

Language in Interaction

Common Ground & Perspective-taking

SS16 - (Embodied) Language Comprehension

Maria Staudte

So far ...

- Embodiment
- Situated & embodied language learning
- Situated adult language comprehension (& production)
- Language in Interaction
 - Taking another person into account
 - Sending and perceiving bodily signals

Language in Interaction

- Language is FOR interaction
- Presupposes a listening/speaking partner
- Do we process language egoistically? Or with consideration to what the partner may (not) know or understand?
 - Personal vs mutual knowledge

Common Ground

- Mutual beliefs and assumptions (Clark & Brennan 1991)
- Egocentric perspective for comprehension (Keysar et al. 2000)
- Partner-sensitive grounding (Hanna & Tanenhaus 2004)
- Merging the evidence (Brown-Schmidt & Tanenhaus 2008, Brown-Schmidt & Hanna 2011)

Mutual beliefs & assumptions

(Clark & Brennan 1991)

- Common ground:
 - Mutual knowledge
 - Beliefs
 - Assumptions
 - “believe that the partners have understood what the contributor meant”
- Constant updating of common ground: “grounding”
 - “collective process of reaching this belief”

Mutual beliefs & assumptions

(Clark & Brennan 1991)

- Grice's maxims for cooperative interlocutors
 - Quantity: "Make contribution as informative as required (not more)"
 - Manner: "Be perspicuous"
 - ➔ Principle of least effort
- Clark & Brennan: Principle of least *collaborative* effort
 - Conversation = collective purpose, so "costs" shared

Grounding

- Common Ground = Shared (e.g. visual or linguistic) knowledge
 - Cf. “private” or “privileged” ground
- Do partners constantly check and update Common Ground?

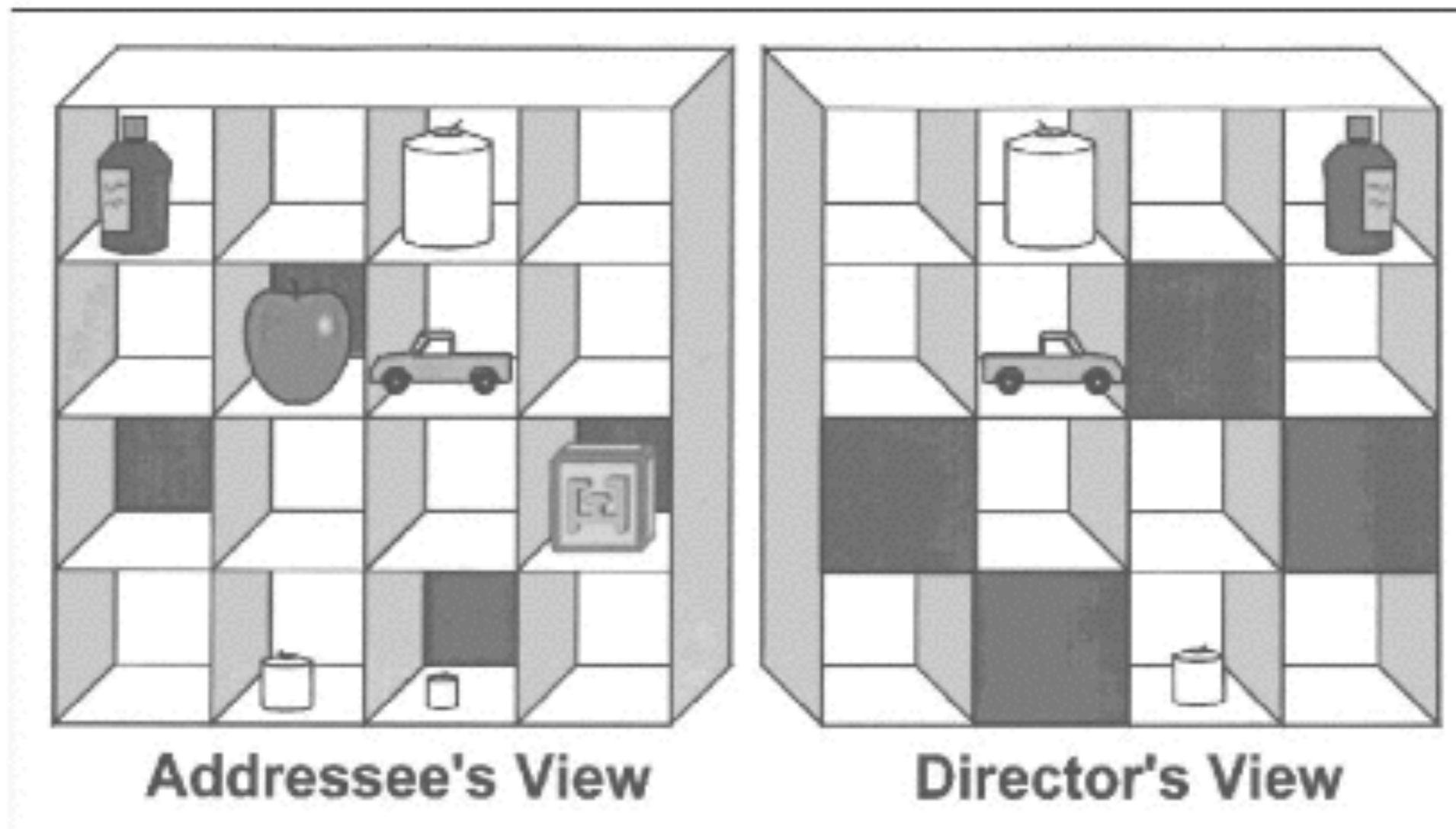
Egocentric?

