



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

Lying about where the treasure lies: Pragmatic cues to deception in production and comprehension

Citation for published version:

Loy, J, Rohde, H & Corley, M 2016, 'Lying about where the treasure lies: Pragmatic cues to deception in production and comprehension', 22nd AMLaP conference, Architectures and Mechanisms for Language Processing. Bilbao, Spain, Spain, 1/01/16.

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Other version

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.



Introduction

Research on deception shows that: (a) **speakers** produce *verbal and nonverbal cues* that signal deceit when lying, and (b) **listeners** attend to certain cues when attempting to recognise deceit.

Are the cues that **listeners** rely on in **perceiving deception** the same as those **speakers produce** when **lying**?

Previous work on deception

Behavioural cues to deception

1. *Pitch variation* due to various emotions associated with deception (the *emotional hypothesis* [1])
2. Increased *speech disturbances* due to greater mental load (the *cognitive hypothesis* [2])
3. *Rigid or unnatural behaviour* due to increased effort to mask deception (the *attempted control hypothesis*) [3]
4. Cue behaviour may be *more pronounced* when **speaker's motivation** increases—the *Motivational Impairment Effect* [4]

Limitations

- ▶ Inconsistencies across studies often lead to *conflicting results* e.g., [2] and [3]
- ▶ **Production studies** tend to employ *cued lying paradigms*
- ▶ **Perception studies** tend to rely on *post-hoc judgements*
- ▶ Studies frequently overlook the *interactive* component of deception

Current study

Investigate the **production** and **perception** of *verbal and nonverbal cues* to deception in an *interactive*, two-person dialogue game.

Motivations for design

- ▶ **Speakers** given *free choice* to lie or tell the truth
- ▶ **Listeners** judge speakers' utterances in *real time*
- ▶ Interactive element of task adds *ecological validity* to findings

Experiment



Participants

- ▶ 24 same-sex, native British English speaking dyads
- Two roles: **Speaker** (liar) and **Guesser** (lie detector)

Stimuli

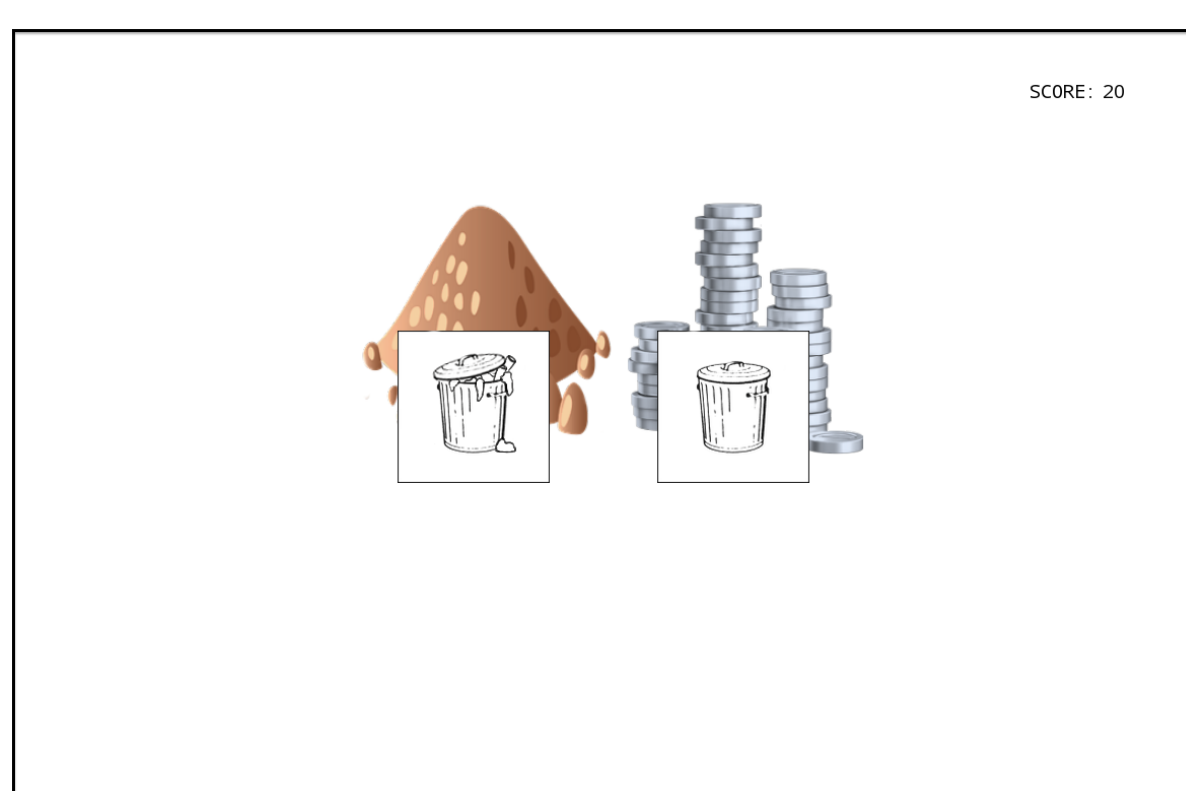
- ▶ Visually-related object pairs
- ▶ *Motivation manipulation*: Gold coins (20 points) and silver coins (5 points)

