Speech acts, interjections and emojis: Revisiting communicative cues

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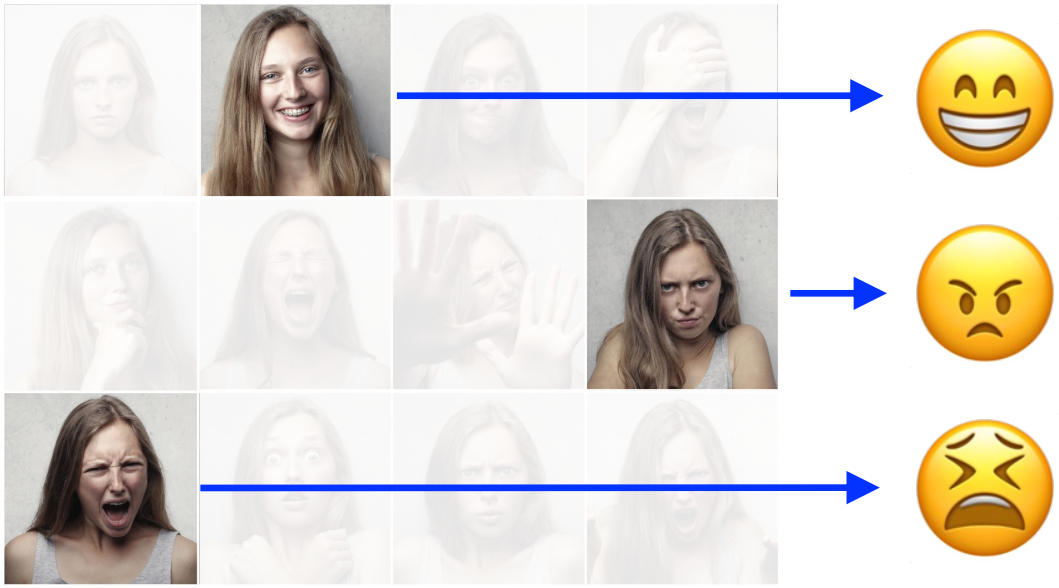
Roadmap

- introducing face emojis
- the puzzle: illocutionary uses of face emojis
- the proposal:
  - analyzing expressive items as pragmatic cues
  - classifying face emojis as a class of expressives
  - steps towards an explanation of the illocutionary effects of face emojis

Facial expressions are central to human face-to-face communication, encoding emotive meaning among other things…

Photo by Andrea Piacquadio from Pexels

Facial expressions are central to human face-to-face communication, encoding emotive meaning among other things…



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Overview on emojis:
Bai et al 2019

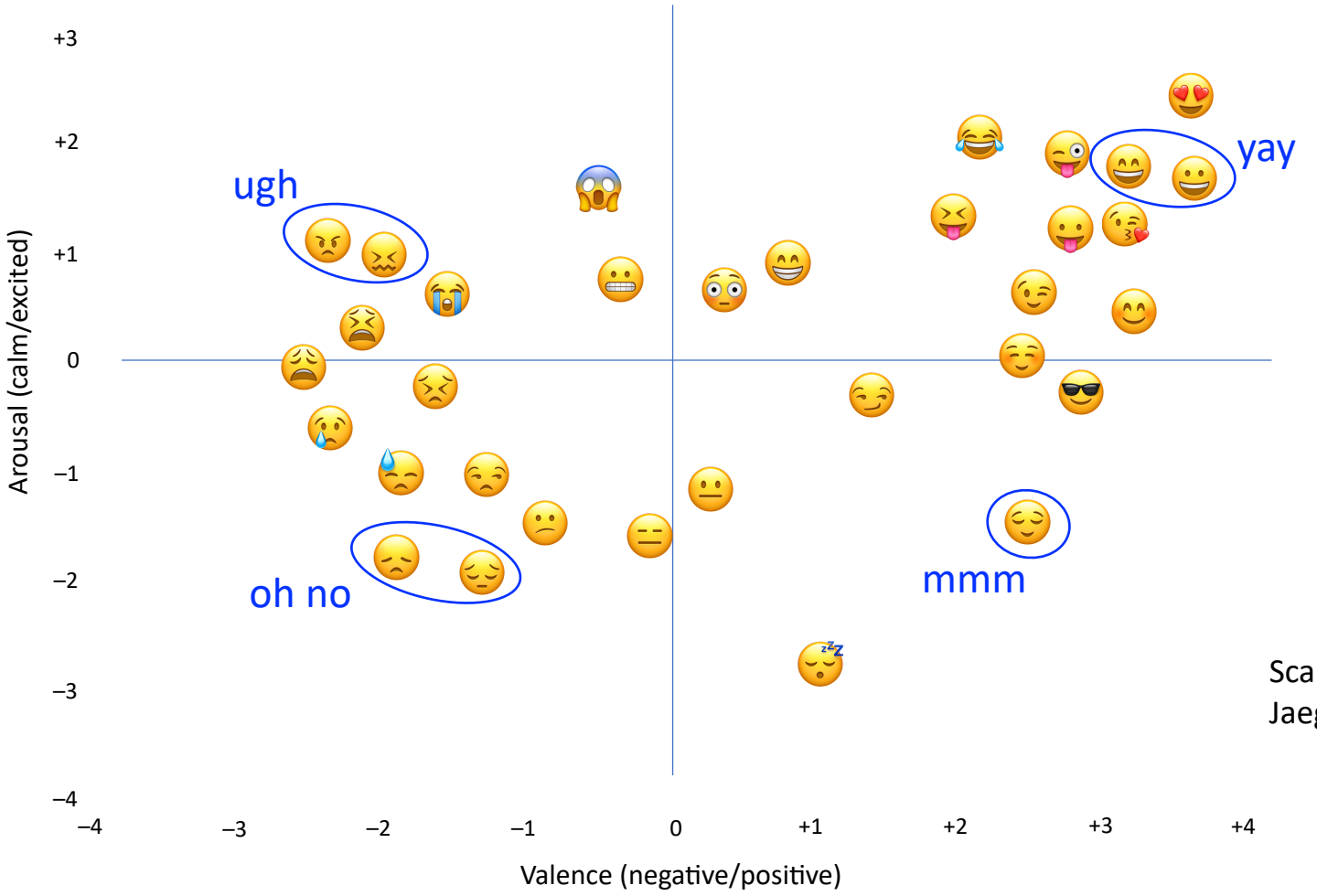
Emojis as gestures:
Gawne & McCulloch 2019
Cohn et al. 2019

Emojis as pictures:
Maier 2021

… Face emojis are a central component of digital communication. They are plausible online counterparts of speech-accompanying facial expressions.

Face emojis also share properties of interjections, (1) ≈ (2).

(1) Yay, only two more to go! (Manning 1990)
(2) only two more to go 😀



Graph partially and schematically redrawn from Jaeger et al. (2019:900); see also Kutsuzawa et al. (2022).

Scales adjusted to –4 to +4; Jaeger et al. had 1-9 scales

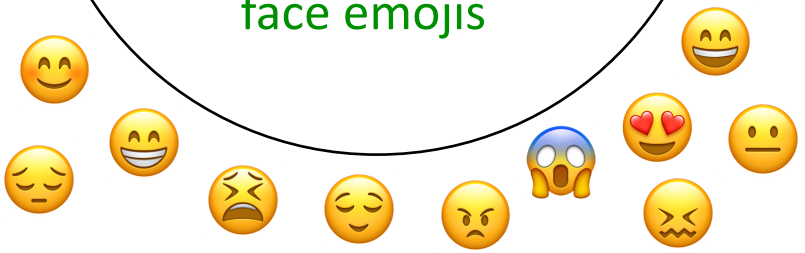
Working hypothesis

properties of facial expressions

Wow
Yuck
Ugh
Phew
Yay
Boo
Pah
Alas
Wah

properties of interjections

properties of face emojis



Connection between facial expressions and intonation

(e.g., Reilly et al. 1990, Nespor & Sandler 1999, Dachkovsky & Sandler 2009, Sendra et al. 2003)

Empirical method

- Step 1: constructed and naturally occurring examples are used to establish solid intuitions, which are captured by initial hypotheses

  (e.g. Grosz, Kaiser & Pierini 2021; Grosz, Greenberg, De Leon & Kaiser 2021)

- Step 2: hypotheses are tested experimentally

  (e.g. Kaiser & Grosz 2021 [*Proceedings of the LSA 6*])

- Results from our first two experiments confirm the validity of using constructed examples and introspective intuitions for emojis.

  ⇒ **Caveat:** there are generational differences (see e.g. recent discussions about how Gen Z users use 💀 instead of 😂).

Where do we find face emojis?

t*n* indicates a naturally-occurring example from twitter

(t1) ***message-initial***

a. *discourse-initial*

😬 That moment when u realise u didn't cook your egg enough...

b. *in response to another post / message*

😬 my bad sis.

