

Variations in explainers' gesture deixis in explanations related to the monitoring of explainees' understanding

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Presented at the Annual Meeting of the Cognitive Science Society 2024, July 24-27, Rotterdam

Background

- Co-speech gestures enhance explainees' (EE) understanding and knowledge about an explanandum (Congdon et al., 2017; Grimminger et al., 2010)
 - via pointing, representing and temporal highlighting (Clark, 2003; McNeill, 2006)
 - in the physical absence of an explanandum (West, 2014).
- Gesturing is idiosyncratic (Bergmann & Kopp, 2009; Priesters & Mittelberg, 2013)
 - varying across different addressees (Holler & Stevens, 2007; Jacobs & Garnham, 2007; Kang et al., 2015).

How is the dimension of gesture deixis in explainers' (EX) explaining behavior related to the monitoring of EEs' understanding?

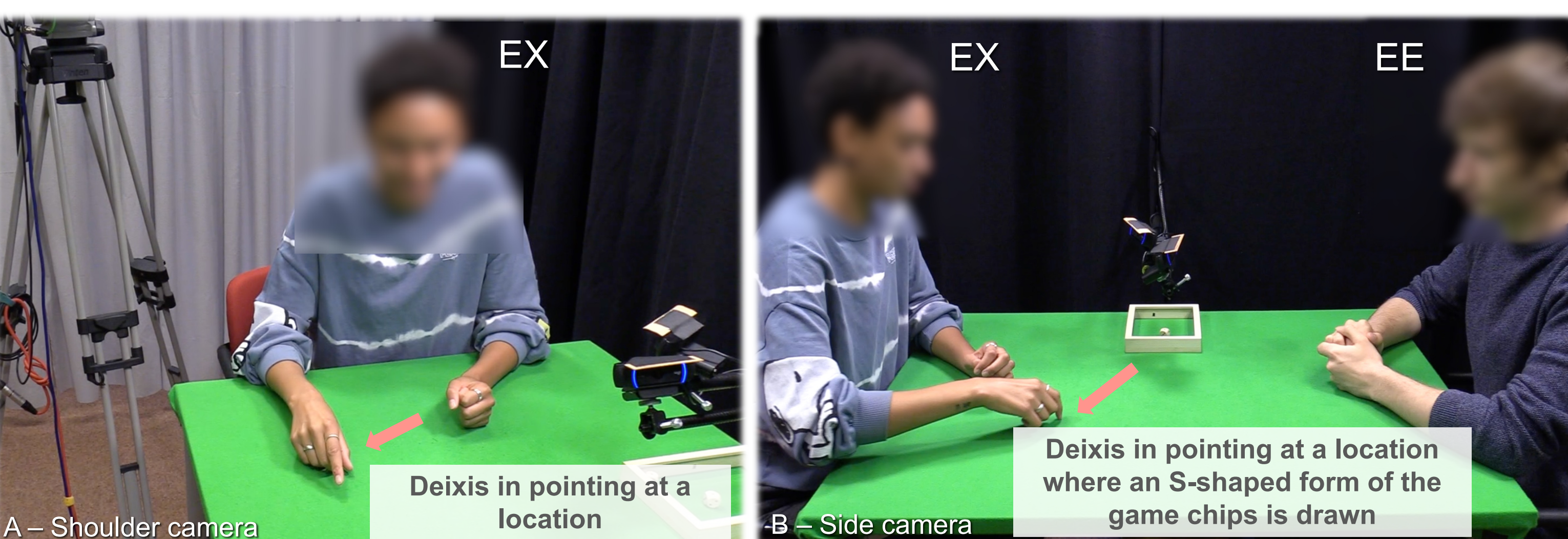


Figure 1. An explainer (EX) explaining a board game to an explainee (EE) while the game is absent.

Methods

- 24 board game explanations; 8 EXs ($M_{Age} = 23.6$, $SD = 3.38$), explaining to 3 different EEs ($M_{Age} = 26.0$, $SD = 9.75$) [Subsample from MUNDEX corpus, Türk et al., 2023];
 - Here: analysis of **game absent phase** ($M_{Duration} = 07:04$ min, $SD = 03:44$ min); phases not considered in the study: game present & game play;
- Annotations of EXs' gesture deixis (Figure 1) and interpretations about EEs' different levels of understanding at various moments (understanding, partial understanding, non-understanding and misunderstanding);
- Analysis: GLMM, fitting non-normal distribution;

effect	<i>M</i>	<i>SD</i>	<i>Est.</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>EM SE</i>	
U (int.)	46.19	32.59	3.95	0.14	27.59	***	Estimated means	3.95 0.14
PU	38.0	23.69	-0.33	0.06	-5.83	***		3.62 0.14
NU	61.36	44.94	0.05	0.05	0.97	ns		4.00 0.14
MU	27.28	26.48	-0.67	0.09	-7.63	***		3.28 0.14

Table 1. Frequency of EXs' gesture deixis related to EXs' interpretations of EEs' understanding, model summary, and estimated means used for pairwise comparisons; U = understanding, PU = partial understanding, NU = non-understanding, MU = misunderstanding.