Design

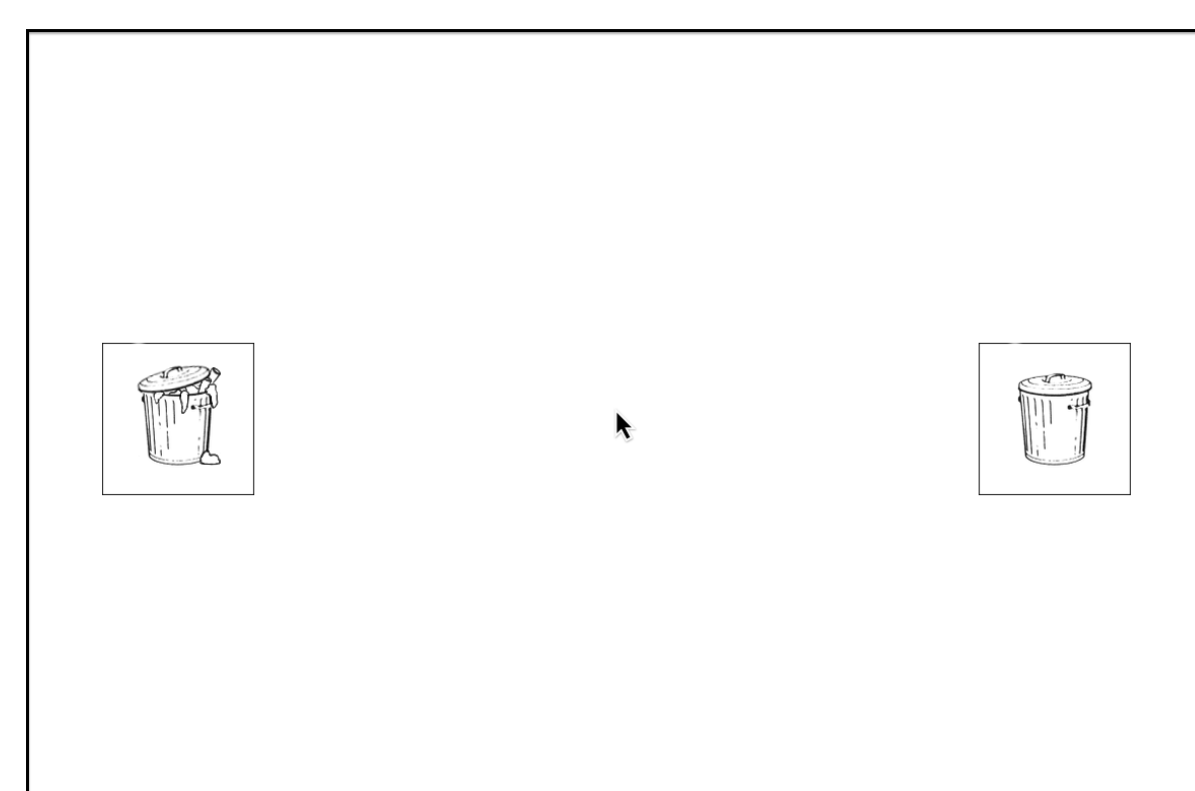
- ▶ 48 trials; 8 lists
- ▶ Objects counterbalanced for *role* (treasure/non-treasure image), *position* (treasure on left/right) and *motivation to lie* (gold/silver coins)

An example trial:

Speaker's perspective



Guesser's perspective



Task

- ▶ **Speakers** specified an object as the one concealing the treasure
- ▶ **Guessers** clicked on object with the aim to *find the treasure*
- ▶ Players awarded points for treasure retained (**Speakers**) or found (**Guessers**)
- Winner received £1 cash reward