(t2) ***message-final:*** itching for another tattoo 😬

(t3) ***message-medial***

a. *sentence-medial*

Extremely grateful 🙄 that the local Health Clinic doesn't charge me for leaning my bike against this rail...

b. *inter-sentential (can be either sentence-final or sentence-initial)*

Well that's mad 😮 can't wait for tomorrow!

(t4) ***message-surrounding:*** 😬 IT'S FRIDAY! 😬

Where do we find face emojis?

(t1) ***message-initial*** **NB:** (t#) … example from Twitter

a. *discourse-initial*

😬 That moment when u realise u didn't cook your egg enough...

b. *in response to another post / message*

😬 my bad sis.

(t2) ***message-final:*** itching for another tattoo 😬

(t3) ***message-medial***

Several empirical studies show that emojis in actual use *frequently* follow the text that they comment on.

(e.g., Garrison et al. 2011, Novak et al. 2015, Al Rashdi 2015, Cramer et al. 2016, Sampietro 2016, Na'aman et al. 2017, Seyednezhad et al. 2018)

Other positions are *less frequent*.

(t4) ***message-surrounding:*** 😬 IT'S FRIDAY! 😬

Face emojis as illocutionary devices

Initial observations

- Prior to the introduction of emojis to a global market, Dresner & Herring (2010) observe that *emoticons* have illocutionary uses.

(3) I'm sick and tired all the time :)

↝ the writer is trying to soften a statement that might be perceived as a complaint

≠ the writer is happy about being sick

(examples and descriptions from Gawne & McCulloch 2019)

- For emojis, anecdotal evidence includes illocutionary uses:

(4) a. Come here please 😠

b. Come here please 😍

(5) a. I loved it 😌

b. I loved it 🙄

(examples from a pop science piece on *the Guardian,* 23rd July 2019, Alex Hern, "Emojis can make us as happy as talking face to face. What's not to ❤️?")

Mapping the interactions more systematically

- One area where face emojis seem to have a clear illocutionary effect is in connection with imperatives.

- Speech acts communicated by imperatives:

(6)

a.	Read this!	COMMAND
b.	Stay away from the projector!	WARNING
c.	Have fun at the party!	WISH
d.	Turn off the light, please!	REQUEST
e.	Take the A train if you want to go to Harlem!	ADVICE
f.	(It starts at eight, but) come earlier if you like!	PERMISSION
g.	All right, don't come then! (If you think you are so clever.)	CONCESSIVE

(all examples cited from Kaufmann 2012:169)

Face emojis can disambiguate speech acts

- Speech acts that seem to interact with face emojis:

(7) a. call me 😠 (≈ you must call me) **COMMAND/WARNING**

(possibly similar: call me 😤 / call me 😡)

b. call me 😢 (≈ please call me) **REQUEST**

(possibly similar: call me 😟 / call me 😔 / call me ☹️)

c. call me ☺️ (≈ go ahead and call me) **PERMISSION/INVITATION**

(possibly similar: call me 😘 / call me 😊)

d. call me 🙄 (≈ okay, call me if you must) **CONCESSIVE**

(possibly similar: call me 🙂)

Not exhaustive; not included on this slide: WISH and ADVICE.

Introducing *Utilize Cues*

Obligatory non-at-issue expressions

- Optative constructions require *some* marker, but *any* will do:

(8) **Ach,** wenn er **doch nur wenigstens** rechtzeitig gekommen wäre!
oh if he DOCH only at.least in.time come were
'Oh, if only he had at least come in time!'

(9) a. ✓ Wenn er **doch** rechtzeitig gekommen wäre!
b. ✓ Wenn er **nur** rechtzeitig gekommen wäre!
c. ✓ Wenn er **wenigstens** rechtzeitig gekommen wäre!
d. ✓ **Ach,** wenn er rechtzeitig gekommen wäre!
e. # Wenn er rechtzeitig gekommen wäre! *(No marker)*

Grosz (2012, 2014): none of these markers *encode* optativity;
they simply serve as *cues* for optativity.

… also in V1-exclamatives

- English V1-exclamatives require an interjection, but not a specific one; in fact, “a whistle or a sharp intake of breath” is enough (Pesetsky & Torrego 2001:411n39)

(10) a. ✓ **Oh,** did we love them! (≈ how very much we loved them)
b. ✓ **Boy,** did we love them!
c. ✓ **Wow,** did we love them!
d. # Did we love them! *(No marker)*

Grosz (2014): *Utilize Cues!*

(11) **Definition of (Speech Act) Cues**

Linguistic expressions (such as interjections, particles, intonational tunes, mood marking, etc.) classify as speech act cues iff they

(i.) are typical for a given use of an utterance, but they

(ii) neither classify as a sufficient nor as a necessary condition for such a use.

(12) **Utilize Cues** *(informal definition)*

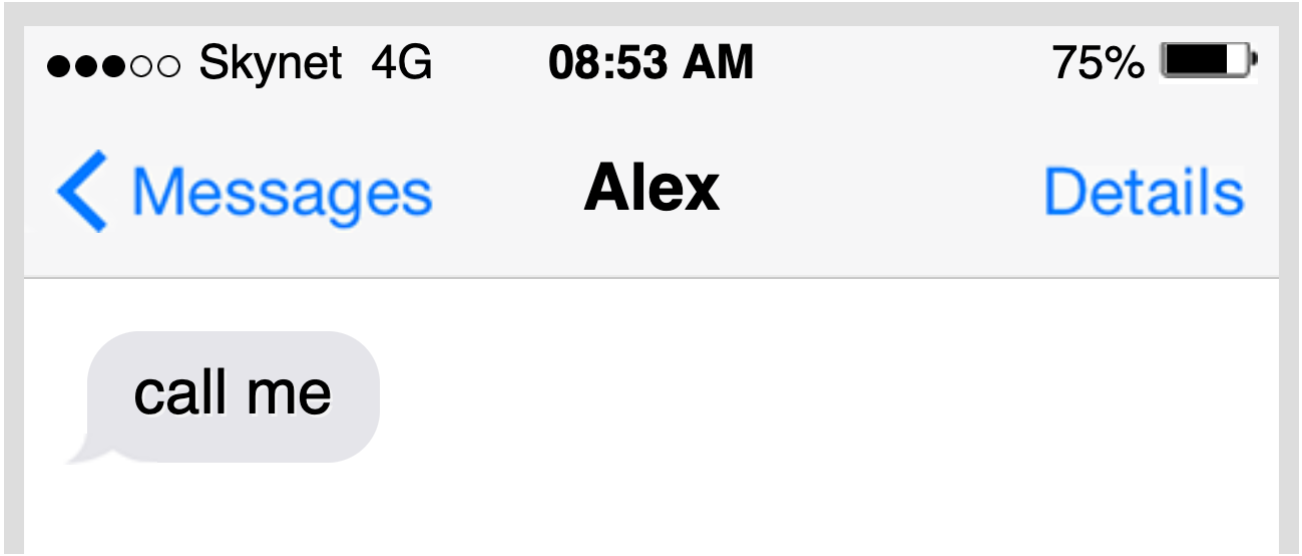
If (i.) an intended use of an ambiguous utterance has a low prior probability,

and (ii.) the utterance context does not independently make the intended utterance use prominent,

then cues are obligatory.

Brief aside: Are face emojis ever **obligatory**?

You be the judge:



For comparison:

call me 😄

call me 😠

call me 😐

call me 😟

Expanding *Utilize Cues* to face emojis

- Cues for a speech act tend to be "truth-conditionally vacuous" elements, such as presupposition triggers or use-conditional items (in the sense of Gutzmann 2013).