(Keysar et al. 2000)

- “People reduce ambiguity of linguistic expressions by using information about perspective”
 - Partner’s perspective? Shared?
 - To the degree that other potential referents are not even considered?
- Sometimes people use an egocentric perspective!

Egocentric

(Keysar et al. 2000)



- Task: rearrange objects to match picture of arrangement
- Confederate & Participant
- **test**: 3 toys differing along 1 dimension (e.g. size)
- **control**: non-relevant toy in occluded spot

Egocentric

(Keysar et al. 2000)

Table 1. Mean number of fixations on the occluded object and their mean summed duration

Measure	Experiment 1		Experiment 2	
	Test	Control	Test	Control
Number of fixations	1.01 (1.16)	0.65 (0.91)	0.90 (0.98)	0.33 (0.65)
Total fixation time (ms)	420 (576)	178 (284)	452 (656)	106 (278)

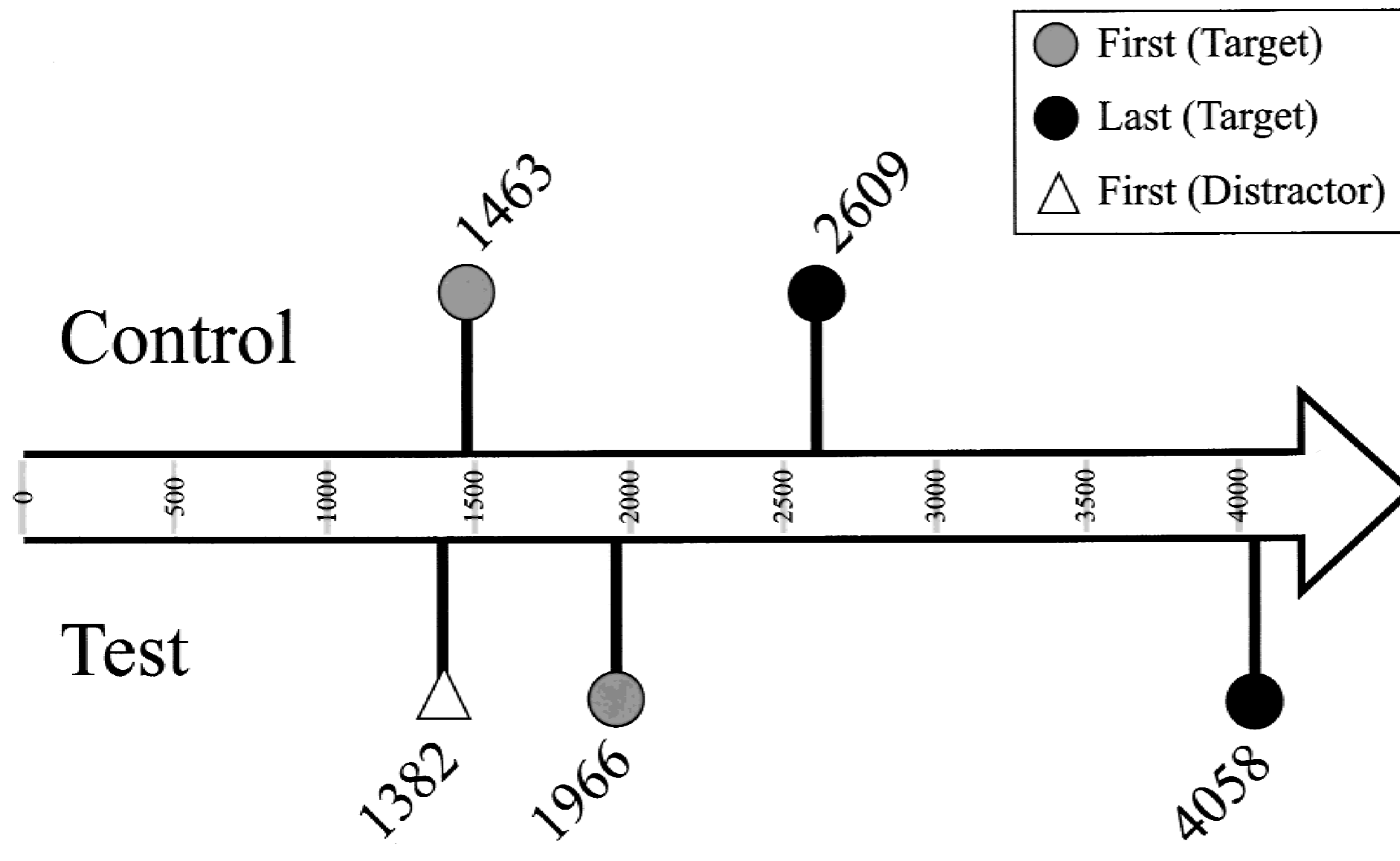
Note. Standard deviations are in parentheses.

Occluded
spot constant

- fixation of occluded spots almost **three times more often** in the **test** condition than in the control condition
- fixations of occluded spot **346ms longer** in the **test** condition than in control condition
- ➔ addressees considered the occluded object as a potential referent in the test condition

Egocentric

(Keysar et al. 2000)



- **test**: decision lag between first and last fixation = 738ms longer; reaching for occluded object in 23% (with 6% corrected before grasp)
- **control**: no reach for occluded object

Egocentric

(Keysar et al. 2000)

- Listeners
 - sometimes start with egocentric perspective,
 - then realise error and,
 - use mutual knowledge (speaker perspective) to correct error OR act upon erroneous interpretation

Egocentric

(Keysar et al. 2000)

- Implications on role of common ground
 - reduces the probability of considering a non-shared object
 - allows error correction when referent which are not common grounds are considered initially
- Advantages & disadvantages of egocentric strategy
 - minimal cognitive effort for addressee
 - collaborative nature of conversation → addressee can be lazy, because speaker will correct
 - benefit of egocentric interpretation vs. cost of making an error

Grounding

- Do partners constantly check and update Common Ground?