Analysis

Verbal cues

Filled pauses	behind <i>um</i> the peeled banana
Silent pauses	behind the (.32) taller house
False start	the money is <i>th-</i> behind the one...
Repetitions	behind <i>the-</i> the cut cake
Prolongations	behind <i>thee</i> broken fence
Substitutions	behind the <i>shorter-</i> lower roof
Insertions	behind the open- <i>more</i> open book
Other speech errors	behind the squashed <i>turtoise-</i> tortoise
Silent pause dur	Total silence across utterance
Onset latency	Time taken to initiate utterance
Speech rate	Syllables per second

Nonverbal cues

Head movements
Hand movements (illustrator)
Hand movements (adaptor/other)
Eyebrow movements
Lip/mouth movements
Smile/laugh
Body/trunk movements
Shoulder movements
Gaze

Analysis: Linear and logit mixed models with maximal converging by-subject random intercepts and slopes & by-item random intercepts

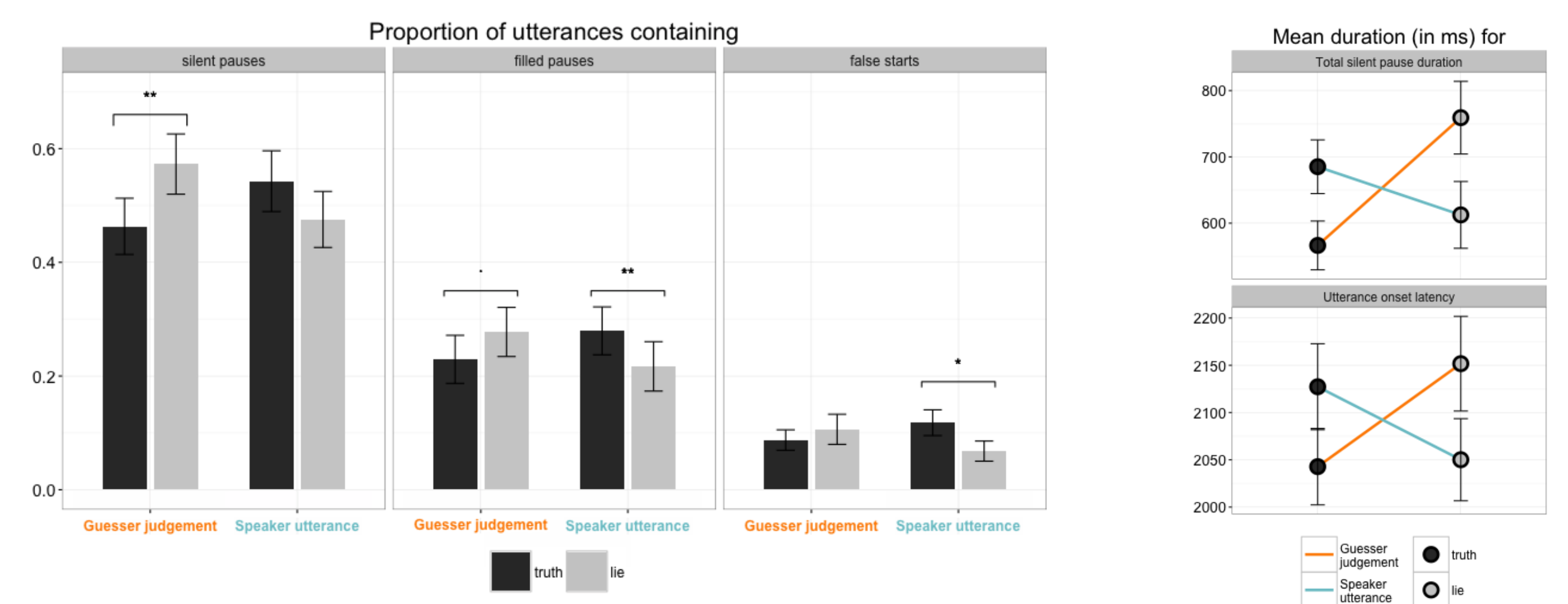
Results: Verbal cues

Guessers

- ▶ More likely to perceive utterances characterised by disfluency as lies
- a) Silent pauses, $p < .01$
- b) Filled pauses, $p = .07$
- c) Silent pause duration, $p < .05$
- d) Onset latency, $p = .08$

Speakers

- ▶ More likely to be disfluent when telling the truth
- a) Filled pauses, $p < .01$
- b) False starts, $p < .05$
- ▶ No effect of motivation on any verbal cues