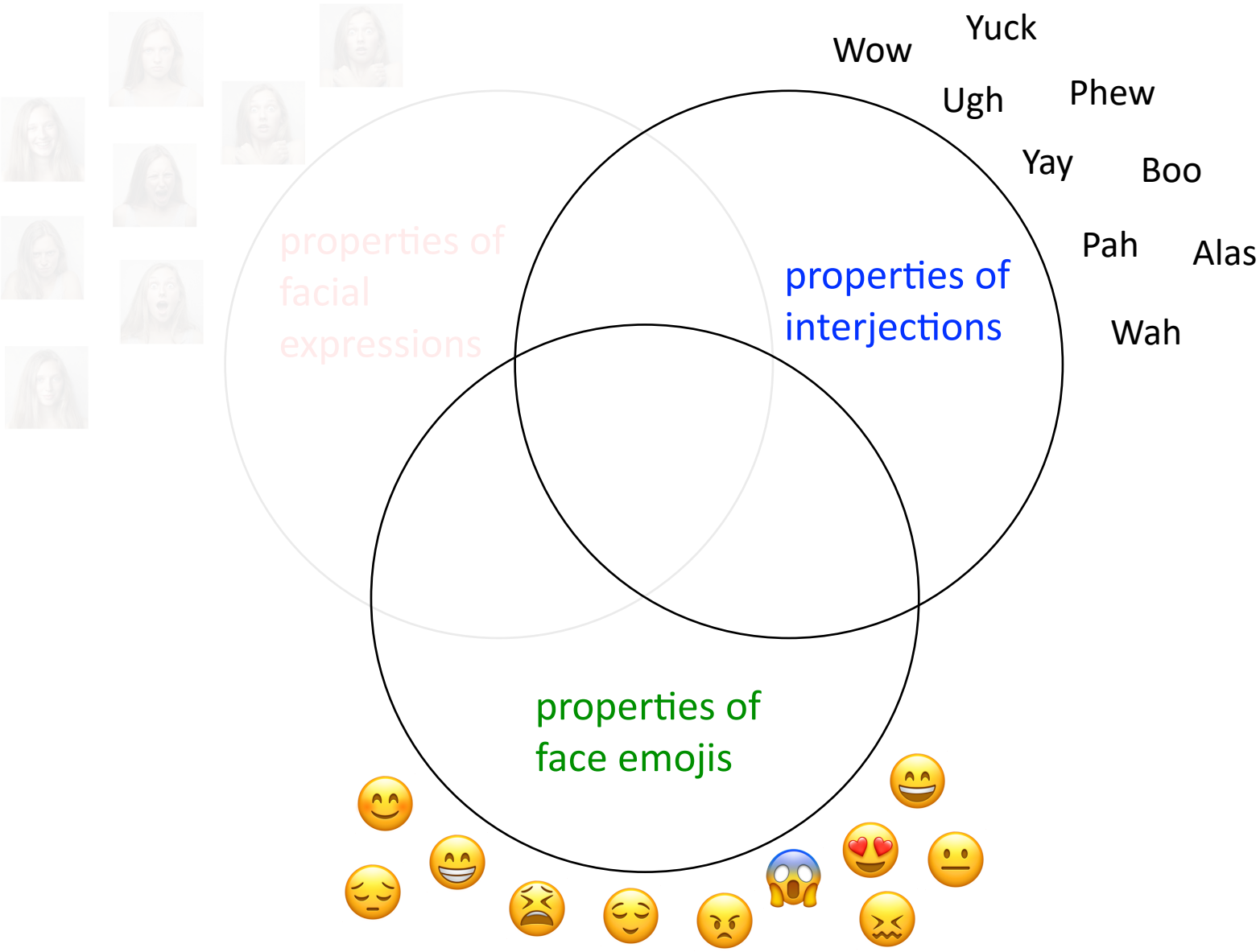
(13) **Ach,** wenn er **doch nur wenigstens** rechtzeitig gekommen wäre!
oh if he DOCH only at.least in.time come were
'Oh, if only he had at least come in time!'

- In what follows, I argue that face emojis can also be analyzed as use-conditional items of this type, e.g., as follows.

(14) $[\![😊]\!]^{w,c} = \lambda p : \text{author}_c \text{ is happy about } p \text{ in } w \,.\, p$

Face emojis as a class of expressives

Zooming in: Face emojis as expressives



Independence (Potts 2007:166, Gutzmann 2013:37)

- Emoji content cannot be denied directly:

(15) a. A: Webster is sleeping 😊

b. B1: No, he isn't.

c. B2: # No, you're not happy about it.

(Modeled after Gutzmann 2013:35, who builds on Jayez & Rossari 2004 and Potts 2007.)

- Emoji content does not affect truth-conditional content:

(16) a. *Context C*: everybody knows that A is happy that it is sunny

b. A: it is sunny ☹

c. emoji content (use conditions): I am unhappy about it **[= false in C]**

d. truth conditions: true iff it is sunny **[= true in C]**

Non-displaceability and immediacy (Potts 2007:166-167)

- Emoji content (here: negative evaluation) cannot be shifted in time or denied from applying to the utterance context.

(17) a. I overslept yesterday 😡

b. **Nondisplaceability of emoji content**

… # But I'm not upset about it now, because I woke up on time today.

c. **Immediacy of emoji content**

… # But I {am not expressing / did not express} negative feelings towards oversleeping.

Perspective dependence (Potts 2007:166)

- The content of expressive emojis is typically interpreted from the author's perspective, but it can shift. (See Kaiser & Grosz 2021.)

(18) abigail brought dessert to emily 😋 ⇝ attitude holder: author

- With psych predicates, the perspective can shift towards an overtly expressed experiencer.

(19) a. richie annoyed adrian 😑 ⇝ attitude holder: Adrian

b. daniel admires aaron 😊 ⇝ attitude holder: Daniel

(see, e.g., Amaral et al. 2007, Harris & Potts 2009, Lasersohn 2005, Kaiser 2015, and Kaiser & Herron Lee 2017, 2018)

Repeatability (Potts 2007:167)

- Face emojis are repeatable elements *par excellence.*

(t20) What did they do? 😡😡😡

(t21) I keep accidentally reacting to ppls IG stories.
They might think I 🤢 like 🤢 them 🤢

(t22) when we were kids my mum always used to make a salad for dinner on Sunday and we'd always be like "where's 😡 the 😡 stew 😡" and now I understand her. [anonymized twitter example]

Caveat: Repeatability has been questioned as a test for expressive content (Gutzmann 2013, McCready 2021).

Descriptive ineffability (Potts 2007:166)

Potts (2007:166): "Speakers are never fully satisfied when they paraphrase expressive content using descriptive, i.e., nonexpressive, terms."

With face emojis, even *expressive words* do not show complete equivalence.

Interjections are the closest counterparts, but they exhibit distributional differences, e.g., they can't freely occur with questions:

(t23) a. Did you miss me? 😁

b. What did you buy? 😁

(24) a. # Did you miss me, yay? / # Yay, did you miss me?

b. # What did you buy, yay? / # Yay, what did you buy?

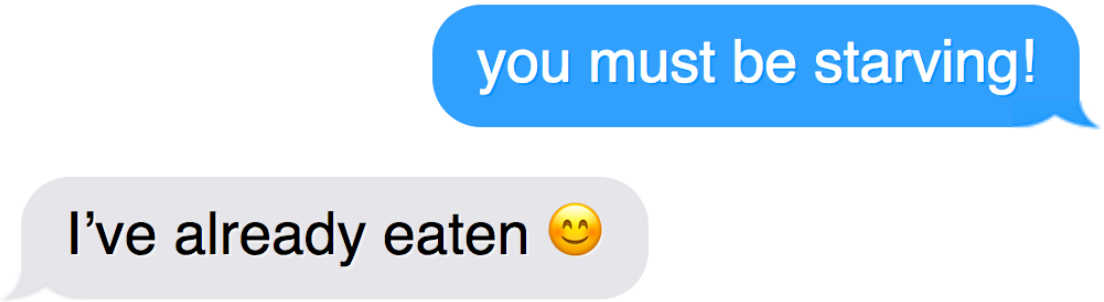
Caveat: descriptive ineffability is another property of expressives that has frequently been challenged (see, e.g., Geurts 2007:211, Gutzmann 2013:42).

Outline of a semantics of face emojis

A Semantics of Face Emojis

- Grosz, Greenberg, De Leon & Kaiser (to appear) [GGDK]:

(25) a.

