

Lying with at-issue and not-at-issue emojis

Mailin ANTOMO — *University of Göttingen, Germany*

Lea FRICKE — *Ruhr University Bochum, Germany*

Patrick G. GROSZ — *University of Oslo, Norway*

Tatjana SCHEFFLER — *Ruhr University Bochum, Germany*

Abstract. Drawing on the commitment based definition of lying, we hypothesize that emojis can be used to lie if and only if they cause speaker commitment. We test the three-way relation between emojis, commitment, and lying in two experimental rating studies. In experiment 1, we ask participants whether a writer is lying when they use a pro-text, at-issue emoji, a message-final, not-at-issue emoji, or no emoji in the control. In experiment 2, participants rate the writer’s commitment, operationalized as accountability and restricted deniability, for the same message types. The results show that participants rate messages with final, not-at-issue emojis significantly lower on the lying scale and higher on the deniability scale than messages with pro-text emojis or without emojis. We conclude that writers are seen as similarly committed to their pro-text, at-issue emojis, as to their textual content. In contrast, message-final, not-at-issue emojis trigger less commitment and are less likely to be seen as lies. Our findings indicate that emojis can indeed be used to lie, and that their usage (pro-text vs. message-final) matters for the extent to which emoji content is identified as a lie. These findings are compatible with a view where different emoji uses map onto different types of semantic content, such as at-issue assertion (pro-text emojis) vs. not-at-issue supplemental meaning (message-final emojis). They closely align with a commitment-based definition of lying.

Keywords: emojis, lying, commitment, (not-)at-issueness, deniability, accountability.

1. Introduction and background

1.1 What is lying?

The question of what constitutes a lie and what means can be used to lie is the subject of both theoretical and empirical research. Even if “there is no universally accepted definition of lying” (Mahon, 2015), many definitions require that a person asserts something. One instance of such an assertion-based definition of lying is proposed by Fallis (2009: 33):

- (1) Assertion-based definition of lying
A lies to B iff:
 - (i) A asserts that p to B, and
 - (ii) A believes that p is false.

A narrow definition as featured in (1) excludes, for instance, lying with conversational implicatures, which are not part of the asserted content, and, therefore, are analyzed as cases of mere misleading. However, results of theoretical and empirical research suggest that, at least

in lay people’s understanding, lying with other means than asserting is possible (e.g. Coleman and Kay, 1981; Meibauer, 2005, 2014; Or et al. 2017; Antomo et al. 2018; Weissman and Terkourafi, 2019; Thalmann et al. 2021; see Wiegmann and Meibauer, 2019 for an overview). This has led to other definitions of lying that are not based on assertion. A relatively recent approach emphasizes the relationship between commitment and lying. According to this theory, lying is possible with any content the speaker is perceived to be committed to, as can be seen in the following definition proposed by Viebahn (2019: 254) (see also Krifka, 2019; Marsili, 2020; Reins and Wiegmann, 2021; or Viebahn, 2021 for similar proposals):

- (2) Commitment-based definition of lying
 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.

As Weissman (2024) has emphasized, the exact wording of (i) is crucial: whereas more traditional definitions often require that a proposition must be explicitly said (see the definition proposed by Stokke 2018, for instance), the commitment-based definition as proposed by Viebahn merely requires a communicative act. It is therefore wider and can also allow for lying with pragmatic inferences and other means, as long as the sender of the content is perceived to be committed to it. Recent years have seen several empirical studies that investigate the correlation between commitment and lying and support a commitment-based definition of lying as in (2). Experiments have shown that commitment is not restricted to the asserted content but can also be acquired for, amongst others, conversational implicatures (Bonalumi et al. 2020; Reins and Wiegmann, 2021; Wiegmann et al. 2021) and presuppositions (Viebahn et al. 2018). Furthermore, these experiments observe a strong correlation between the degree of commitment and the degree to which an utterance is perceived as a lie, as predicted by (2).

In this paper, we are interested in the question whether emojis can be used to lie. Lying with emojis, in principle, should be possible within both an assertion-based and a commitment-based definition of lying. Following the more narrow definition in (1), lying with emojis should be possible if emojis are part of the asserted content. The question that arises then is whether emojis can contribute to the assertion. We think that the answer to this question depends on the specific usage of the emoji. Therefore, different usage types of emoji constitute a key concept in our experiment. Within a commitment-based definition of lying as featured in (2), on the other hand, lying with emojis should be possible if emojis involve commitment. We will present two experiments investigating the relation between emoji usage, commitment, and lying. Typically, it is assumed that commitment encompasses **accountability** and **restricted deniability**. By uttering (3), for instance, Peter becomes committed to the proposition $p = \textit{that the train is canceled}$.

- (3) Peter: The train is canceled.

Lying with at-issue and non-at-issue emojis

If, at a later time, the addressee learns that *p* is false, s/he can confront Peter, who would have to justify himself (*accountability*). Furthermore, being committed to *p* involves *restricted deniability*: After uttering (3) for instance, Peter cannot convincingly deny having claimed that *p* by stating (4) (Reins and Wiegmann, 2021):

(4) Peter: # I did not claim that the train was canceled!

The results of many experimental investigations using accountability, deniability and other strategies to measure the degree of commitment for different meaning types suggest that commitment is a matter of degree, and the degree of perceived commitment seems to depend on various factors. Moeschler (2013) has argued that the classical division of labor between semantics and pragmatics matters for commitment attribution, such that commitment is higher for semantic content than for pragmatic inferences (see also Morency et al. 2008; Reboul, 2017; Mazzarella et al. 2018). On the other hand, the results of some empirical investigations suggest that it is not so much the saying/meaning distinction that matters for commitment attribution, but the contextual relevance of the content. Based on the results of several experimental studies, Bonalumi et al. (2020: 361) conclude, for instance, that “what communicators are committed to is the relevance of their communicative behaviour” (see also Wiegmann et al. 2021: 731). Closely related to this is the notion of (not-)at-issueness: Meaning can be contributed as at-issue content that is put on the table for further discussion, or as not-at-issue content that is not at stake. As we will shortly discuss in the following section, this holds also for emojis which can express at-issue or not-at-issue content depending on their specific usage. Concerning lying, the information status of the content is crucial: Previous studies show that false not-at-issue content has only little impact on the overall truth conditions, while content that affects the truth conditions is contributed as at-issue information (see e.g. Kroll and Rysling, 2019; Barnes and Ebert, 2024). Following these observations, we predict that emojis can be used to lie only if their content is contributed in the at-issue dimension.