Research question and Hypothesis 1:

How is gesture deixis used by different EXs related to their interpretations of EEs' understanding?

Following EXs' interpretations of EEs' complete understanding, EXs' gesture deixis decreases while it increases following EXs' interpretations of EEs' partial, non- or misunderstanding.

Research question and Hypothesis 2

Can the relation between EXs' gesture deixis and EX's monitoring of EEs' understanding be explained by exploring EXs' intra-individual gestural behavior during interactions with different EEs?

Gesture deixis of individual EXs varies across interactions with different EEs.

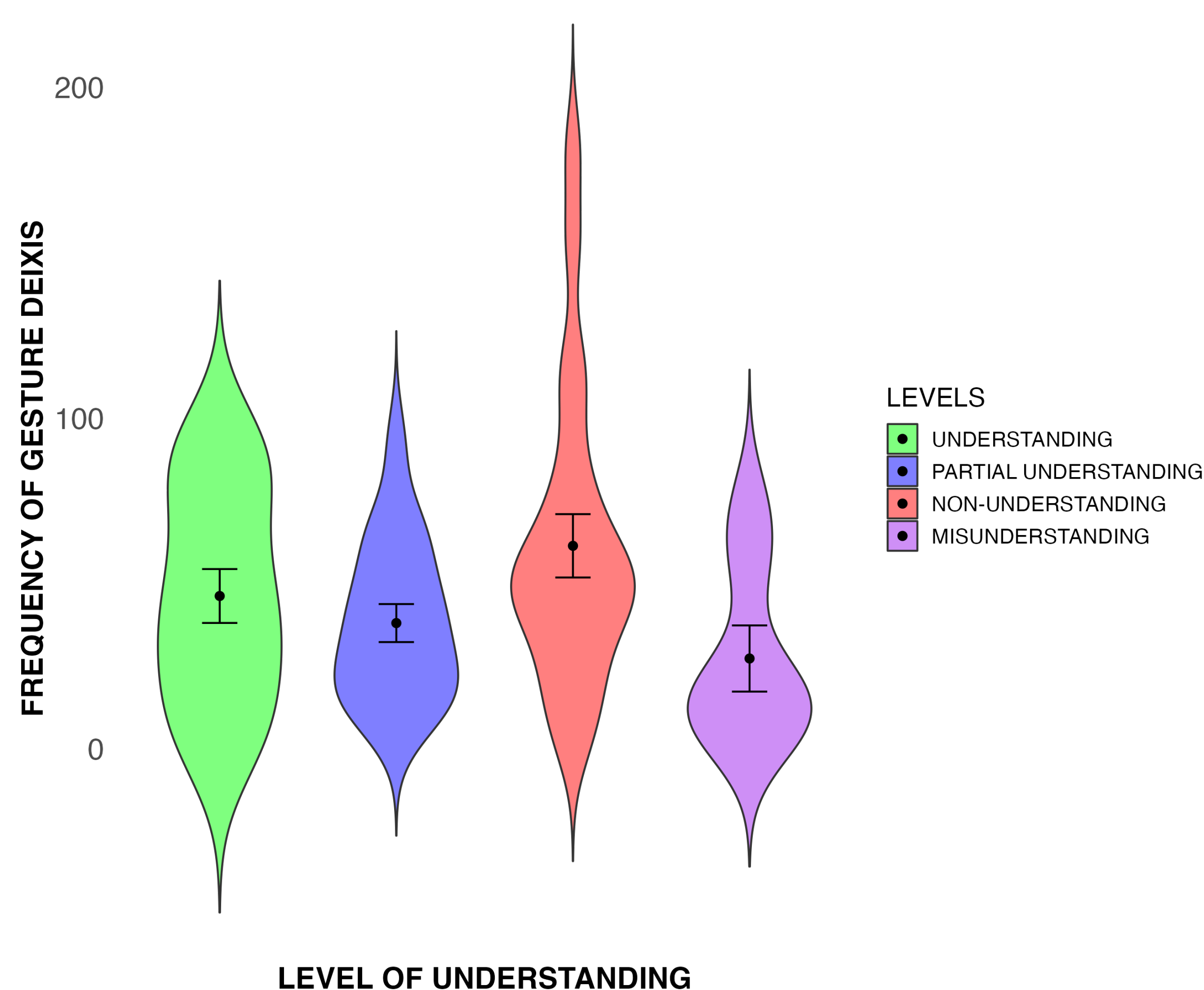


Figure 2. EXs' gesture deixis related to interpretations of EEs' understanding.