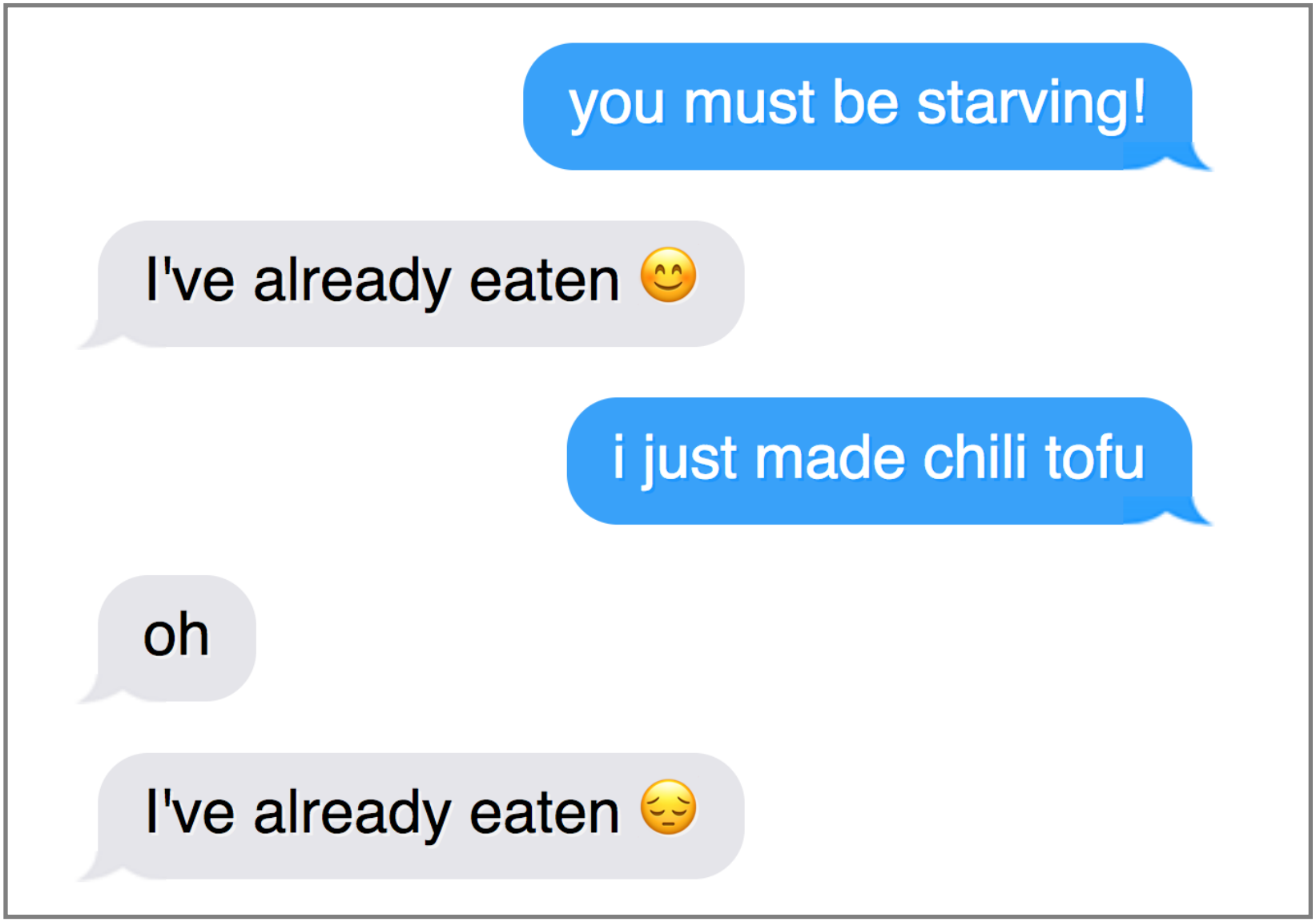


b. For any author x and target p:
⟦😊⟧ = λxλp . {w | x is happy about p in w}

c. p = the author has already eaten

first attempt

But … context matters

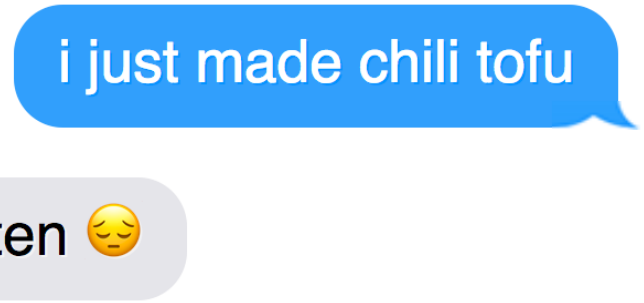


Same Situation – Different Emoji

- **One central insight:** face emoji with contradictory valence (😔 vs. 😊) can be used in the same situation.

  GGDK: incorporate context via a discourse value V (a state of affairs that the author desires, aspires to, wishes for, or hopes for)

(26) a.



b. For any author x, target p, and value V:

   ⟦😔⟧ = λxλpλV . {w | x is unhappy about **how p bears on V** at w}

c. **V =** the author eats chili tofu

d. p = the author has already eaten

e. p entails ~V

second attempt

Evidence for text-emoji interaction I

- Also from GGDK: Ordering effects indicate text-emoji interaction.

Emojis locally comment on immediately preceding propositions:

(27) a. OK I'm really hungry 😟 just ordered some food.
b. # I'm really hungry, just ordered some food. 😟

(28) a. OK I'm really hungry, just ordered some food. 😀
b. # just ordered some food, I'm really hungry. 😀

⇒ not predicted if the emoji just communicated general happiness (😀) or unhappiness (😟) in the situation, as the facts don't change.

(examples from Grosz, Greenberg, De Leon & Kaiser 2021:11-13)

Evidence for text-emoji interaction II

- Also from GGDK: framing effects (see, e.g., Tversky & Kahneman 1981)

(29) Context: we're watching college football; there are no ties; not winning equals losing. We know that our current chances are 50:50

a. OK There's a 50% chance we'll **win**. 😀
b. # There's **only** a 50% chance we'll **win**. 😀
c. OK There's a 50% chance we'll **lose**. 😟
d. # There's **only** a 50% chance we'll **lose**. 😟

e. # There's a 50% chance we'll **win**. 😟
f. OK There's **only** a 50% chance we'll **win**. 😟
g. # There's a 50% chance we'll **lose**. 😀
h. OK There's **only** a 50% chance we'll **lose**. 😀

Case I: *only* switches OK to #

Digest:
Emojis are sensitive to linguistic material.

Case II: *only* switches # to OK

(examples from Grosz, Greenberg, De Leon & Kaiser 2021:13-14)

Commenting on propositions in context

- **Summarizing what we know:** Face emojis comment on a proposition *p* which they access through an anaphoric relation.
- They evaluate *p* in light of a contextually given value *V*.

unhappy face emoji addresses: does *p* demote my value *V*?

(30) a. I've already eaten 😔 (**p** = the author has already eaten)

b. **V** = the author eats chili tofu **p entails ¬V**

c. ⟦😔⟧ = λxλpλV . {w | x is unhappy about how **p** bears on V at w}

happy face emoji addresses: does *p* promote my value *V*?

(31) a. I've already eaten 😊 (**p** = the author has already eaten)

b. **V** = the author has eaten **p entails V**

c. ⟦😊⟧ = λxλpλV . {w | x is happy about how **p** bears on V at w}

Face emojis can comment on propositions other than what is asserted

(32) *face emoji targets a presupposition* (Grosz, Greenberg, De Leon & Kaiser 2021:10)

Who drank my coffee? 😟

⇝ I'm unhappy that p = somebody drank my coffee

(33) *face emojis targets an expected answer*

a. Isn't there some vegetarian restaurant around here? 😀

⇝ I'm happy that p = there (plausibly) **is** a vegetarian restaurant around here

b. Is there no vegetarian restaurant around here? 😟

⇝ I'm unhappy that p = there (plausibly) **is no** vegetarian restaurant around here

(example from Büring & Gunlogson 2000, based on Ladd 1981, see Krifka 2017; for further discussion, see Romero & Han 2004, Romero 2006)

Linking Emojis to Imperatives

How do emojis cue a certain speech act?

- Compare the disambiguating effects to the Emojipedia descriptions:

(34) a. call me 😠 (≈ you must call me) **COMMAND/WARNING**

b. ⇝ "Conveys varying degrees of anger, from grumpiness and irritation to disgust and outrage. May also represent someone acting tough or being mean."

(35) a. call me 😢 (≈ please call me) **REQUEST**

b. ⇝ "May convey a moderate degree of sadness or pain, usually less intensely than 😭 Loudly Crying Face."

(36) a. call me ☺️ (≈ go ahead and call me) **PERMISSION/INVITATION**

b. ⇝ "Conveys a wide range of warm, positive feelings, including love, happiness, and gratitude."

(37) a. call me 🙄 (≈ okay, call me if you must) **CONCESSIVE**

b. ⇝ "commonly conveys moderate disdain, disapproval, frustration, or boredom. Tone varies, including playful, sassy, resentful, and sarcastic, as if saying *Yeah, whatever*."

What do the face emojis comment on?

- Intuitively and pre-formally, emojis can comment on three targets:

(38) a. call me 😠 (disambiguates towards **COMMAND/WARNING**)

b. ⇝ *sp (= speaker)* is angry at *ad (= addressee)*

c. ⇝ *sp* is angry at the cause for [*sp wants ad to call sp*]

d. ⇝ *sp* is angry at the non-realization of [*ad calls sp*]

(In some contexts, (38b) and (38c) may be indistinguishable, but this is not universal, as we see on the next slide.)

Outline of a cue based explanation:

an angry face acts as a cue for a COMMAND/WARNING by eliminating two competing readings: REQUESTS nor PERMISSIONS/INVITATIONS are implausible in a situation in which a speaker is angry at one of the targets in (38b-d).

What is the status of these targets?

- Addressee-oriented readings, (38b), are generally available for face emojis (see also Maier 2021).
- As for (38d), the non-realization of the property expressed by the imperatives is a plausible condition for a non-trivial use of the utterance (see, e.g., Searle 1969:66; Lindner 1991:187).

cf. Searle's (1969:66) second preparatory condition for *Request*: "It is not obvious to both *S* and *H* that *H* will do *A* in the normal course of events of his own accord."

