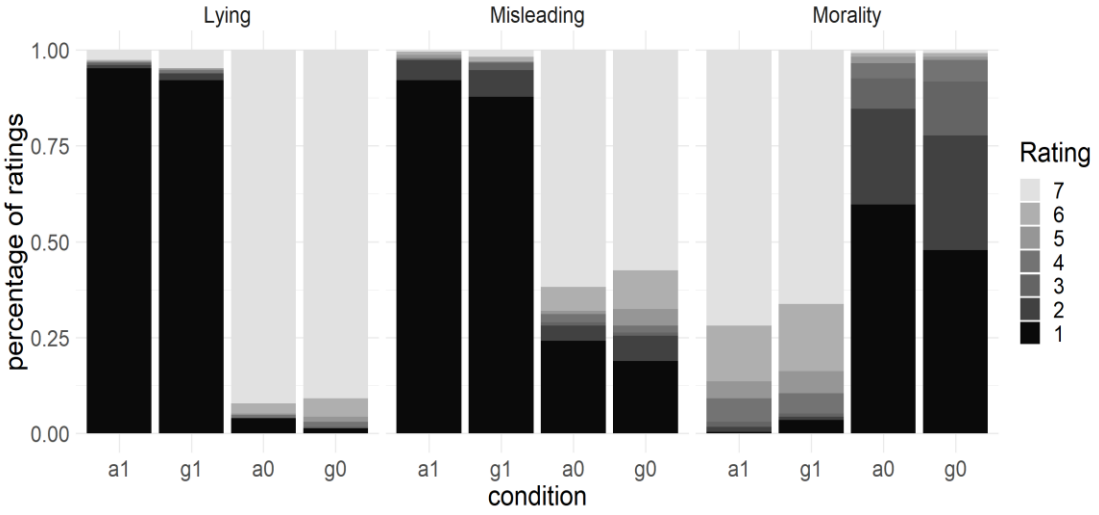


Figure 1. Distribution of ratings with regard to task and condition in Exp.I.

Considering our experiment design, the full model for each task included TRUTH VALUE, MODALITY and their interactions as fixed effects and the maximal random effects structure[9], using *probit* as the link function. Furthermore, as our research questions are about whether the gestural content differs from speech only, once they provide false information, the two parameters were both coded with the treatment contrast, using '*1*' (true) and '*a*' (verbal only) as reference level[10]. As we mainly focus on the verbal-visual comparison, the full models were firstly compared with the restricted models, in which only the fixed effect MODALITY and its

[9] y~TRUTH VALUE*MODALITY + (1 + TRUTH VALUE*MODALITY | Subject) + (1 + TRUTH VALUE*MODALITY | Item).
[10] Note that in CLMM, treatment contrast can also be used to produce Type III tests (for more details, see Christensen, 2018).

interaction with TRUTH VALUE have been removed[11]. A summary of the model comparisons with regard to all three tasks is given below in Table 2. Results showed no significant differences between the full and restricted models for ratings on lying and misleading, and the comparison was only significant regarding the ratings on morality.

Table 2. Results of comparison between full and restricted models w.r.t. ratings on lying, misleading, and morality.

	LR.stat	df	*p*-value
lying rating	1.423	2	0.491
misleading rating	1.095	2	0.578
morality rating	12.637	2	0.002

For ratings on lying, the model comparison shows that neither MODALITY nor its interaction has a statistically significant impact, in line with the report from the CLMM-full model of lie ratings. However, as we define *'a'* and *'1'* as the reference levels, the full model reports, among others, that for verbal responses, participants unsurprisingly judged false answers significantly more often as lies than true answers ($\hat{\beta}$=4.578, z=7.433, p<0.001), while for the true answers, the change of modality does not have such an effect ($\hat{\beta}$=0.079, z=0.131, p=0.896).

In order to address our research question in (6), we also need the comparison between *g0* and *g1*, as well as the comparison between *a0* and *g0*. Thus, the full model was applied to the *emmeans* function from the *emmeans* package (Lenth, 2021). The pairwise contrasts (see Table 3) reveal two key findings. First, there is a significant difference between answers with true and false gestural content (see *g1 – g0* in the table), suggesting that participants clearly distinguish between true and false pointing gestures in terms of their lying status. Second, once the answer is false, there is no statistically significant difference between verbal and visual content. Given the similarity of these patterns, we can conclude that, in terms of lie ratings, there is no difference between content expressed by speech alone and speech with a co-speech pointing gesture.