Results 1

- No decrease of EXs' gesture deixis in relation to their interpretations of EEs' complete understanding compared to other levels of understanding (Table 1 and Figure 2);
- No significant difference between complete understanding and non-understanding ($p > .05$);
- **Hypothesis 1 could not be verified.**

Results 2

- A high proportional variance based on the fixed & the random effect: conditional $R^2 = 0.943$;
- A greater variance between the EXs when including different EEs ($\sigma^2 = 0.21$, $SD = 0.45$);
- Descriptive results of proportions (Figure 3);
- **Results support hypothesis 2.**

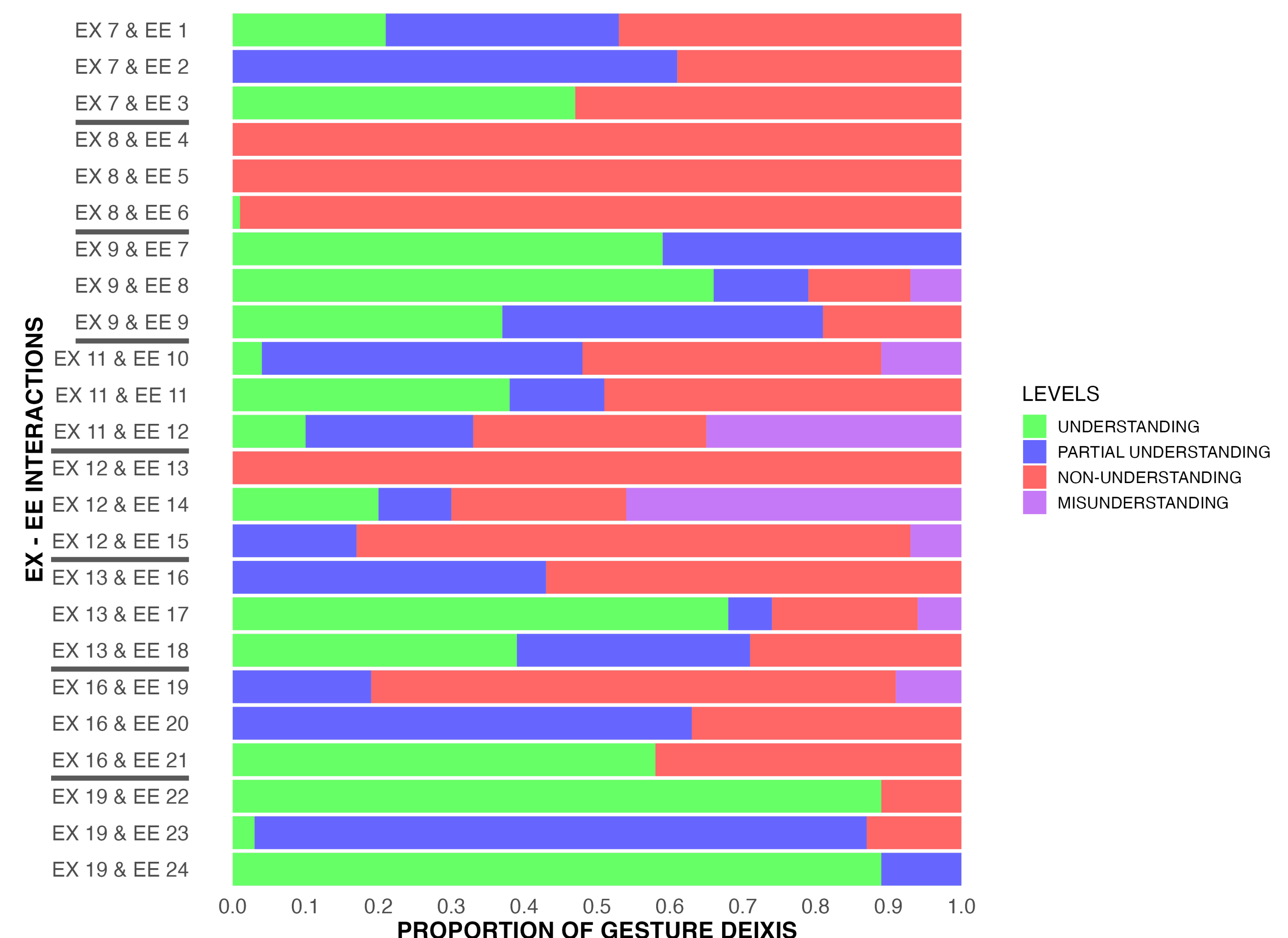


Figure 3. Proportions of EXs' gesture deixis related to interpretations of EEs' understanding.

Discussion

- An increased demand to establish an imagined space by referring to invisible locations & objects because the board game was absent.
 - Awareness of EXs about the knowledge gap between them and the novice EEs;
- The use of gesture deixis by EXs is related not only to the interaction with different EEs but also to EXs' monitoring of EEs' understanding during the interaction.

Future analysis will be extended by

- relating EXs' gesture deixis to interpretations of EEs' understanding within explanation topics (the game rules), and also considering openings / closures of topics and elaborations within topics;
- including of other forms of dynamics: EEs' verbal and non-verbal behavior (linguistic backchannels, gaze behavior and head gestures)