- The inference in (38c) may require further inferencing, in the sense that wishes/desires are often motivated by superordinate goals.

(38) a. call me 😠 (disambiguates towards **COMMAND/WARNING**)

b. ⇝ *sp (= speaker)* is angry at *ad (= addressee)*

c. ⇝ *sp* is angry at the cause for [*sp wants ad to call sp*]

d. ⇝ *sp* is angry at the non-realization of [*ad calls sp*]

- Not all face emojis have the same target.

  However, it is plausible that the same logic turns them into cues.

(39) a. call me ☺️ (disambiguates towards **PERMISSION/INVITATION**)

b. ⇝ *sp* feels positively wrt *ad*

c. ⇝ *sp* feels positively wrt the cause for [*sp wants ad to call sp*]

d. (#) ≠ *sp* feels positively wrt the non-realization of [*ad calls sp*]

(40) a. call me 😢 (disambiguates towards **REQUEST**)

b. (?) ≠ *sp* feels sad for *ad*

c. ⇝ *sp* feels sad about the cause for [*sp wants ad to call sp*]

d. ⇝ *sp* feels sad about the non-realization of [*ad calls sp*]

(41) a. call me 🙄 (disambiguates towards **CONCESSIVE**)

b. ⇝ *sp* disapproves of *ad*

c. ⇝ *sp* disapproves of the cause for [*sp wants*[?] *ad to call sp*]

d. (#) ≠ *sp* disapproves of the non-realization of [*ad calls sp*]

Conclusion

What do we know about illocutionary functions of face emojis?

- Face emojis (☺️, 😢, 😠, 🙄) can disambiguate speech acts, as illustrated for imperatives.
- They share this property with natural language expressions that communicate use-conditional non-at-issue meaning (e.g., *Boy, did we love them!*)
- Face emojis can be argued to contribute an expressive meaning similar to what such natural language expressions convey.
- Their interactions with speech acts can thus be explained by modeling them as speech act cues.

Open question:

Facial expressions can directly encode speech acts (see, e.g. Kuhn & Chemla 2017); is there *potential* for face emojis to also encode, e.g., assertion vs. question acts? (“spinach 😀” vs. “spinach 🤔”)

Thank you! 🙏

Collaborators

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Comments on Grosz 2022: "Speech acts, interjections and emojis: Revisiting communicative cues"

Jeremy Kuhn
Insitut Jean Nicod (ENS, CNRS, EHESS)

May 20, 2022

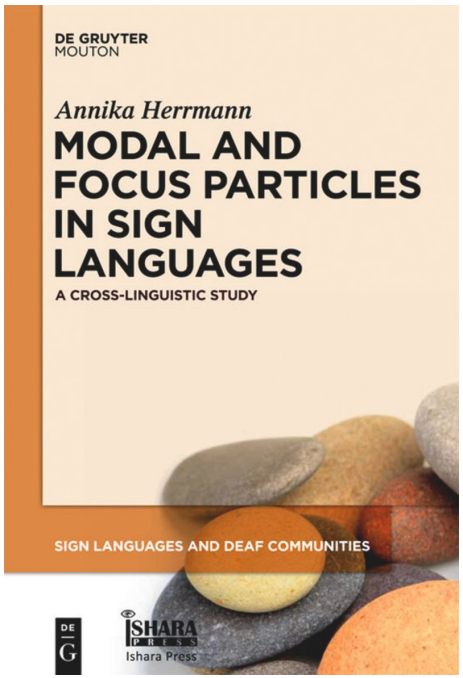
Section 1

Multidimensional meaning in a multidimensional form

Expressives

"Face emojis as expressives"

- English interjections (*yay*, *alas*, *wow*)
- German discourse particles (*doch*, *wohl*, *ja*, *nur*)



- How communicate discourse-related meanings in DGS, NGT, ISL?
- Conclusion for discourse particles ... is that there are none.
- Rather, use non-manual markers.
- One notable finding: similar non-manuals recur across these unrelated languages.
  - (E.g. eye-squint for shared knowledge.)

Expressives

Hypothesis: there is a linguistic pressure to employ multidimensional form to express multidimensional meaning.

- Even when grammaticalized, constructions with a multi-dimensional, non-interactive semantics more likely to have a non-interactive syntax with fewer pressures on linearization?
- = A good characterization of particles?

(Kuhn 2017, Review of Herrmann 2013, *Sign Language & Linguistics*)

Section 2

Encoding vs. cuing speech acts

Imperatives

"One area where face emojis seem to have a clear illocutionary effect is in connection with imperatives."

Brentari et al. (2018). Production and Comprehension of Prosodic Markers in Sign Language Imperatives. *Frontiers in Psychology*.

- Command, Explanation, Permission, Advice
- Signers of ASL

  vs.

  American non-signers, Signers of DGS, German non-signers
- *Finding:* All subject groups can deduce imperative type, with boost for ASL signers.

Imperatives

Question:

- Something special about imperatives (compared to indicatives, questions)?
- Or just a quirk of the literature that imperatives have been looked at in detail?
- E.g. Are these ever encoded by grammatical markers?

Motivation to test even coarser speech-act categories.

(Kuhn & Chemla 2017, Facial expressions and speech acts in non-signers)

Facial expressions

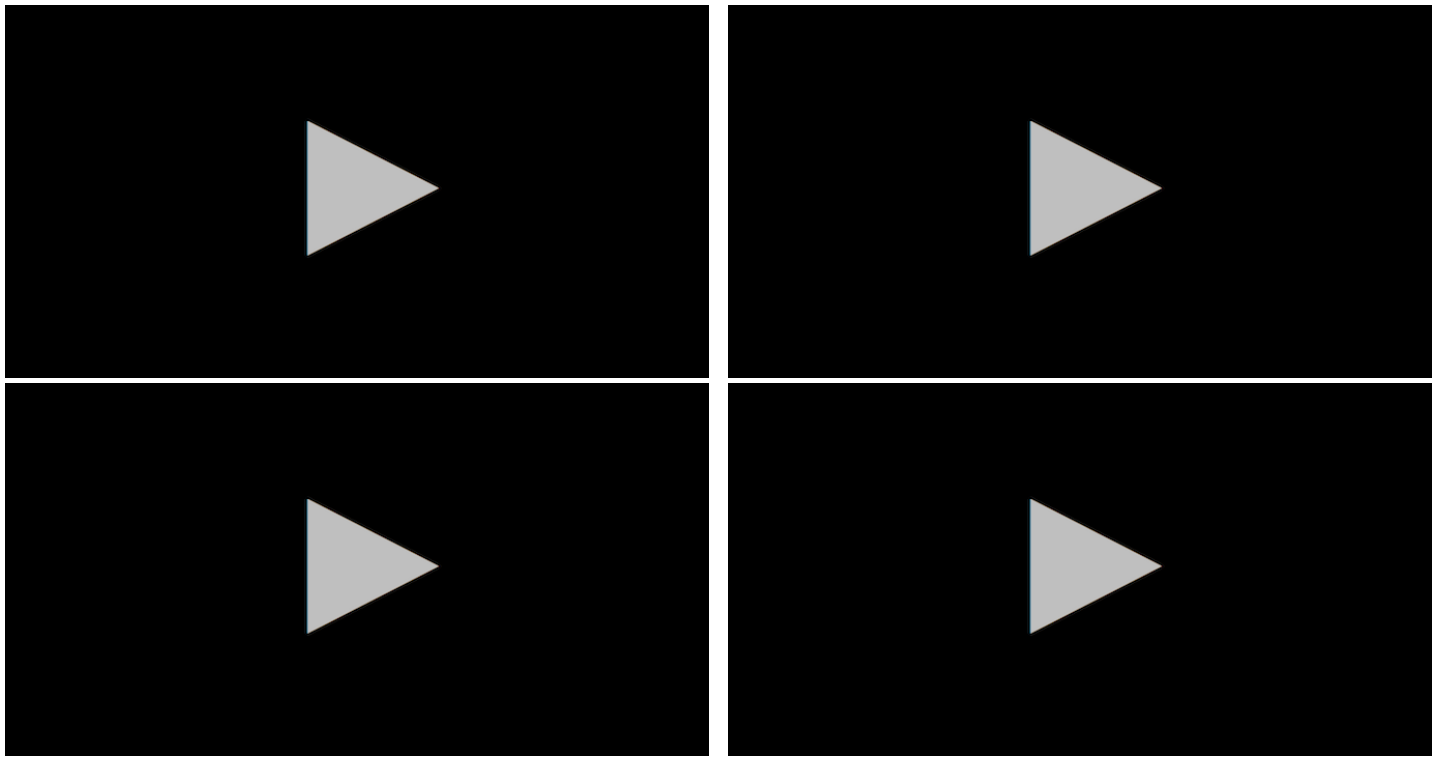
In sign language, facial expressions can serve grammatical functions.