Table 3. Pairwise comparison based on the CLMM full model of lying rating with z test, p-value adjusted with tukey method.

Comparison	estimate	*z*-ratio	*p*-value
g1 – g0	-4.24	-7.846	p <.0001
a0 – g0	0.257	0.540	0.589

To explore the potential distinction between lying and misleading in relation to modality, we conducted a post-hoc analysis, comparing ratings for *a0* vs *g0* in the first two tasks of our experiment. After the application of full model[12] again to *emmeans*, the pairwise comparison revealed an unexpected significant impact of TASK for both verbal and gestural answers: Participants judged false answers significantly more often as lies than as instances of misleading.

[11] y~ TRUTH VALUE + (1 + TRUTH VALUE*MODALITY | Subject) + (1 + TRUTH VALUE*MODALITY | Item).

[12] y~MODALITY*TASK + (1 + MODALITY*TASK | Subject) + (1 + MODALITY*TASK | Item), using 'a' and 'misleading' as reference level.

Table 4. Pairwise comparison based on the CLMM full model of lying-misleading contrast with z test, p-value adjusted with tukey method.

Comparison	estimate	*z*-ratio	*p*-value
a	-1.42	-2.256	0.024
g	-1.33	-8.186	0.001

Among the three tasks, a significant difference between the full and the restricted models only has been observed for ratings on morality. As reported by the full model of morality, this difference should mainly be due to the significant interaction of MODALITY with TRUTH VALUE ($\hat{\beta}$=0.671, *z*=2.621, p=0.009). The difference between modalities with regard to truth value can be clearly illustrated with pairwise comparisons (see Table 5): While the false answers given with speech were rated morally significantly worse than those given with speech and gestures (*a0 – g0*), this significant difference disappeared if the answer was true *(a1 – g1*). In other words, modality impacts the morality ratings depending on the truth value of the information.

Table 5. Pairwise comparison based on the CLMM full model of morality rating with z test, p-value adjusted with tukey method.

Comparison	estimate	*z*-ratio	*p*-value
a0 – a1	-4.520	-10.932	p <.0001
g0 – g1	-3.850	-10.683	p <.0001
a0 – g0	-0.542	-3.053	0.002
a1 – g1	0.129	0.647	0.518

4. Experiment II: Ratings on commitment

4.1. Design, material, procedure and participants

In our second experiment, we explore whether pointing involves commitment, operationalized through ratings on accountability and deniability. Since these measures aren't appropriate for true answers, the second experiment has a 1*2 design: The parameter TRUTH VALUE has only one level, *false*, while the parameter MODALITY has two levels: *speech only* and s*peech with co-speech gestures*, with items presented under conditions *a0* and *g0*. Using a Latin-square design, two lists were created so that each participant rated items under only one condition. To control for attention, we included a multiple-choice task asking details from the background story.

Participants were only included in the statistical analysis if the proportion of their correct answers to these questions was clearly above chance level. Besides these changes, the design, material and procedure of the second experiment were identical with those of the first one.

To gather judgements on accountability and deniability, we used a 7-point agreement scale, where 1 = *I totally disagree* and 7 = *I totally agree*. For our example (8), for instance, participants were asked to give ratings for the following sentences:

(10) i. *Accountability*: Wenn Jakob später am Tag herausfindet, dass die silberne Lampe gar nicht billiger war, wird sich Kristin rechtfertigen müssen.
'If Jakob finds out later that day that the silver lamp wasn't cheaper, Kristin will have to justify herself.'
ii. *Deniability*: Wenn Jakob später am Tag herausfindet, dass die silberne Lampe gar nicht billiger war, und Kristin damit konfrontiert, könnte Kristin den Vorwurf mit der folgenden Entgegnung überzeugend zurückweisen: „Ich habe gar nicht behauptet, dass die silberne Lampe billiger ist."
'If Jacob finds out later in the day that the silver lamp was not cheaper and confronts Kristin, Kristin could convincingly refute the accusation with the following reply: "I didn't claim that the silver lamp was cheaper."'

Note that accountability is higher when a speaker is committed to *p,* thus, high ratings on accountability correspond to a high degree of commitment. In contrast, since deniability is restricted when a speaker is committed to *p,* low ratings on deniability correspond to a high degree of commitment. The participants of the second experiment consisted of 22 German native speakers from 18 to 33 (mean age 23.00 ± 3.06, 14 female, 7 male and 1 diverse). During the test, the participants were balanced between the lists.