1.2 Lying in a multimodal setting

Emojis are part of visual communication, whereas lying is a notion that is typically applied to verbally uttered content. However, there are already some investigations that explore the possibility of lying using visual means. Viebahn (2019) extends the commitment-based theory of lying to visual content by discussing pictures. Parallel to the results for verbally communicated content, he argues that pictures can be instances of lying if the communicator is perceived to be committed to the pictorial content. He compares pictures to linguistic acts with the same content and concludes that there is no difference between the two regarding deniability. While data on pictures and commitment are still sparse (but see Viebahn and Wiegmann, 2023), there are first empirical results on emoji usage and commitment. The results of Weissman (2024) show that the sender of an emoji is perceived to be committed to the content of the emoji, although this does not apply to all emojis to the same degree: Weissman (2024) observes a difference between emojis with a widely acknowledged meaning, that pattern

with text regarding commitment attribution and lie ratings, and emojis without meaning agreement. The results show that it is not so much the verbal-visual boundary that is relevant for commitment attribution, but rather the emoji type. Antomo (2025) comes to a similar conclusion regarding another instance of visual content, namely gestures. After discussing gestures and deniability, she concludes that the degree of perceived commitment (and thus their suitability for lying) depends on the gesture type: whereas gestures that are used to replace a part of speech (so-called pro-speech gestures) involve a high degree of commitment and are thus just as suitable for lying as verbal speech, the content of speech-accompanying gestures (co-speech gestures) seems to be deniable. Thus, it is concluded that co-speech gestures lead to a lower degree of commitment (see Antomo and Chen, 2025 for empirical results on co-speech gestures). As co-speech gestures are argued to express their content on the not-at-issue dimension, whereas pro-speech gestures are at-issue (Ebert et al. 2020), here, at-issueness and commitment attribution seem to correlate. In this paper, we will further investigate the relation between emoji usage, commitment attribution and lying. While Weissman (2024) investigates different subgroups of emojis (with/without stability in meaning), we intend to explore different usage types of the same emojis. Thus, we are interested in the question whether there are differences in commitment and lie ratings depending on the usage type of the emoji.

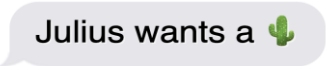
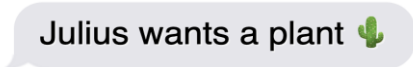
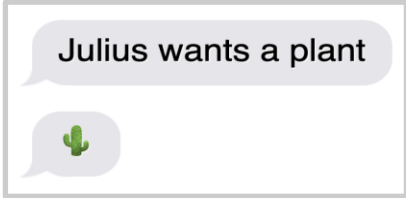
1.3 Emojis

We approach emojis from an angle informed by research in theoretical semantics (e.g., Pierini, 2021; Grosz, Kaiser and Pierini, 2023; Grosz et al. 2023; Maier, 2023); this field typically starts by drawing a fundamental distinction between face emojis (e.g., 😊) and non-face emojis (e.g., 🏀, 🏃), a terminological distinction attributed to Riordan (2017). Face emojis have been argued to communicate expressive/emotive information (e.g., Grosz et al. 2023; Maier, 2023). By contrast, non-face emojis have been treated as object descriptions or event descriptions (Grosz, Kaiser and Pierini, 2023: 26), or, alternatively, as stylized depictions of situations (Maier, 2023: 313). The previous semantics literature does not differentiate further between object emojis (🏀, 🏊, 🚲) and action emojis (🏃, 🏊, 🚲), though this distinction may constrain the emojis' interpretation; for example, it is plausible that an object emoji such as the basketball (🏀) ends up denoting a basketball-playing event due to semantic coercion, but it is less plausible for an action emoji such as the ball-bouncing woman (🏃) to end up denoting an object that is a basketball.

Emojis are frequently used in combination with written text; it is thus an important question how the emojis combine with the text, which is orthogonal to the question of their lexical meaning (and lexical entry). Pierini (2021) applies Schlenker's (2018) approach, originally conceived for speech-accompanying gestures, and proposes that there are minimally three types of emojis. In the same way in which Schlenker discusses pro-speech gestures (which replace words), co-speech gestures (performed in parallel to the speech) and post-speech gestures (which follow the speech), Pierini argues that emojis come in three variants: *pro-text*,

Lying with at-issue and non-at-issue emojis

co-text and *post-text*. Emojis are Unicode characters and thus linearized in the same modality as the written text, which sets them apart from speech-accompanying gestures. While the term *pro-text emoji* is sufficiently clear, (5a), the terms *co-text emoji* and *post-text emoji* are more difficult to operationalize. Pierini (2021) argues that message-final emojis, (5b), behave like co-speech gestures and thus qualify as co-text emojis. By contrast, emojis that are sent in a separate message, (5c), behave like post-speech gestures and thus qualify as post-text emojis. In terms of (*not-*)*at-issueness*, only the pro-text emoji in (5a) appears to make an at-issue contribution, whereas the emojis in (5b)–(5c) are considered to make not-at-issue contributions. For (5b), Pierini assumes that the emoji contributes *cosuppositional meaning*, a special type of presupposition; by contrast, he proposes that the emoji in (5c) contributes *supplemental meaning*, the type of meaning standardly contributed by non-restrictive relative clauses.

- (5) a. Pro-text emoji: 
- b. Co-text emoji: 
- c. Post-text emoji: 

Pasternak and Tieu (2022) and Tieu et al. (2023) provide experimental evidence compatible with Pierini's (2021) typology of emoji uses. While their experiment includes a focus on the distinction between *co-text* and *post-text* emojis, our own focus is on the at-issue vs. not-at-issue distinction, which alleviates the need to differentiate between the two types of not-at-issue uses in (5b)–(5c). We exclusively use the variant in (5b) with the neutral label *message-final emoji* as a representative of a not-at-issue use. The upshot is that pro-text emojis, (5a), have been argued to contribute at-issue meaning, whereas message-final emojis, (5b), contribute not-at-issue meaning. Further evidence for such a view stems from at-issueness tests previously proposed for gestures, as surveyed in Ebert (2024). The three tests are non-contradictability, projection behavior and behavior under ellipsis.¹ A set of introspective intuitions is given in (6)–(8), based on the English translation of an actual (German-language) item from our experiment. The contrast in (6) shows that an at-issue (pro-text) emoji can be directly denied by virtue of *No, that's not true*, (6A₁+B), whereas this is impossible for a not-at-issue (message-final) emoji, (6A₂+B).

(6) Test 1: Non-contradictability

¹ Ebert (2024) uses the term *non-deniability* instead of *non-contradictability* to describe the inability of an interlocutor to respond with *no, that's not true*. We avoid the term *non-deniability*, as we use *deniability* in a different way (related to the speaker) throughout this paper.

- A₁: I've already photographed quite a few 🐳 (*pro-text/at issue*)
 A₂: I've already photographed quite a few animals 🐳 (*message-fin./not-at-iss.*)
 B: (after A₁: OK/after A₂: #) No, that's not true. There are only seals in your photos!