Partner-sensitive grounding

- Critique on Keysar et al:
 - Common ground not just space & objects
 - Salience/co-presence can interfere with common ground (to the extent that suppression is necessary)
 - “Small candle” not felicitous (cf. “smallest candle”)
- Evidence against initial egocentric perspective

Partner-sensitive grounding

(Hanna & Tanenhaus 2004)

- Cooking situation between helper (H; participant) and cook (C; confederate)
- Cook asks Helper to pass an object from the shared table space:
 - Cook has empty hands OR not
 - Object is from Helper's side OR exists twice on H's and C's side of the table

Partner-sensitive grounding

(Hanna & Tanenhaus 2004)

		hands	
objects		empty	full
	1	domain restricted to H's side fixates & takes object on his side	domain is restricted to H's side fixates & takes object on his side
	2	domain restricted to H's side fixates & takes object on his side	domain widens to H's & C's side fixates both objects asks for clarification

Partner-sensitive grounding

(Hanna & Tanenhaus 2004)

- In the hands full - two objects condition, Helper's domain widens to the Helper's AND Cook's area
 - already during the object name!
- Addressees take into account speakers' pragmatic constraints quickly enough to influence initial domain of interpretation for a reference

Merging the evidence

(Brown-Schmidt & Hanna 2011)

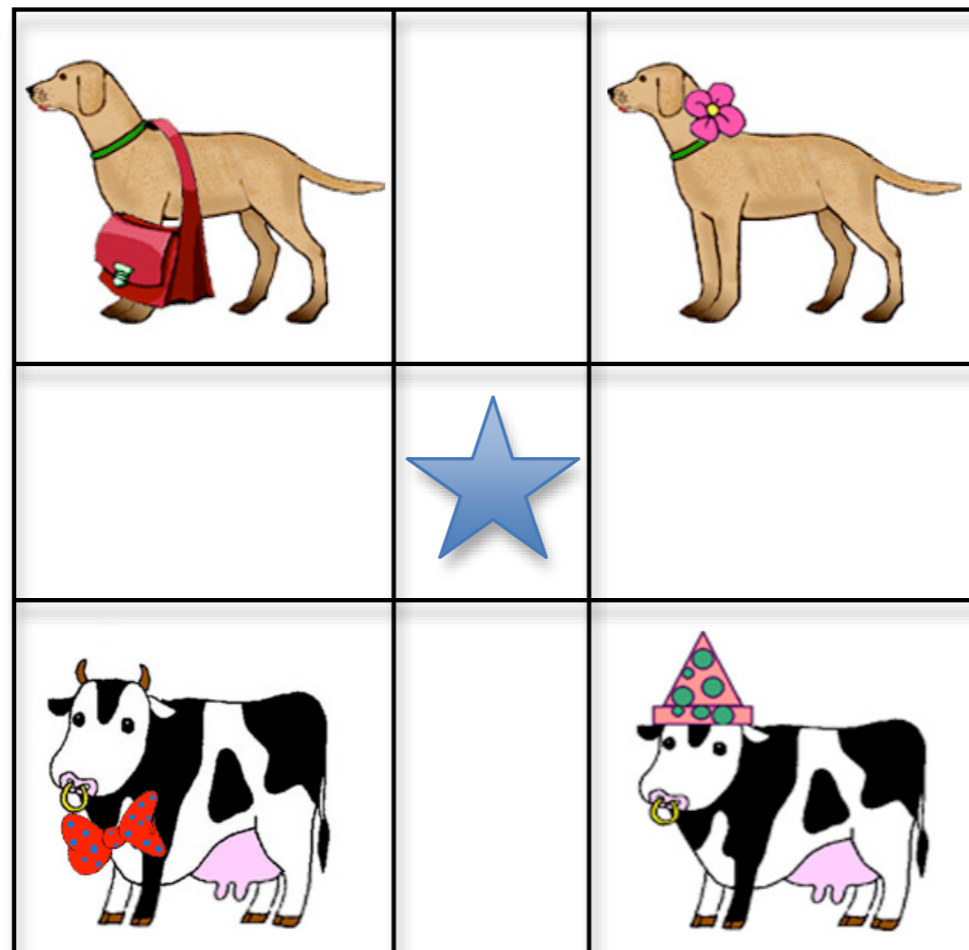
- Common Ground is used only sometimes
- Pragmatic factors in previous experiment: “hands-full” vs “hands-free”
- Sometimes constrains the domain of interpretation
 - When cooperation principle particularly relevant
- Depends of experimental setup and type of ambiguity!
 - Truly interactive, collaborative, natural