4.2. Predictions

Following a commitment-based definition of lying, we expect that ratings on commitment pattern with lie ratings. Since we had high ratings on lying for both modalities with neither a significant effect of MODALITY nor a significant interaction, a commitment-based definition of lying would predict that both modalities also get high scores for commitment without a main effect of MODALITY. Thus, we expect high scores on commitment for both modalities, translated as high scores for accountability, but ratings on the lower half of the scale for deniability.

4.3. Results

Similar to the first experiment, all ratings of the training and filler items were first excluded. All participants passed the attention check with a percentage of correct answers between 75% and 100%, clearly above chance level (see Figure 8 in the Appendix, 528 answers from 22 participants) and no participant had to be excluded from the analysis. The critical data then encompassed 1,056 judgments taken from 22 individuals for 24 critical items with regard to 2 tasks. The percentage of ratings given for each task under each condition is presented below in Figure 2

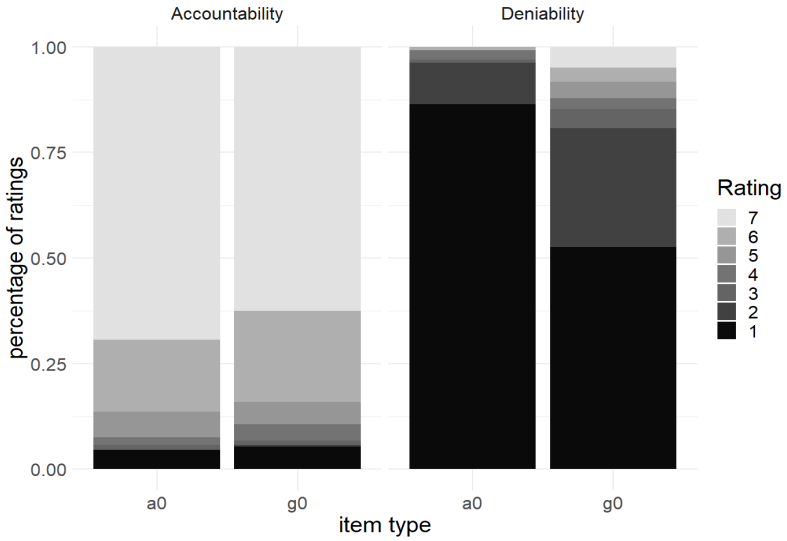


Figure 2. Distribution of ratings with regard to task and condition in Exp.II.

To estimate the effects of MODALITY, the data were analyzed using R (version 4.3.2, R Core Team 2023) with the *clmm* function from the *ordinal* package (Christensen, 2019). The full model for each task included MODALITY as the fixed effect and the maximal random effects structure[13], using *probit* as the link function. The only parameter MODALITY is dummy coded and level *a* (*speech only*) is defined as reference level. Similar to Exp.I, the full models were firstly compared with the restricted models, in which the fixed effect MODALITY has been removed[14]. The results of this model comparison with regard to both tasks are summarized below. As can be seen in Table 6, for both accountability and deniability, MODALITY has a significant impact on the ratings. In line with the modal comparison, the full models of both ratings report a main effect of MODALITY. For accountability, the full model reports that, compared to a false answer given with speech only, a false pointing gesture can significantly decrease the ratings ($\hat{\beta}$=-0.498, z=-2.142, p=0.032). In other words, if the answer to the QUD is communicated through a co-speech pointing gesture, the speaker is perceived to be less accountable than if the answer is expressed by speech only. The same holds for deniability: The full model reports that if the QUD is answered by using a co-speech pointing gesture, deniability is less restricted than if it is given with speech only ($\hat{\beta}$=3.308, z=3.495, p<0.001) (recall that a low degree of deniability corresponds to a high degree of commitment) – commitment, thus, is higher for speech only.

Table 6. Results of the comparison between full and restricted models w.r.t. accountability and deniability ratings.

	LR.stat	df	p
accountability rating	5.216	1	0.022
deniability rating	7.948	1	0.005

[13] y ~ MODALITY + (1 + MODALITY | Subject) + (1 + MODALITY | Item).
[14] y ~ 1 + (1 + MODALITY | Subject) + (1 + MODALITY | Item).