The contrast in (7) reproduces the observations of Pierini (2021), Pasternak and Tieu (2022) and Tieu et al. (2023). In the scope of a negative operator, the contribution of a pro-text emoji is part of what is negated, which is what makes the continuation (7A₃) felicitous after (7A₁). By contrast, the contribution of a message-final emoji is not in the scope of negation, which makes (7A₃) infelicitous after (7A₂). There are two ways of interpreting this observation for message-final emojis. Either the emoji is interpreted as being in the scope of negation and projects out of negation; or the emoji is located outside of negation to begin with, scoping over the entire text (see Grosz, Pierini and Kaiser, 2023 for discussion).²

(7) *Test 2: Projection behavior*

- A₁: I haven't photographed any 🐳 yet (*pro-text/at issue*)
 A₂: I haven't photographed any animals yet 🐳 (*message-fin./not-at-iss.*)
 A₃: (after A₁: OK/after A₂: #) ... I only photographed seals.

Finally, the contrast in (8) shows that co-text emojis can be ignored in ellipsis contexts, whereas this is impossible for pro-text emojis. These examples are meant to be construed in an exchange where the author is a wildlife photographer. Since Chad is a landlocked country, we can assume that the author's colleague would not be able to photograph any whales. This makes the continuation (8A₃) infelicitous after (8A₁), since the meaning contribution of the pro-text emoji is at-issue and part of the inferred content in the ellipsis configuration. By contrast, (8A₃) is entirely felicitous after (8A₂), since the message-final emoji can be ignored for the interpretation of ellipsis, which is typical for the behavior of not-at-issue meaning.

(8) *Test 3: Ellipsis*

- A₁: I've already photographed quite a few 🐳 (*pro-text/at issue*)
 A₂: I've already photographed quite a few animals 🐳 (*message-fin./not-at-iss.*)
 A₃: (after A₁: #/after A₂: OK) ... and my colleague who is traveling in Chad has too.

Based on the previously established typology of emoji uses, and further corroborated by our adaptation of the three tests from Ebert (2024), we can confidently assume the following: pro-text emojis make a meaning contribution that is at-issue, whereas message-final emojis make

² The message-final position of the emoji does not make this a foregone conclusion; message-final emojis can be forced to be at-issue, and in the scope of negation, by means of adding a demonstrative to the text (e.g., "I haven't yet photographed any animals like this: 🐳 ... I only photographed seals."; see Ebert et al. 2020 on gestures, as well as the control sentences of Pasternak and Tieu, 2022 and Tieu et al. 2023).

a not-at-issue meaning contribution (unless coerced to make an at-issue contribution by a demonstrative; see fn. 2). In this connection, it is worth raising the possibility that at-issueness is graded (see Barnes and Ebert, 2024), i.e., meaning contributions can be more at-issue or less at-issue rather than reflecting a binary at-issue/not-at-issue distinction. When it comes to message-final emojis, a corresponding possibility may be that they are not at an extreme (not-at-issue) end of the (not-)at-issueness scale, but merely *less* at issue than pro-text emojis, which would be sufficient to give rise to the patterns in (6), (7) and (8).

In the remainder of this paper, we hypothesize that there is a correlation between at-issueness and commitment attribution with regards to the distinction of pro-text vs. message-final emojis: (pro-text) at-issue emojis lead to higher author commitment, and (message-final) not-at-issue emojis to lower author commitment. This hypothesized correlation requires additional justification, since the two notions at-issueness and commitment are far from identical (see Scheffler and Malamud, 2023). To address this matter, we start by outlining the relationship between at-issueness and commitment *in emojis*; we observe that not-at-issue message-final emojis have a loose connection to the text content (see Grosz, Kaiser and Pierini, 2023), as shown in (9i), but the combination of text content plus emoji content can give rise to implicatures in connection with the Question Under Discussion, (9ii), which mimics a tighter connection.

- (9) Julius wants a plant 🌵
- i. ↷ Julius wants a plant and this has something to do with cacti
 - ii. +> Julius wants a cactus (*conversational implicature*)

In many cases (including our experimental items), the author intends to indirectly communicate (9ii) by means of the emoji, rather than the much vaguer (9i). In line with how conversational implicatures pattern, this suggests a lower author commitment to the intended contribution of a message-final emoji, (9ii), than in the pro-text cases where the emoji content is necessary to answer the QUD. In other words, it is not the not-at-issueness of message-final emojis that leads to lower commitment, but their interpretive vagueness, (9i). Based on this reasoning, our experimental hypothesis is that authors have a higher commitment to the contribution of pro-text emojis (which are at-issue) than to that of message-final emojis (which happen to be not-at-issue).³ If correct, this entails that the deceptive use of pro-text emojis is more likely to be construed as lying than the use of message-final emojis. We expect that pro-text emojis will fare similarly to plain text (without any emojis) when it comes to commitment/deniability and the classification of a deceptive message as a lie. By contrast, we expect that message-final

³ As discussed, we allow for graded at-issueness, i.e., it may be necessary to speak of ‘more at-issue’ contributions in the case of pro-text emojis, as opposed to ‘less at-issue’ emoji contributions in the case of message-final emojis. There is no immediate reason to assume that graded at-issueness correlates with varying degrees of commitment, but we leave this possibility open for future research.

emojis give rise to lower commitment/higher deniability and readers are less likely to classify a deceptive message that contains them as a lie.

2. Experiment

We conducted two online rating studies which presented messages with and without emojis and asked participants to rate their status as lies (experiment 1, lie task) and whether the author was seen as committed to their content (experiment 2, commitment task).

2.1 Method

2.1.1 Design and materials

We tested false statements involving pro-text emojis and message-final (co-text) emojis as well as text-only statements as exemplified in (5). We selected five object (🍕 (“pizza”), 🐶 (“poodle”), 🌵 (“cactus”), 🐳 (“whale”), 🏰 (“castle”)) and five activity emojis (🏃 (“man bouncing ball”), 🏄 (“man surfing”), 🏃 (“woman running”), 🏊 (“woman swimming”), 🏌 (“man golfing”)) for testing, with comparatively low ambiguity according to the results of an emoji naming task presented by Cześtochowska et al. (2022). They were rendered in the iOS 16.4 version. The false statements were presented as screenshots of text messages in order to appear as natural as possible. Each text message was preceded by a context, which clarifies that the statement is false and that the author had the intention to deceive the addressee for personal benefit. To illustrate, for the statements in (11), the context was as shown in (10).