- headshake = negation
- brow raise = yes/no questions
- brow furrow = wh-questions
- ...

Question: Are such facial expressions used to indicate the kind of speech acts in spoken language, too?

- "indicate" = encode? cue?

Facial expressions and speech acts



Choose the meaning:

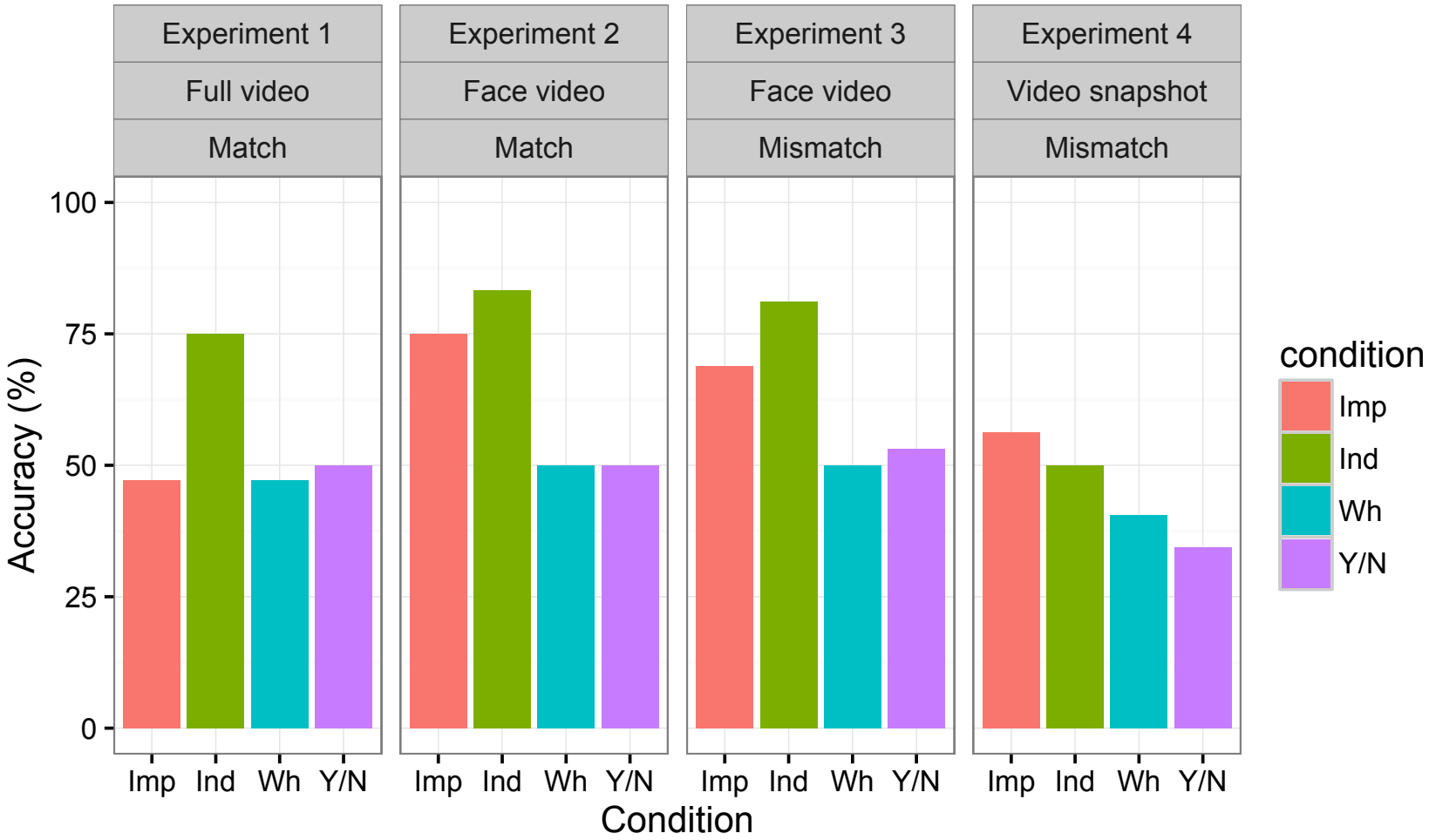
What time is it?

It will take some time.

Are you keeping track of time?

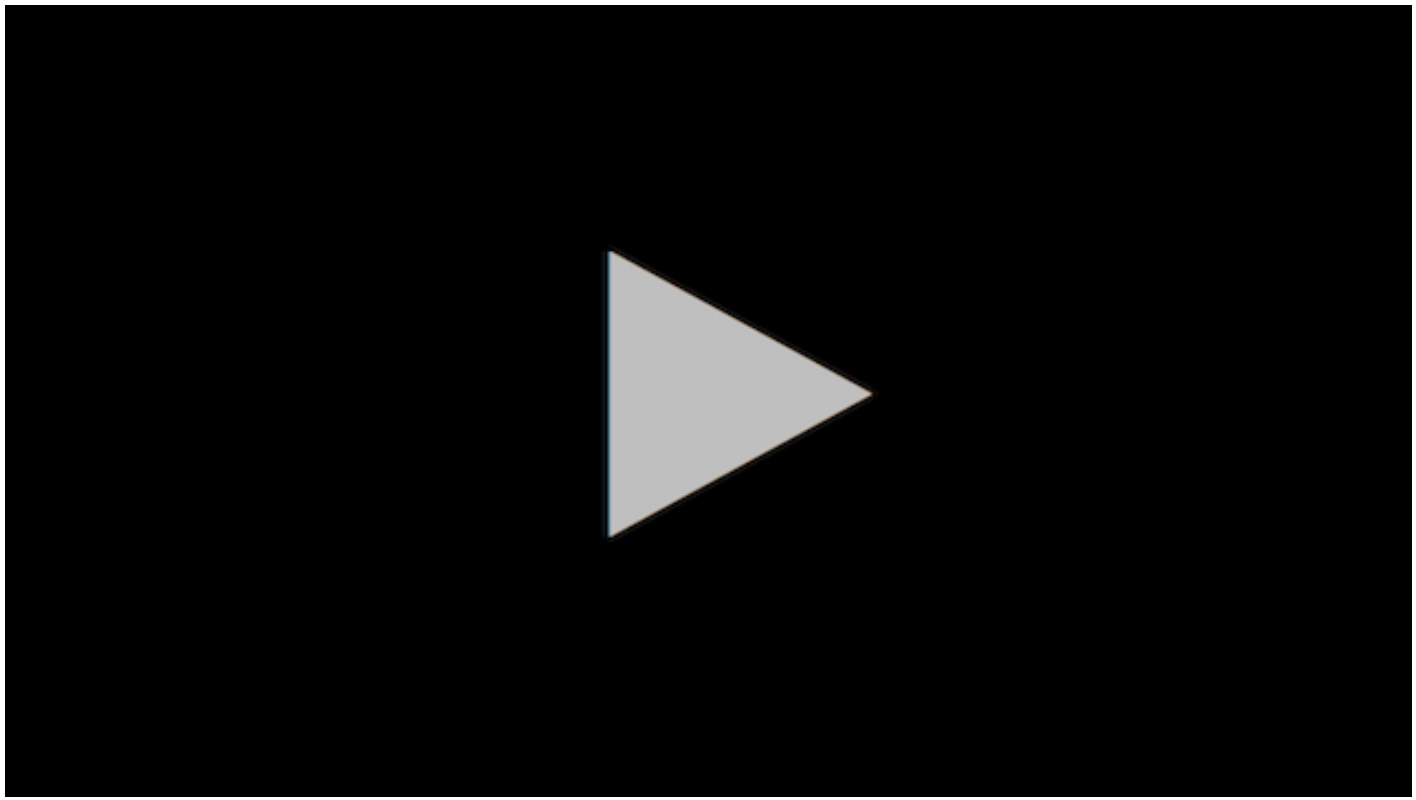
Stop now!

Facial expressions and speech acts



Facial expressions and speech acts

What if they mismatch?



Facial expressions and speech acts

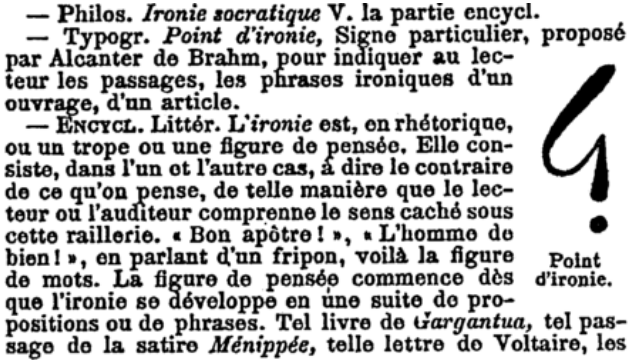
- "Facial expressions can directly encode speech acts (see, e.g. Kuhn & Chemla 2017); is there potential for face emojis to also encode, e.g., assertion vs. question acts?"
- "None of these markers encode optativity; they simply serve as cues for optativity."
- "Face emojis can comment on propositions other than what is asserted"

Section 3

Irony and contradictory cues

Irony

- The idea of special punctuation for irony goes back to at least the 16th or 17th century.
- Recent variations in online communication.