5. Discussion

5.1. Lying and pointing gestures

Our first experiment investigates whether it is possible to lie using pointing gestures. The results show that this is indeed the case. According to the laypersons' understanding, the meaning of a co-speech pointing gesture does significantly affect the truth value of the sentence, and providing false information with such a gesture is clearly classified as lying. Furthermore, we observed no statistically significant differences between speech only and speech + pointing, but similar results for both ratings on lying and misleading.

The impact of these results for a definition of lying is obvious: according to many classical definitions of lying as featured in (2), lying about *p* is only possible if "S said that *p*", whereas visually communicated content such as "pointing in the wrong direction […] are not lies", but rather cases of deception or misleading (Stokke, 2018, p. 7). However, our data show that Stokke`s assumption is too restrictive: In our experiment, utterances with false pointing gestures were clearly judged as instances of lying, and this to the same degree as speech only.[15]

However, this does not mean that traditional definitions as featured in (2) have to be discarded – at least not, if the "statement condition" is formulated as "S asserts that *p*" (instead of "S says that *p*"), as proposed by Fallis (2009). There is good reason to assume that the pointing gestures from our experiment are part of the asserted content, since all of them are necessary to establish reference: Without the use of a pointing gesture, the answers are under-informative. That pointing gestures constitute a relevant part of the asserted content is also supported from a theoretical perspective: Demonstratives can be described as definites that presuppose an accompanying demonstration (Roberts, 2002), where pointing gestures serve as essential non-verbal elements that typically accompany definite articles and pronouns (see e.g. Lyons, 1977; Levinson, 1983; Chierchia and McConnell-Ginet, 2000, and summary in Lücking et al., 2015). Furthermore, there are approaches to define assertions on normative concepts such as responsibility or commitment, instead of modality (Alston, 2000; Cull, 2019; Marsili, 2024). Finally, since the pointing gestures in our experiment directly address the QUD, they contribute at-issue content. This is in line with findings from Kroll and Rysling (2019) and Barnes et al. (2022), who observe that at-issue content has a more significant impact on truth value judgements than not-at-issue content (see also the results of Antomo et al., 2025), and, vice versa, that truth-conditionally relevant information should be considered as at-issue. Thus, there is good reason to assume that our pointing gestures contribute to the assertion (even if this might not be the case for all kinds of visually communicated content or even gestures) – our results are, thus, compatible with assertion-based definitions of lying (Fallis 2009) as well as with definitions that characterize assertions in terms of commitment as mentioned in footnote 5, but in conflict with Stokke's definition.

In Exp.I, an unexpected observation arose regarding the relation between lying and misleading. Typically, lying is considered to be a narrower concept than misleading, Surprisingly, however,

[15] Note, furthermore, that Bonalumi et al. (2020) propose that the requirement for a lie to be explicitly asserted may vary between different cultural and social groups. Since our experiment focused on a single language, we have to leave this intriguing point for further research.

we observe that in our experiment, often, false answers were judged as instances of lying but not as misleading. An explanation for this pattern might be the German word we used for misleading: '*irreführend*', which some participants reported as confusing.[16]

As shown in Figure 4 in the appendix, this uncertainty can be especially observed for participants 1012, 1018, 1027 and 1035. In addition, participants 1007, 1017, 1024, 1032 and 1036 continuously absolutely disagreed that a false verbal expression is an instance of misleading. We have reasons to assume that they might interpret the task on misleading very differently than we expected – perhaps they understood 'misleading' in the sense of being ambiguous. Another problem might be the order of the tasks, which might have led participants to overthink their responses. Therefore, we believe that this result stems from the design and the procedure and does not challenge the fundamental relationship between lying and misleading. Nonetheless, the key observation is that, despite these concerns, we observed a similarity in ratings for both *a0* and *g0* for both ratings on lying and on misleading. In sum, this similarity shows that modality might not be a crucial criterion that differentiates lying from misleading, which is in contrast to Stokke (2018)'s assumption featured in (2): both verbal and gestural (visual) contents are perceived as lies.