(10) Matilda and Julius are a couple and have just moved in together. They want another plant for the living room, but can’t agree on what kind. Matilda thinks that a cactus would go best with their interior. However, Julius doesn’t like cacti and would prefer to have a palm tree. Julius is celebrating his birthday tomorrow. Julius’ father is invited and wants to buy a present for Julius. He writes Matilda a message and asks: “What would Julius like for his birthday?” Matilda really wants a cactus. She replies:

- | | | |
|------|-------------------------|------------------------|
| (11) | a. Pro-text emoji: | Julius wants a 🌵 |
| | b. Message-final emoji: | Julius wants a plant 🌵 |
| | c. Text only: | Julius wants a cactus |

We collected lie and commitment ratings for these statements in a between-subjects design⁴ where commitment is operationalized in terms of accountability and deniability. Thus,

⁴ The message variants a, b, c were not mixed for a given subject in order to abstract from the presence or absence of emojis as a factor affecting the overall lie/commitment ratings. There is evidence that messages with emojis are in general seen as more trustworthy than messages without emojis (Reglin and Scheffler, 2019). We also

Lying with at-issue and non-at-issue emojis

participants were presented with one of the three statements types shown in (11) above and asked to indicate on a 7-point Likert scale to which extent they agree either with claims that the author had lied, see (12), “lie task”, or with claims that they were accountable for their statement, and that their statement was deniable, see (13), “commitment task”. The endpoints of the Likert scale were labeled as *stimme überhaupt nicht zu* (‘strongly disagree’) and *stimme voll und ganz zu* (‘strongly agree’). Participants who completed the lie task were additionally asked to indicate to which extent they agree with the claim that the author’s message was misleading. This prompt was included in order to give participants the option to indicate that they recognized the deceptive nature of the text message, even when they do not consider it a lie. Moreover, both lie and commitment ratings were preceded by a morality rating task, see (14). This was included to ensure that moral judgments do not influence the other ratings (Reins and Wiegmann, 2021). The 7-point Likert scale for the moral judgment ranged from *sehr schlecht* ‘very bad’ to *sehr gut* ‘very good’.

(12) **Lie Task**

Lying:

‘X lied to Y.’

Misleading:

‘X’s message was misleading.’

(13) **Commitment Task**

Accountability:

‘If Y is later that day notified that <not p>, then X would have to justify themselves.’

Deniability:

‘Assuming that Y is notified later that day that <not p> and confronts X about it. X could then convincingly reject the accusation with the following reply: “I did not claim that <p>”.’

(14) **Morality (both tasks):**

‘How do you judge X’s behavior in moral terms?’

Two of the ten test items were additionally followed by a simple comprehension question about the context story, which served as attention checks. The ten trials were preceded by one training item, so each participant rated eleven items in total.

2.1.2 Predictions

Based on the categorization of pro-text emojis as at-issue, we expect messages with these emojis to behave similar to the text-only messages in all ratings. In contrast, message-final co-

wanted to avoid the possibility that participants develop strategies directly comparing utterances with and without emojis.

text emojis are not-at-issue. We expect the lie ratings as well as the two operationalizations of commitment (deniability and accountability) to diverge for messages with final emojis from the text-only and pro-text emoji messages: ratings for lying and accountability are expected to be lower, ratings for deniability higher. We have no expectations in either direction for the morality question, as it is influenced mostly by the situation described in the context, which is stable across all groups. For the question about whether the message was misleading, predictions are less clear: On the one hand, it is possible to mislead without lying, leading to an expectation that the ratings for “misleading” may be higher than the ratings for “lying” across the board. On the other hand, some participants may take both categories to be mutually exclusive, only judging messages as “misleading” if they are not judged as full-out “lies”. Therefore, we do not establish any clear hypotheses for this rating.

2.1.3 Participants

In total, 203 participants took part in our experiment. 81 of them were university students who participated on a voluntary basis. The remaining participants were recruited via *Prolific* and received on average 1.55 GBP as compensation for their participation. The data of 11 participants were excluded from further analysis because they were not native speakers of German ($n = 5$), they answered at least one of the two attention checks incorrectly ($n = 4$) or they took an extremely long time to complete the experiment (more than 10 hours, $n = 2$). The remaining 192 participants were native speakers of German residing in Germany and aged between 19 and 36 years ($M = 25.85$, $SD = 4.75$). 99 participants specified female, 92 male and 1 non-binary gender. 58% (112) of the participants were Android users, the remaining participants specified that they use iOS. The majority reported to use emojis frequently and the self-reported attitude towards emojis was generally positive among the participants. Further, the participants reported an overall good understanding of emojis.

2.1.4 Procedure

The experiment was conducted as a web-based experiment created with the software *_magpie* (Franke et al. 2018). Thus, participants completed the experiment by means of their own PCs/notebooks. They were randomly assigned to one of the six experimental lists (three conditions x two tasks). At the beginning of the experiment, participants were presented with a similar training item to familiarize themselves with the task. Afterwards, the 10 test items were presented to them in randomized order. After completing the experimental task, participants were asked optional questions about their demographics and about the frequency with which they use emojis, their attitude towards and understanding of emojis, and about their smartphone operating system with which they use emojis (see Section 3.1.3). The completion of the experiment took between 2.98 and 140.63 minutes ($M = 11.9$, $SD = 12.15$).

Lying with at-issue and non-at-issue emojis

2.2 Results

For data analysis, we used the software *R* (version 4.3.1, R Core Team, 2023) and *RStudio* (version 2023.09.0, Posit Team, 2023). The packages *tidyverse* (Wickham et al. 2019) and *gridExtra* (version 2.3, Auguie and Antonov, 2017) were used for data processing and analysis, and the packages *ordinal* (version 2023.12-4, Christensen, 2023) and *emmeans* (version 1.8.9, Lenth et al. 2023) were used for the inferential statistical analysis.

2.2.1 Lie ratings

Table 1 shows the mean ratings of the lie task for each of the three statement types. The results of the lie ratings and misleading ratings are also visualized in Figure 1. We observe close to ceiling lie ratings for statements with pro-text emojis and text-only statements. Lie ratings for statements with message-final emojis are considerably lower. Misleading ratings are highest in this condition, but they vary very little across the three conditions.⁵ The morality ratings, too, are highest for statements with message-final emojis and do not differ much between the other two statement types.⁶ Since morality ratings and misleading ratings were included mainly for practical reasons to enable participants to register that they understood the deceptive nature of the messages, we will not discuss them further in the analysis.

Table 1. Mean ratings per statement type (SD) – lie task (7-point Likert scale).