— Philos. *Ironie socratique* V. la partie encycl.
— Typogr. *Point d'ironie,* Signe particulier, proposé par Alcanter de Brahm, pour indiquer au lecteur les passages, les phrases ironiques d'un ouvrage, d'un article.
— Encycl. Littér. L'*ironie* est, en rhétorique, ou un trope ou une figure de pensée. Elle consiste, dans l'un et l'autre cas, à dire le contraire de ce qu'on pense, de telle manière que le lecteur ou l'auditeur comprenne le sens caché sous cette raillerie. « Bon apôtre ! », « L'homme de bien ! », en parlant d'un fripon, voilà la figure de mots. La figure de pensée commence dès que l'ironie se développe en une suite de propositions ou de phrases. Tel livre de *Gargantua,* tel passage de la satire *Ménippée,* telle lettre de Voltaire, les

Point d'ironie.

(1) a. What a productive meeting </sarcasm>
b. What a productive meeting ;)
c. ∼What a productive meeting∼

(2) a. Another dull day in NY </sarcasm>
b. Another dull day in NY ;)
c. ∼Another dull day in NY∼

Irony

Mantovan et al. (2019). Signing something while meaning its opposite: The expression of irony in Italian Sign Language (LIS). *Journal of Pragmatics*.

What markers of irony in LIS?

- *Lexical sign:* CIRCLE
- *Prosodic cues:* prolonged articulation, multiple head nods, lateral head tilts, raised eyebrows
  - Not specific to irony

Irony

- Also: *Contradictory* facial expressions

Irony

What a productive meeting 😡

Another dull day in New York 🤩

Irony

- Another example of 'cues'
- Irony $\neq$ primitive?
- More general question:
  - Lexical primitives?
  - Cognitive primitives?

Section 4

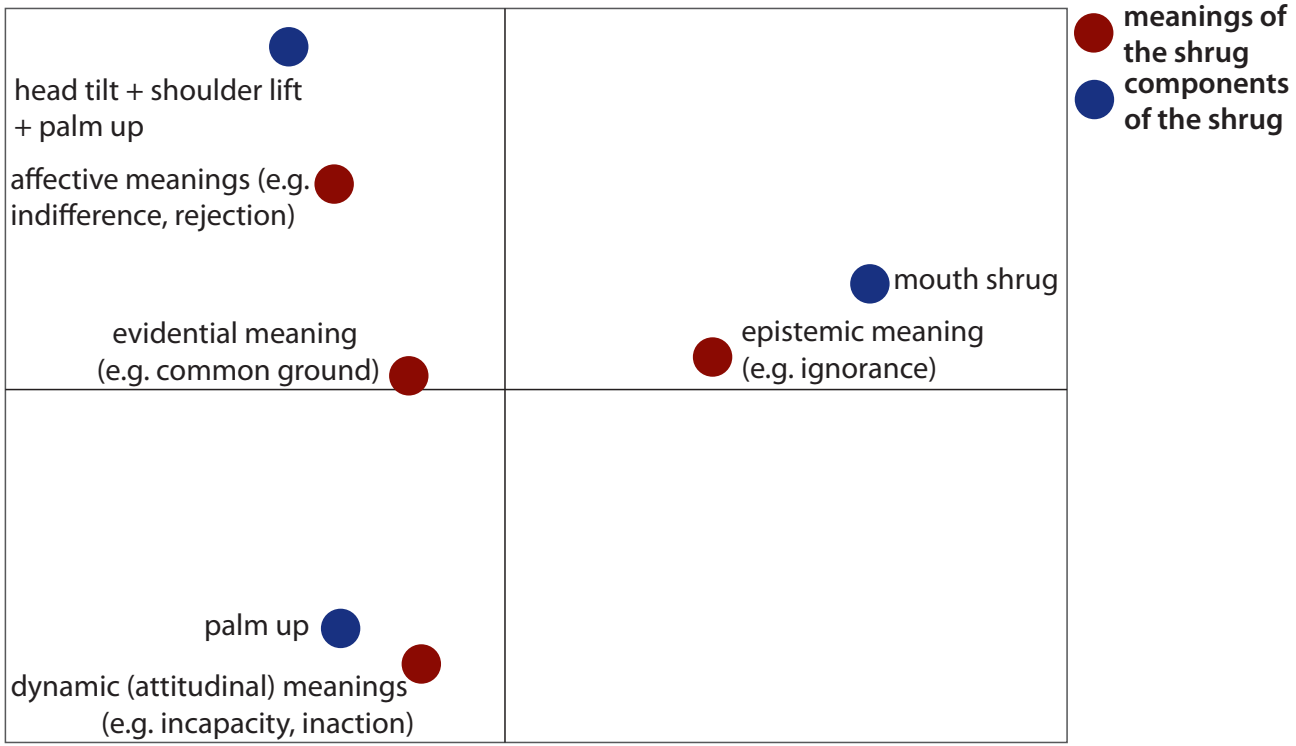
Epistemic knowledge

Epistemic knowledge

Epistemic knowledge

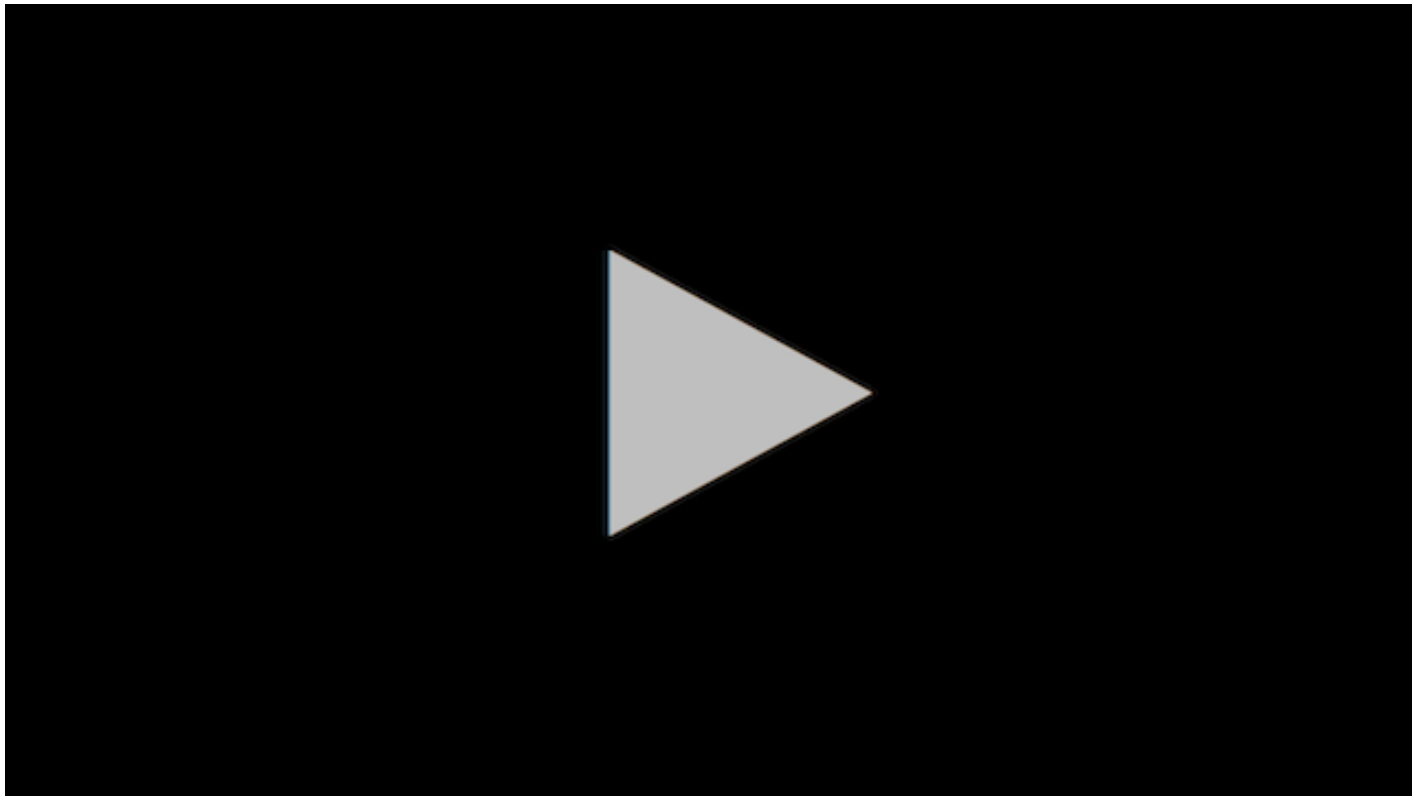
Debras (2017). The Shrug. *Gesture*.