Merging the evidence

(Brown-Schmidt & Hanna 2011)

- **Perspective Adjustment model** (Keysar et al)
 - Initially “cheap” and useful egocentric perspective
 - Perspective check and adaptation for error correction
- **Anticipation Integration model** (Barr et al)
 - Use of Common Ground during anticipation as domain constraint
 - But egocentric integration (during non-collaborative task)
- **Constraint-based model** (Brown-Schmidt et al)
 - Competition of multiple constraints, with Common Ground being just one of them
 - Immediate but probabilistic influence

Model-based predictions

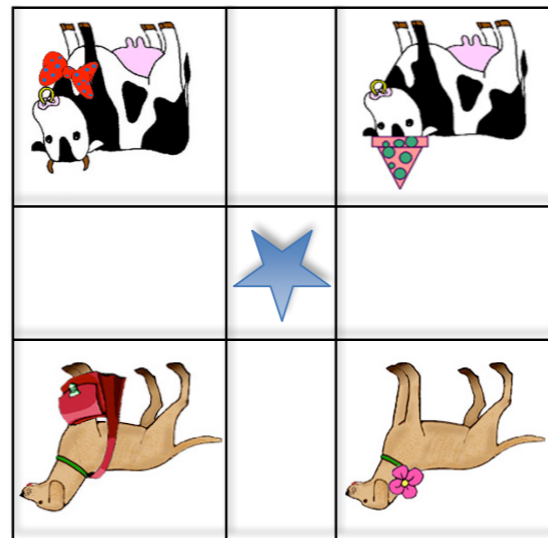


right = Partner 1's
"right"

Figure 1. Example display from partner 2's perspective. Partner 1 would see the mirror-image reverse.

right = Partner 1's
"right"

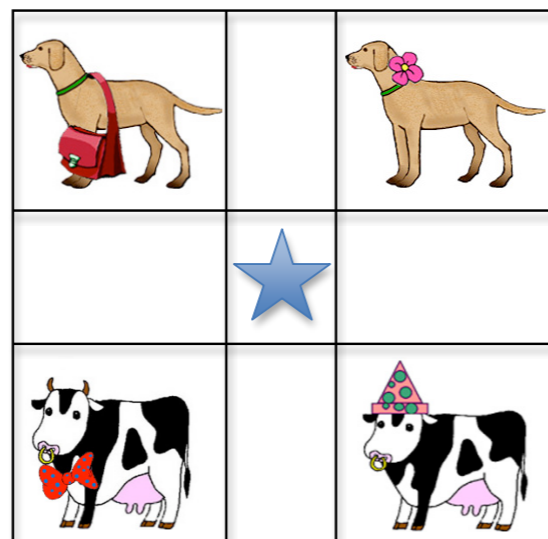
Partner 1



right

Partner 1 says:
"Put the star below the
dog on the right
wearing the flower"

left



Partner 2

Common Ground

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Outlook

- Language (situated) in interaction
 - ✓ Taking perspective of partner into consideration
- Considering (non-verbal) signals of the partner
 - Speaker gaze
 - Listener gaze
 - (Pointing/Grasping)

References

- Clark, H. & Brennan, S. (1991). “Grounding in Communication”. *Perspectives on socially shared cognition*, 13, 127-149.
- Brown-Schmidt, S. and Hanna, J. (2011). “Talking in Another Person’s Shoes: Incremental Perspective-taking in Language Processing”. *Dialogue and Discourse*, 2, 11-33.
- Hanna, J. and Tanenhaus, M. (2004). “Pragmatic effects on reference resolution in a collaborative task: evidence from eye movements”. *Cognitive Science*, 28, 105-115.
- Keysar, B., Barr, D., Balin, J., and Brauner, J. (2000). “Taking Perspective in Conversation: The Role of Mutual Knowledge in Comprehension”. *Psychological Science*, 11(1), 32-38.