Rating ↓ Condition →	Message-final emoji	Pro-Text emoji	Text-only statement
Lie rating	4.19 (1.78)	6.6 (0.94)	6.69 (0.68)
Misleading rating	5.78 (1.4)	5.46 (2.16)	5.4 (2.13)
Morality rating	3.26 (1.37)	2.67 (1.45)	2.69 (1.33)

⁵ Six participants commented that they found the term ‘misleading’ confusing, most because they did not know whether plain lies were supposed to be also misleading. Different participant groups decided differently on this question. Since we did not have any specific hypothesis regarding this question, we do not address it further here.

⁶ As anticipated, morality ratings vary between test items. For example, lying to one’s superior about why one cannot attend a meeting at a certain time received higher morality ratings (= better/less bad in moral terms) than a lie which has negative effects for someone else’s career.

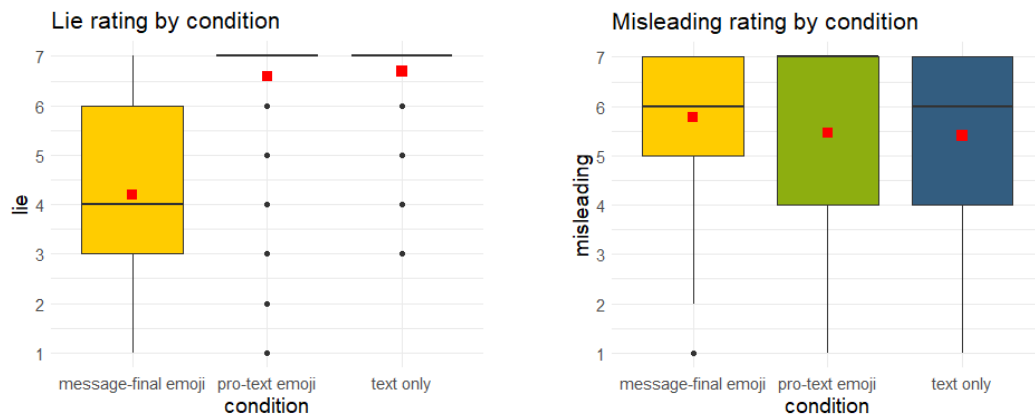


Figure 1. Boxplots for the lie (left) and misleading rating (right) (red squares indicate mean).

For the inferential statistical analysis of the lie ratings, we built a cumulative link mixed model (logit) with lie rating (1–7) as the dependent variable. The model included statement type as a fixed factor, random intercepts for participants and random slopes for items. Table 2 shows the coefficients of the fixed effects of the model, which represent the estimated difference in the log-odds of the lie rating compared to the reference level statement with message-final emoji. Additionally, we ran pairwise comparisons between the three levels of the factor statement type with emmeans using the Bonferroni correction. As already shown by the coefficients, there is a significant difference between the lie ratings of the statement types message-final emoji and pro-text emoji as well as between message-final emoji and text-only emoji. There is, however, no significant difference between the statement types pro-text emoji and text only (estimated difference = -0.51, SE = 0.57, $p = 1$).

Table 2. Lie rating: Coefficients of the fixed effects with type message-final as reference level.

Statement type	Estimate	Std. Error	z value	p value
Pro-text emoji	5.21	0.58	9	< 0.0001
Text-only	5.71	0.62	9.2	< 0.0001

2.2.2 Commitment ratings

The mean ratings of the commitment task are shown in Table 3. The accountability and deniability judgments are additionally visualized in Figure 2. The accountability ratings differ only slightly between the conditions with statements with message-final emojis having the lowest mean ratings. We observe a bigger difference between statements with message-final emojis and the other two statement types in terms of deniability judgments. The former show the highest deniability ratings. Morality ratings are highest for statements with message final

Lying with at-issue and non-at-issue emojis

statements, too, but the difference to the other statement types is even lower than in the context of the lie task.

Table 3. Mean ratings per statement type (SD) – commitment task (7-point Likert scale).

Rating ↓ Condition →	Message-final emoji	Pro-Text emoji	Text-only statement
Accountability rating	5.42 (1.59)	5.93 (1.3)	5.79 (1.36)
Deniability rating	3.35 (1.97)	1.53 (1.03)	1.39 (0.96)
Morality rating	2.81 (1.47)	2.6 (1.32)	2.66 (1.33)

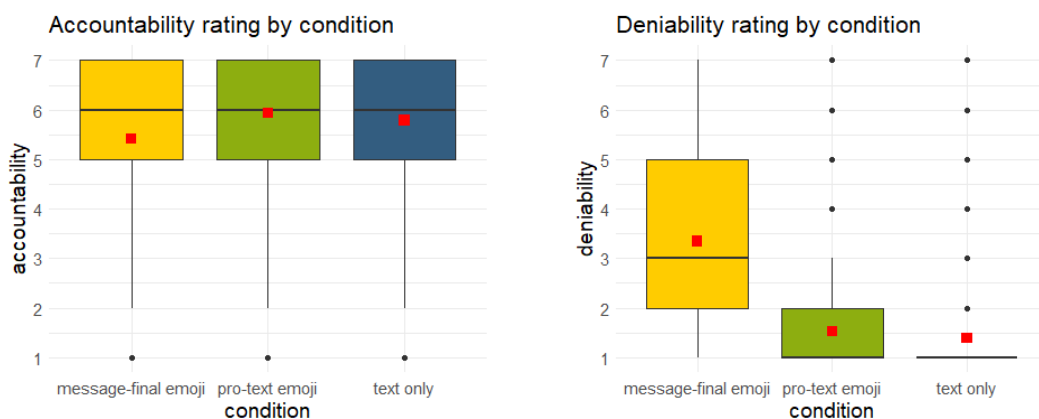


Figure 2. Boxplots for commitment ratings (red squares indicate mean).

For the inferential statistical analysis of the commitment ratings, the deniability ratings were reversed, since we expect the level of *non*-deniability to positively correlate with the level of accountability, lying and misleading. We created two cumulative link mixed models (logit). One model had accountability rating and the other model had deniability rating (both 1–7) as the dependent variable. Both models included statement type as a fixed factor, random intercepts for participants and random slopes for items. Tables 4 and 5 show the coefficients of the fixed effects of the models. Again, we ran additional pairwise comparisons between all three levels of the factor statement type with emmeans using the Bonferroni correction. In terms of the accountability ratings there are no significant differences between the statement types (estimated difference between statements with pro-text emojis and text-only statements = 0.34, SE = 0.4, $p = 1$). Accountability, thus does not differentiate between the conditions. However, with deniability ratings, there is a significant difference between the statement types message-final emoji and pro-text emoji as well as between message-final emoji and text-only emoji. As with the lie ratings, the small difference between the statement types pro-text emoji and text only is not significant (estimated difference = -0.84, SE = 0.57, $p = 0.47$).

Table 4. Accountability: coefficients of the fixed effects with type message final as reference.