5.2. Pointing gestures and commitment

Our second experiment investigates whether communicators are perceived to be committed to the content of their gestures. Generally speaking, our participants perceived the communicators to be committed to the content of their pointing gestures. Regarding an answer with a false gesture, the majority of participants clearly agreed that the speaker has to explain himself/herself (*accountability*) and disagreed that s/he can deny having claimed that *p* (*restricted deniability*). However, we observe for both accountability and deniability ratings a significant difference between the two modalities: a speaker is considered to be less committed to his/her gestural content than to content that is uttered by speech only. These observations differ from results presented by Weissman (2024) and Antomo et al. (2025) on emojis: In these investigations, no difference between emojis and plain text could be found regarding commitment attribution. We suspect that this can be traced back to the fact that emojis are linearized in the same modality as the written text, whereas co-speech gestures express their content in another modality than verbal speech. To explain the differences in commitment between speech only and gestures + speech, we therefore propose to introduce modality as a factor that influences the degree of commitment, where verbally uttered content involves a higher degree of commitment than gestural content. It is possible that the lower degree of commitment to gestural content is related to the fact that gestures are not always produced intentionally, but are sometimes, as in the case of beats, also ostentatious.

Thus, pointing gestures do involve commitment, but not to the same extent as speech only. Now, how do we interpret the impact of our results concerning more recently proposed commitment-based definitions of lying? If we consider both of our experiments, we can

[16] However, a brief online search in DWDS (https://www.dwds.de/wb/irref%C3%BChrend) shows that over the past 20 years (2003-2023), the word '*irreführend*' had an absolute frequency ranging from 1.6K to 2.2K in newspaper corpora and a relative frequency between 1.71 and 4.76 in freely accessible contemporary corpora – therefore, the expression is not really uncommon.

observe that the ratings to capture commitment, i.e. accountability and deniability, are not able to correctly predict lie ratings. So even if participants thought that a speaker was less committed to his/her gestures than to verbally uttered content, this difference surprisingly did not influence their judgments on lying. In our experiment, unlike in the experiments run by Reins and Wiegmann (2021), neither of the two measured commitment indicators fully predicts lie ratings. Note, however, that we cannot investigate how lying and commitment correlated for each participant, as our two experiments were between subject, our results, thus, cannot challenge the predictions of a commitment-based definition with inference statistics.

In sum, the findings from our two experiments do not definitively rule out either the assertion-based nor the commitment-based definitions of lying, as the potential to lie using pointing gestures is allowed by both accounts. According to the assertion-based definition, lying with gestures is possible if the gestural content is considered to be part of the assertion. On the other hand, under the commitment-based definition of lying, lying with gestures is possible if the communicator acquires commitment for the gestural content. However, our findings suggest that the correlation between the degree of commitment and the degree of lying, if any, may sometimes be indirect.

6. Conclusion

We investigated pointing gestures that co-occur with underinformative definite articles and pronouns in German, focusing on two key research questions. The first question examines whether it is possible to lie using pointing gestures: according to traditional definitions of lying, a proposition *p* has to be *said* to be a potential lie (see Stokke 2018, for instance), while more recent definitions are based on speaker's commitment and require only a communicative act. Our first experiment demonstrates that lying with pointing gestures is indeed possible, with these gestures being judged as lies to the same degree as spoken statements, a finding that challenges narrow definitions of lying. However, our results do not totally rule out definitions of lying that are based on saying/asserting: If we assume that the pointing gestures in our experiment are part of the assertion, then lying with these kinds of gestures is compatible with an assertion-based definition of lying as proposed by Fallis (2009). Furthermore, our results suggest that co-speech pointing gestures that are necessary to establish reference can contribute at-issue content and do impact truth value judgements to the same extent as verbal assertions.

Our second research aim was to investigate whether communicators are perceived to be committed to the content of their pointing gestures. The results of our second experiment reveal that pointing gestures indeed induce commitment, although ratings on commitment were lower than for verbally uttered content. Notably, neither of the two commitment-related properties – accountability and restricted deniability – accurately predicts the similarity between pointing gestures and speech in lie ratings. This observation suggests potential limitations of the commitment-based definition of lying or, at the very least, in the methods used to measure commitment.

In summary, our findings present empirical challenges to both saying-based and commitment-based definitions of lying, while they also demonstrate that lying with gestures is possible. Further types of gestures, such as iconic gestures, need to be examined to determine whether

the results obtained in our two experiments remain consistent. Similarly, other usage types of gestures should be explored, as our study focused solely on co-speech gestures, leaving open the possibility that differences may exist with pro-speech gestures.

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Appendix

Our research data, including the critical items, additional plots, and the cleaned data file from our experiment, is available with open access at:
https://data.mendeley.com/datasets/vwsssxbghy/1