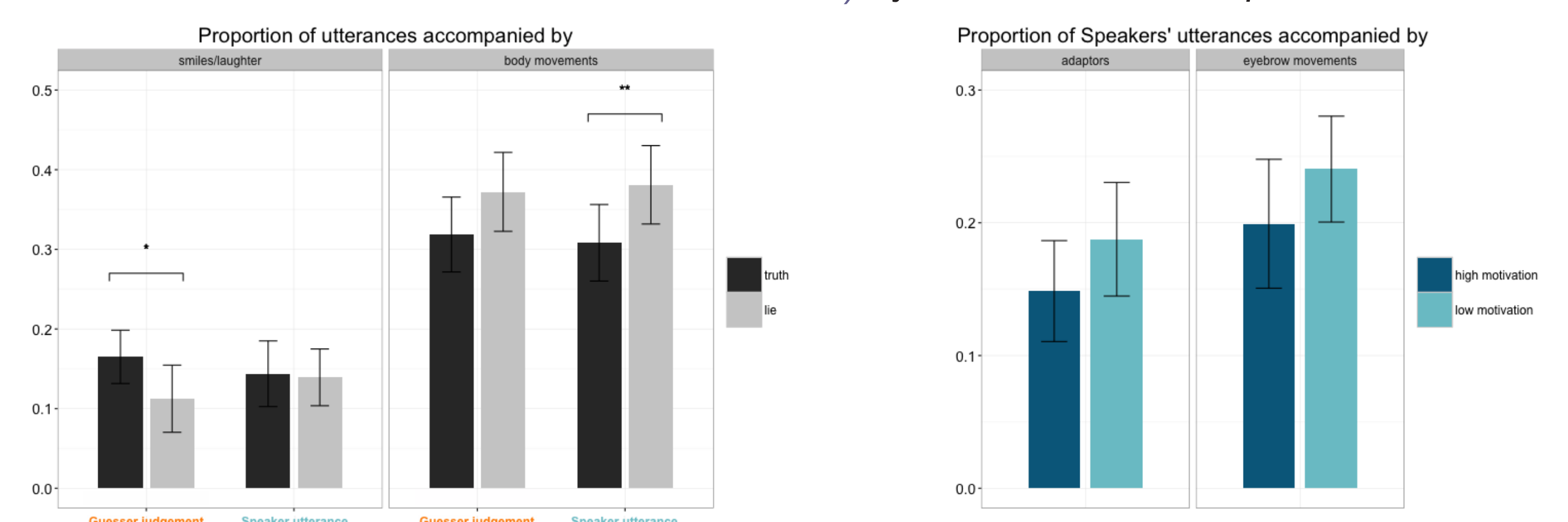
Results: Nonverbal cues

Guessers

- ▶ More likely to perceive utterances characterised by smiling/laughter as truthful, $p < .05$

Speakers

- ▶ More likely to produce body movements when lying, $p < .01$
- ▶ Lower motivation associated with an increase in
- a) Adaptors, $p < .05$
- b) Eyebrow movements, $p = .05$



Conclusions

1. There appears to be a *disconnect* between **Guessers' perception** and **Speakers' production** of behavioural cues to deception
2. **Gs** behaviour suggests expectations based on the **cognitive hypothesis**; **Ss** behaviour supports the **attempted control hypothesis**
3. Verbal behaviours appear *easier to control* than nonverbal (cf. Ekman & Friesen's 'leaky channels')
4. Motivation results do not support the Motivational Impairment Effect
 - May be due to *different operationalisations of motivation* across studies
 - More work would be needed to explore the motivation effect *within speakers*

References

- [1] Vrij, A., Edward, K. & Bull R. (2001). Stereotypical verbal and non-verbal responses while deceiving others, *Personality and social psychology bulletin*, 27(7), 899–909.
- [2] Vrij, A. & Heaven, S. (1999). Vocal and verbal indicators of deception as a function of lie complexity, *Psychology, Crime & Law*, 5(3), 203–215.
- [3] Arciuli, J., Mallard, D. & Villar, G. (2010). "Um, I can tell you're lying": Linguistic markers of deception versus truth-telling in speech, *Applied Psycholinguistics*, 31(3), 397–411.
- [4] DePaulo, B. M., Kirkendol, S. E., Tang, J. & O'Brien, T. P. (1988). The motivational impairment effect in the communication of deception: Replications and extensions, *Journal of nonverbal behaviour*, 12(3), 177–202.