Statement type	Estimate	Std. Error	z value	p value
Pro-text emoji	0.8	0.45	1.8	0.07
Text-only	0.46	0.59	1	0.32

Table 5. Deniability: coefficients of the fixed effects with type message final as reference level.

Statement type	Estimate	Std. Error	z value	p value
Pro-text emoji	3.33	0.53	6.34	< 0.001
Text-only	4.17	0.63	6.64	< 0.001

2.2.3 Correlations between ratings

We calculated Spearman correlations between the commitments and lie ratings based on aggregated ratings per item and condition. Note that the rating scale for the deniability ratings has been reversed for this analysis, too. The results are shown in Table 6. There are strong and significant correlations between the three ratings. The strongest correlation can be observed between deniability and lie ratings.

Table 6. Correlations between ratings (Spearman).

Parameter 1	Parameter 2	rho	95% CI	p-value
Accountability	Deniability	0.61	0.31, 0.8	< 0.01
Accountability	Lie	0.58	0.26, 0.78	< 0.01
Deniability	Lie	0.78	0.58, 0.89	< 0.001

3. Discussion

Emojis and lying. In our experiment, messages with pro-text emojis (see 11a) behave indistinguishably from text-only messages (see 11c). This reconfirms that at-issue, pro-text emojis contribute main content just like written text. For this reason, untruthful, deceptive statements containing pro-text emojis lead to full speaker commitment in our sample utterances, and are judged as lies by participants to the same degree as text-only messages. In contrast, message-final emojis (see 11b), are not at-issue to the same extent and seem to be truth-conditionally less binding. Messages with such not-at-issue, co-text emojis are also rated significantly lower on the lying scale. Thus, object and activity emojis can be easily used to lie if they are at-issue pro-text emojis, but meaning contributions expressed solely by text-accompanying emojis are perceived as lies less often.



Lying with at-issue and non-at-issue emojis

It is worth noting that the possibility of using emojis with deceptive intent does not entail that this is a frequent phenomenon. In a combined production and perception survey on face emojis and false statements, Reglin and Scheffler (2019) found that participants used fewer emojis when lying, and conversely, messages with emojis were perceived as more trustworthy (and less likely to be lies) than messages without emojis. They conjecture that writers are averse to expressing additional, untrue emotional (not-at-issue) content using emojis.

Emojis and commitment. Our experiment showed that different emoji usages (at-issue vs. not-at-issue) trigger different levels of speaker commitment to the emoji's content. In particular, our participants judge the deniability of the contribution of message-final co-text emojis as much higher than for pro-text emojis and pure text. Since participants prefer ratings in the middle part of the deniability Likert scale for the message-final emojis, our results support concepts of graded commitment. The ratings indicate that while the speaker is assumed to be fully committed to both textual content and pro-text emojis, the speaker's commitment to the contribution of co-text emojis is judged as significantly lower at least regarding deniability (we observe no difference in accountability ratings, see below). Graded commitment in the form of intermediate levels of commitment has been independently proposed to account for other types of semantic contributions, such as biased questions (Scheffler and Malamud, 2023), which have been argued to partially but not fully commit their speaker to their content. Our results are consistent with our predictions based on Pierini's (2021) emoji typology, which draws a clear distinction between co-text emojis, for which he assumes a not-at-issue semantics (Pierini, 2021: 725), and pro-text emojis, which he takes to be at-issue (Pierini, 2021: 729). Again, the graded ratings on the deniability scale are more in line with a graded concept of at-issueness (as proposed by Barnes and Ebert, 2023) than a binary one. For emojis, commitment and at-issueness as seen by their relevance to the QUD may thus be closely correlated, in a similar way to what Antomo (2024) observes for gestures.

Lying and commitment. More generally, our results indicate that deniability (as applied by Reins and Wiegmann, 2021, amongst others) is a better measure for public commitment than accountability (Elder, 2021), since our participants rated accountability highly in all cases across the board. We conjecture that this is the case because social agents may be accountable for all kinds of actions or non-actions, not only for commitments obtained via linguistic means. For example, a roommate may need to justify himself for not having taken out the trash even in the absence of any clear speech act that commits him to having done this. Thus, not only commitments but also other events or non-events may lead to the need for justification (see also, "Why didn't you tell me that it's your mom's birthday today?!").

Our main lie ratings are expected under the commitment-based definition of lying: Speakers are fully committed to content expressed with pro-text emojis just as much as to text-only content, and accordingly, the lie ratings for these two kinds of sentences are also statistically nearly identical. In contrast, co-text emojis which do not yield full commitment also lead to

lower lie ratings. In section 2.2.3 we showed that the commitment (in particular, deniability) and lie ratings are highly correlated across our experiments. However, our results do not rule out the assertion-based definition of lying, either. Since pro-text emojis are at-issue, their contribution can be said to be part of the regularly asserted, propositional content of the utterance. Some evidence speaks for this view. In addition to Pierini’s (2021) test for at-issueness, some previous experimental studies show that pro-text emojis are processed similarly to textual content and trigger retrieval of the complete lexical information of words (Scheffler et al. 2022). In this respect, emojis (at least when they are presented in line with text) seem to differ from pictures more generally. For example, pro-text emojis can be negated, and appear to allow for the formation of morphological units of emojis and text, at least for some emoji users (see Storment, 2024, who discusses corpus examples with inflectional marking, as illustrated by “ed” [kissed] and “s” [dolphins]). Our experimental results therefore also address the overall question of how emojis relate to pictures. Some previous work (Viebahn and Wiegmann, 2023) strictly differentiates between language and pictures. The possibility of lying with pictures (Viebahn, 2019) therefore gives evidence for a commitment-based definition of lying, since pictures do not contribute asserted content. Weissman (2024: 24) stresses that emojis and photographs share the graphical modality and he sees parallels between lying with pictures and emojis. Even for pictures in general, it is not completely uncontroversial that they do not contribute propositional content (see Greenberg, 2013 and Abusch, 2014 for a propositional analysis of pictures; see Maier, 2024 for a recent overview article). At least pro-text emojis seem to be part of the linguistic content and seem to contribute to the propositional, asserted meaning of an utterance, similar to some types of gestures. Our experiments confirm this, since pro-text emojis behave completely at par with textual contributions. Therefore, the fact that (messages with) emojis are also seen as lies in some cases does not force the conclusion that the commitment-based definition of lying must be correct. Instead, it merely shows that some emojis also contribute to the asserted content of an utterance.