- Speakers of British English



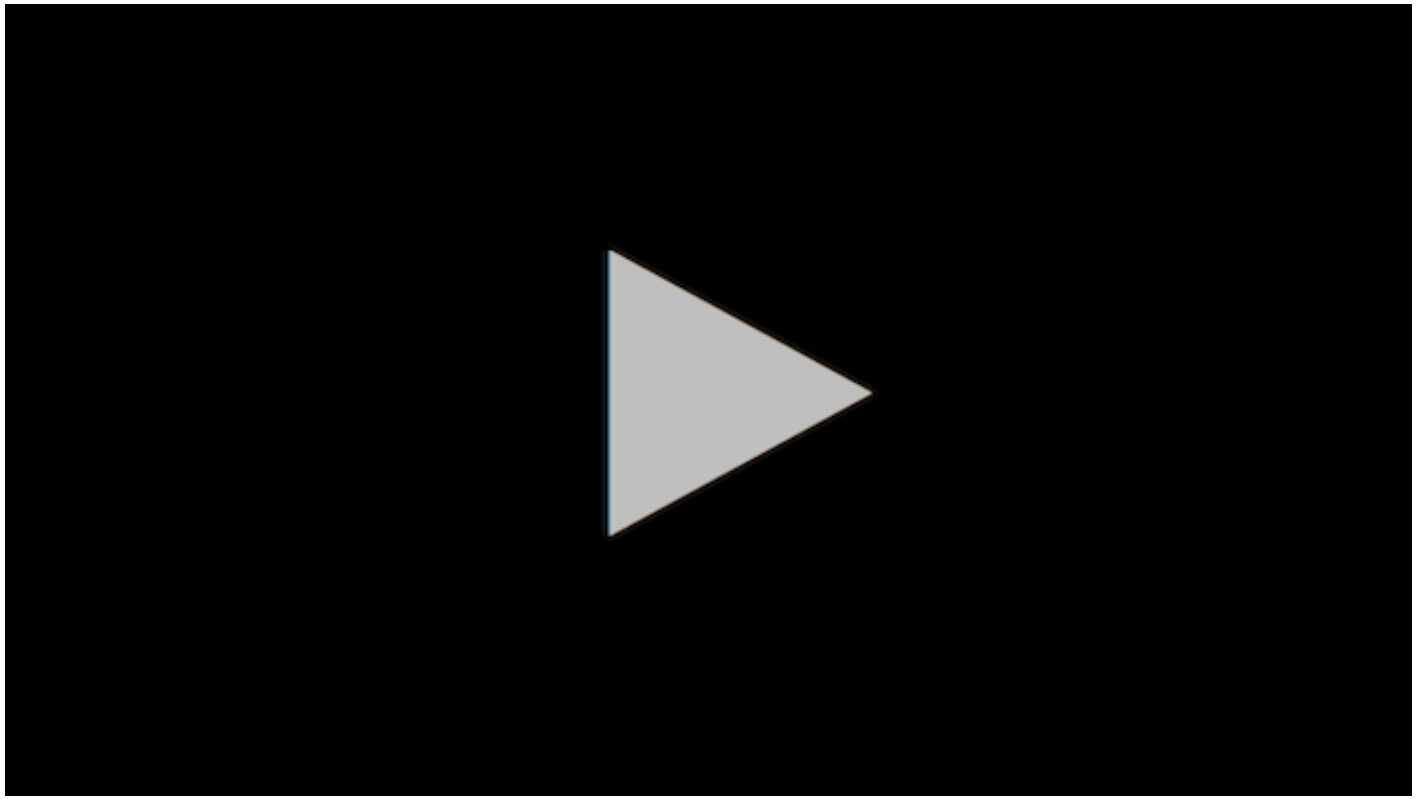
- Kuhn, Geraci, Mantovan. "Low referentiality in LSF and LIS."

Epistemic knowledge: Frown :-(



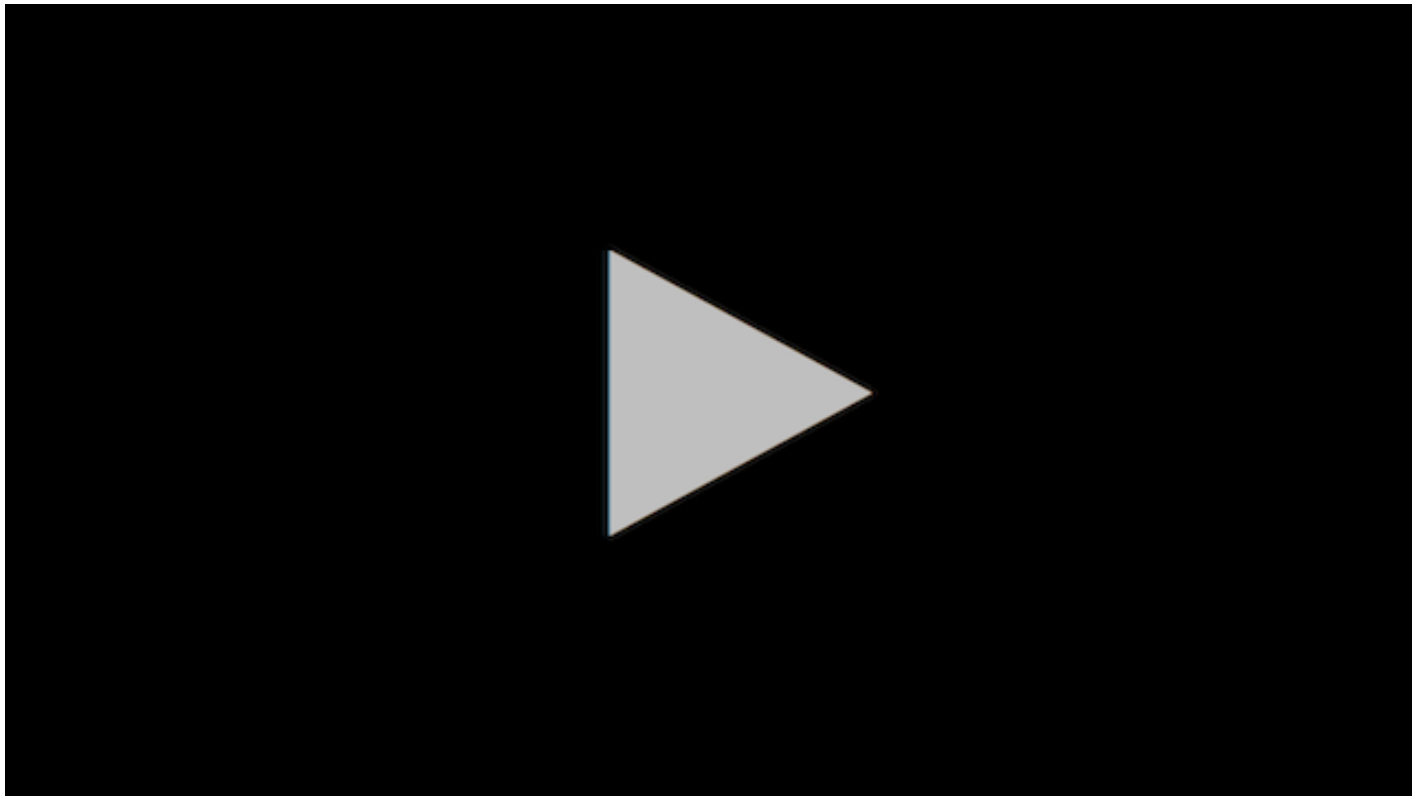
(3) :-(
{SOMEONE/CL-PERSON} HOUSE POSS-1 ENTER. (LIS)
The signer does not know the identity of the referent.

Epistemic knowledge: eyegaze



(4) $\overline{\{\text{SOMEONE/CL-PERSON}\}}^{\text{gaze}}$ ENTER POSS-1 HOUSE. (LSF)
The signer has a particular person in mind.

Epistemic knowledge: :-(+ eyegaze



(5) SEE $\overset{\text{:-(+ gaze}}{\text{CL-PERSON}}$. ‘I saw someone.’
The signer has a particular person in mind, but does not know their identity.

Epistemic knowledge

(6) Diese Murmeln haben unter den Kindern
These marbles have among the children
untereinander irgendeinen bestimmten Wert,
among-each-other irgendein bestimmt value
Glasmurmeln zum Beispiel die Werte von zwei
glass-marbles for example the values of two
einfachen Murmeln.
simple marbles
'These marbles have certain values among the children, marbles made of glass, for example, have the same value as two simple marbles.'

(Ebert et al. 2009)