4. Conclusion

In our experiments, messages with pro-text emojis, (11a), behave indistinguishably from text-only messages, (11c): they lead to full speaker commitment in our sample utterances, and are judged as lies just as deceptive written text. In contrast, message-final not-at-issue emojis, (11b), seem to be less suitable for lying and participants judge the deniability of the contribution of message-final emojis as much higher than for pro-text emojis and pure text. We can therefore conclude that lying with emojis is possible and that emojis involve commitment, but that this depends on the usage type (only true for pro-text at-issue emojis). Our results nicely align with Pierini’s (2021) emoji typology. Furthermore, our results are in line with a commitment-based definition of lying, nevertheless, they do not rule out an assertion-based definition, provided that pro-text at-issue emoji are part of the asserted content. Thus, both the possibility to lie and commitment attribution are not so much influenced by the verbal-visual boundary, whereas the usage type seems to have a decisive influence on both variables. For the case of emojis, the

type of usage (co-text or pro-text) is closely related to (not-)at-issueness, the exact division of labor still being up for debate.

5. Data availability statement

The experimental stimuli, all data, analysis scripts and results can be found in the OSF repository: <https://osf.io/skvbn/>

6. Ethics approval statement

The study was preregistered as https://aspredicted.org/J4V_X4D and received ethical approval by the ethics committee of the Faculty of Philosophy and Education Science of Ruhr-University Bochum, Germany (votum EPE-2023–022 of August 28, 2023).

7. Funding statement

This study was supported by the Deutsche Forschungsgemeinschaft (DFG) through the Priority Program DFG SPP 2392 Visual Communication (ViCom), project “Semantics and Pragmatics of Emojis in Digital Communication” (project number 501983851) and project “Lying, deceiving, misleading: are we committed to our gestures?” (project number 502020235).

References

- Abusch, D. (2014). Temporal succession and aspectual type in visual narrative. In L. Crnić and U. Sauerland (Eds.), *The Art and Craft of Semantics: A Festschrift for Irene Heim*, Volume 1, pp. 9–29. MITWPL. <https://semanticsarchive.net/Archive/zMzMjE4N/>
- Antomo, M. and Y. Chen. (2025). The information status of co-speech gestures: Evidence from lying and commitment. *Proceedings of Sinn und Bedeutung 29*.
- Antomo, M. (2025). Lying with gestures. In A. Wiegmann (Ed.), *Advances in Experimental Philosophy of Lying*, pp. 169–193. London: Bloomsbury.
- Antomo, M., S. Müller, M. Paluch, K. Paul, and M. Thalmann (2018). When children aren't more logical than adults: An empirical investigation of lying by falsely implicating. *Journal of Pragmatics 138*, 135–148. <https://doi.org/10.1016/j.pragma.2018.09.010>.
- Auguie, B. and A. Antonov. (2017) *gridExtra: Miscellaneous Functions for “Grid” Graphics. R Package Version 2.3*. <https://CRAN.R-project.org/package=gridExtra>
- Barnes, K. and C. Ebert (2024). The information status of iconic enrichments: Modelling gradient at-issueness. *Theoretical Linguistics 49*(3–4), 167–223. <https://doi.org/10.1515/tl-2023-2009>
- Bonalumi, F., T. Scott-Phillips, J. Tacha, and C. Heintz (2020). Commitment and communication: Are we committed to what we mean, or what we say? *Language and Cognition 12*(2) 360–384. <https://doi.org/10.1017/langcog.2020.2>

- Christensen, R. (2023). *_ordinal-Regression Models for Ordinal Data_*. Rpackage version 2023.12-4. <https://CRAN.R-project.org/package=ordinal>
- Coleman, L. and P. Kay (1981). Prototype Semantics: The English Word Lie. *Language* 57(26), 26–44.
- Czestochowska, J., K. Gligorić, M. Peyrard, Y. Mentha, M. Bień, A. Grütter, A. Auer, A. Xanthos, and R. West (2022). On the context-free ambiguity of emoji. In *Proceedings of the International AAAI Conference on Web and Social Media 16*, Atlanta, Georgia, pp. 1388–1392. <https://doi.org/10.1609/icwsm.v16i1.19393>
- Ebert, C. (2024). Semantics of Gesture. *Annual Review of Linguistics* 10, 169–189. <https://doi.org/10.1146/annurev-linguistics-022421-063057>
- Ebert, C., C. Ebert, and R. Hörnig (2020). Demonstratives as dimension shifters. In: *Proceedings of Sinn und Bedeutung* 24(1), 161–178. <https://doi.org/10.18148/sub/2020.v24i1.859>
- Elder, C. H. (2021). Speaker meaning, commitment and accountability. In M. Haugh, D. Z. Kádár, and M. Terkourafi (Eds.), *The Cambridge Handbook of Sociopragmatics*, pp. 48–68. Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781108954105>
- Fallis, D. (2009). What is lying? *Journal of Philosophy* 106(1), 29–56.
- Franke, M, X. Ji, S. Ilieva, J. Rautenstrauch, and M. Klehr (2018). *magpie: Minimal architecture for the generation of portable interactive experiments*. <https://magpie-experiments.org/>
- Greenberg, G. (2013). Beyond resemblance. *Philosophical Review* 122(2), 215–287. <https://doi.org/10.1215/00318108-1963716>
- Grosz, P. G., E. Kaiser, and F. Pierini (2023). Discourse anaphoricity vs. perspective sensitivity in emoji semantics. *Glossa: a journal of general linguistics*, 8(1), 1–35. <https://doi.org/10.16995/glossa.9128>
- Grosz, P. G., Greenberg, G., De Leon, C. and Kaiser, E. (2023). A semantics of face emoji in discourse. *Linguistics and Philosophy* 46, 905–957. <https://doi.org/10.1007/s10988-022-09369-8>
- Kaiser, E. (2021). Focus marking with emoji: On the relation between information structure and expressive meaning [Abstract for *CSSP* 2021]. <http://www.cssp.cnrs.fr/cssp2021/abstracts/Kaiser.pdf>
- Krifka, M. (2019). Commitments and beyond. *Theoretical Linguistics* 45(1–2), 73–91. <https://doi.org/10.1515/tl-2019-0006>
- Kroll, M. and A. Rysling (2019). The search for truth: appositives weigh in. *Proceedings of Semantics and Linguistic Theory* 29, 180–200. <https://doi.org/10.3765/salt.v29i0.4607>
- Lenth, R. (2023). *emmeans: Estimated marginal means, aka least-squares means*. R package version 1.8.9
- Mahon, J. E. (2015). The definition of lying and deception. *Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/archives/win2016/entries/lying-definition/>

- Maier, E. (2023). Emojis as pictures. *Ergo, an Open Access Journal of Philosophy* 10(11), 302–340. <https://doi.org/10.3998/ergo.4641>
- Maier, E. (2024). Pictorial language and linguistics. Manuscript submitted for G. Dupré, R. Nefdt, and K. Stanton (Eds.): *Oxford Handbook of Philosophy of Linguistics*. [Version: February 2024] <https://ling.auf.net/lingbuzz/007603>
- Marsili, N. (2020). Lying, speech acts, and commitment. *Synthese* 199, 3245–3269. <https://doi.org/10.1007/s11229-020-02933-4>
- Mazzarella, D., R. Reinecke, I. Noveck, and H. Mercier (2018). Saying, presupposing and implicating: How pragmatics modulates commitment. *Journal of Pragmatics* 133, 15–27. <https://doi.org/10.1016/j.pragma.2018.05.009>
- Meibauer, J. (2005). Lying and falsely implicating. *Journal of Pragmatics* 37(9), 1373–1399. <https://doi.org/10.1016/j.pragma.2004.12.007>
- Meibauer, J. (2014). *Lying at the Semantics-Pragmatics Interface*. Berlin: De Gruyter Mouton. <https://doi.org/10.1515/9781614510840>
- Moeschler, J. (2013). Is a speaker-based pragmatics possible? Or how can a hearer infer a speaker’s commitment? *Journal of Pragmatics* 48(1), 84–97. <https://doi.org/10.1016/j.pragma.2012.11.019>
- Morency, P., S. Oswald, and L. Saussure de (2008). Explicitness, implicitness and commitment attribution: A cognitive pragmatic approach. *Belgian Journal of Linguistics* 22, 197–219. <https://doi.org/10.1075/bjl.22.10mor>
- Or, S., M. Ariel, and O. Peleg (2017). The case of literally true propositions with false implicatures. In Chiluba, I. E. (Ed.), *Deception and Deceptive Communication: Motivations, Recognition Techniques and Behavioral Control*, 67–108. Hauppauge, NY: Nova Science.
- Pasternak, R. and L. Tieu (2022). Co-linguistic content inferences: From gestures to sound effects and emoji. *Quarterly Journal of Experimental Psychology* 75(10), 1828–1843. <https://doi.org/10.1177/17470218221080645>
- Pierini, F. (2021). Emojis and gestures: A new typology. *Proceedings of Sinn und Bedeutung*, 25, 720–732. <https://doi.org/10.18148/sub/2021.v25i0.963>
- Posit Team (2023). *RStudio: Integrated Development Environment for R. Posit Software, PBC*, Boston, MA. URL <http://www.posit.co/>.
- R Core Team (2023). *R (4.3.1): A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org>
- Reboul, A. (2017). Is implicit communication a way to escape epistemic vigilance? In S. Assimakopoulos (Ed.), *Pragmatics at Its Interfaces*, 91–112. Berlin: De Gruyter Mouton. <https://doi.org/10.1515/9781501505089-006>
- Reglin, R. and T. Scheffler (2019). *Emotionality, Truthfulness, and Emoji* [Unpublished Manuscript]. <https://ling.auf.net/lingbuzz/006228>
- Reins, L. M. and A. Wiegmann (2021). Is lying bound to commitment? Empirically investigating deceptive presuppositions, implicatures, and actions. *Cognitive Science* 45(2). <https://doi.org/10.1111/cogs.12936>

- Riordan, M. A. (2017). The communicative role of non-face emoji: Affect and disambiguation. *Computers in Human Behavior* 76, 75–86. <https://doi.org/10.1016/j.chb.2017.07.009>
- Scheffler, T., L. Brandt, M. de la Fuente, and I. Nenchev (2022). The processing of emoji-word substitutions: A self-paced-reading study. *Computers in Human Behavior* 127. <https://doi.org/10.1016/j.chb.2021.107076>
- Scheffler, T. and S. A. Malamud (2023). “Won’t you?” reverse-polarity question tags in American English as a window into the semantics-pragmatics interface. *Linguistics and Philosophy* 46, 1285–1327. <https://doi.org/10.1007/s10988-023-09385-2>
- Schlenker, P. (2018). Gesture projection and cosuppositions. *Linguistics and Philosophy* 41, 295–365. <https://doi.org/10.1007/s10988-017-9225-8>
- Stokke, A. (2016). Lying and misleading in discourse. *Philosophical Review* 125(1), 83–134. <https://doi.org/10.1215/00318108-3321731>
- Stokke, A. (2018). *Lying and Insincerity*. Oxford: Oxford University Press.
- Storment, J. D. (2024). Going 🚫 lexicon? The linguistic status of pro-text emojis. *Glossa: a journal of general linguistics* 9(1). <https://doi.org/10.16995/glossa.10449>
- Thalmann, M., Y. Chen, S. Müller, M. Paluch, and M. Antomo (2021). Against PCI-GCI uniformity: Evidence from deceptive language in German and Chinese. *Linguistische Berichte* 267, 355–385.
- Tieu, L., J. Qiu, V. Puvipalan, and R. Pasternak (2023). *Experimental Evidence for a Semantic Typology of Emoji: Inferences of Co-, Pro-, and Post-Text Emoji* [Unpublished Manuscript], September 2023. <https://ling.auf.net/lingbuzz/007609>
- Viebahn, E., A. Wiegmann, N. Engelmann, and P. Willemsen (2018). Can a question be a lie? An empirical investigation. *Ergo, an Open Access Journal of Philosophy* 8(7), 175–217. <https://doi.org/10.3998/ergo.1144>
- Viebahn, E. (2019). Lying with pictures. *The British Journal of Aesthetics* 59(3), 243–257. <https://doi.org/10.1093/aesthj/ayz008>
- Viebahn, E. (2021). The Lying-Misleading Distinction: A Commitment-Based Approach. *The Journal of Philosophy* 118(6), 289–319.
- Viebahn, E. and A. Wiegmann (2023). *An Empirical Perspective on Pictorial Lies* [Unpublished Manuscript]. <https://osf.io/preprints/osf/wp7va>
- Weissman, B. and M. Terkourafi (2019). Are false implicatures lies? An empirical investigation. *Mind and Language* 34(2), 221–246. <https://doi.org/10.1111/mila.12212>
- Weissman, B. (2024). Can an emoji be a lie? The links between emoji meaning, commitment, and lying. *Journal of Pragmatics* 219, 12–29. <https://doi.org/10.1016/j.pragma.2023.11.004>
- Wickham H. et al. (2019). Welcome to the tidyverse. *Journal of Open Source Software* 4(43), 1686. doi:10.21105/joss.01686.
- Wiegmann, A and J. Meibauer (2019). The folk concept of lying. *Philosophy Compass* 14(8). <https://doi.org/10.1111/phc3.12620>

Lying with at-issue and non-at-issue emojis

Wiegmann, A., P. Willemsen, and J. Meibauer, J. (2021). Lying, deceptive implicatures, and commitment. *Ergo, an Open Access Journal of Philosophy* 8(50), 709–740. <https://doi.org/10.3998/ergo.2251>