Listener gaze in live (face-to-face) instruction-giving

Seminar: Gaze as function of instructions - and vice versa

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Speakers' eye gaze disambiguates referring expressions early during face-to-face conversation (Hanna, Brennan)

Gaze and communication

http://seanmunger.files.wordpress.com/2013/11/bushs-watch.jpg

Speakers' eye gaze as a constraint upon interpretation (attention and intention)

Gaze and communication

http://newsletter.blogs.wesleyan.edu/files/2011/09/fishlecture-26.jpg

The addressee gazes more at the speaker than the speaker gazes at the addressee

Gaze and communication

http://arnoldzwicky.s3.amazonaws.com/BizarroParrot.jpg

Spoken utterances can be ambiguous

Role of eye gaze cues in communication

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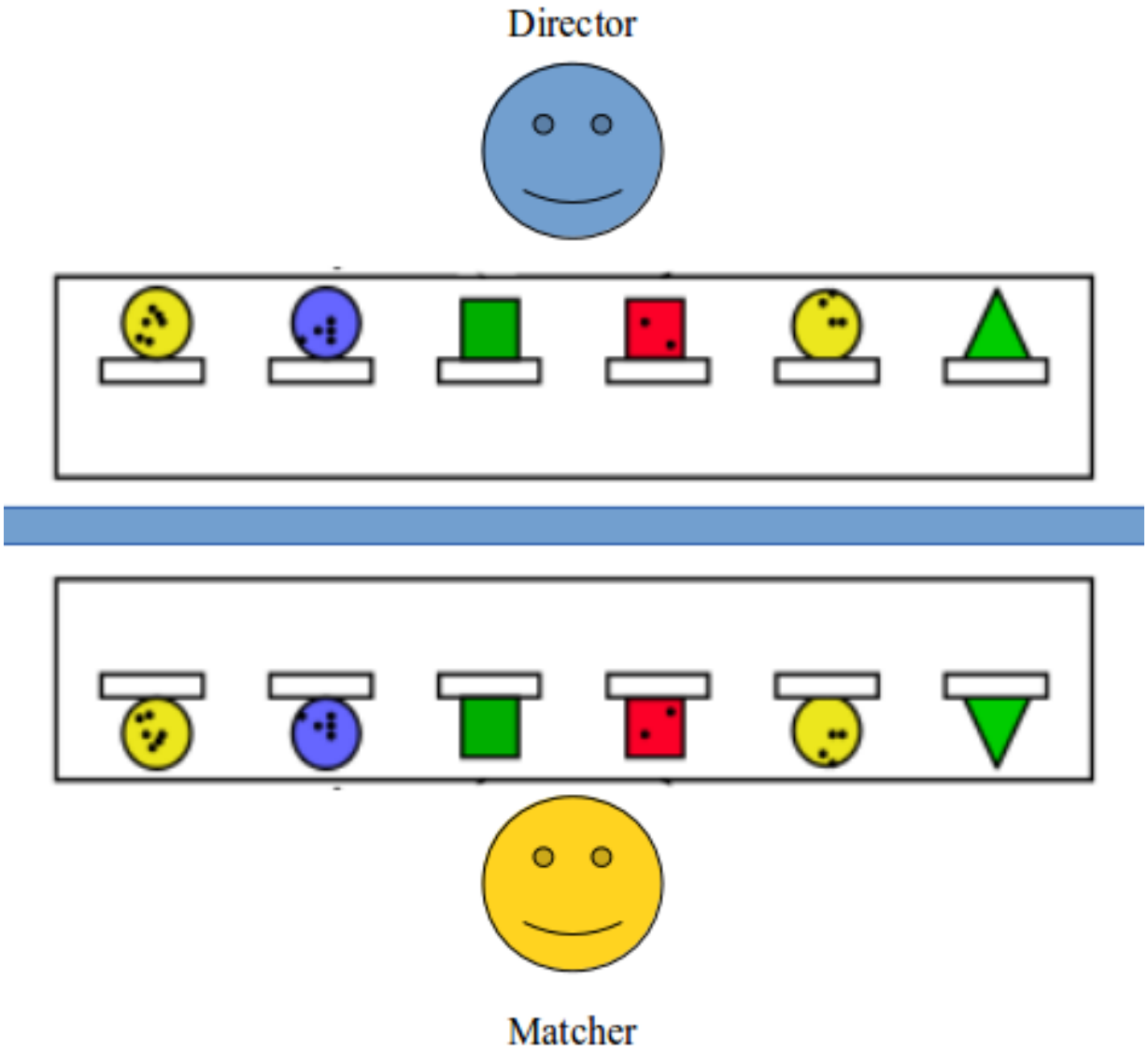
2. What is the time course by which addressees' eye gaze is integrated with linguistic processing?
3. Does eye gaze serve as an automatic orienting cue, or as a flexible cue?

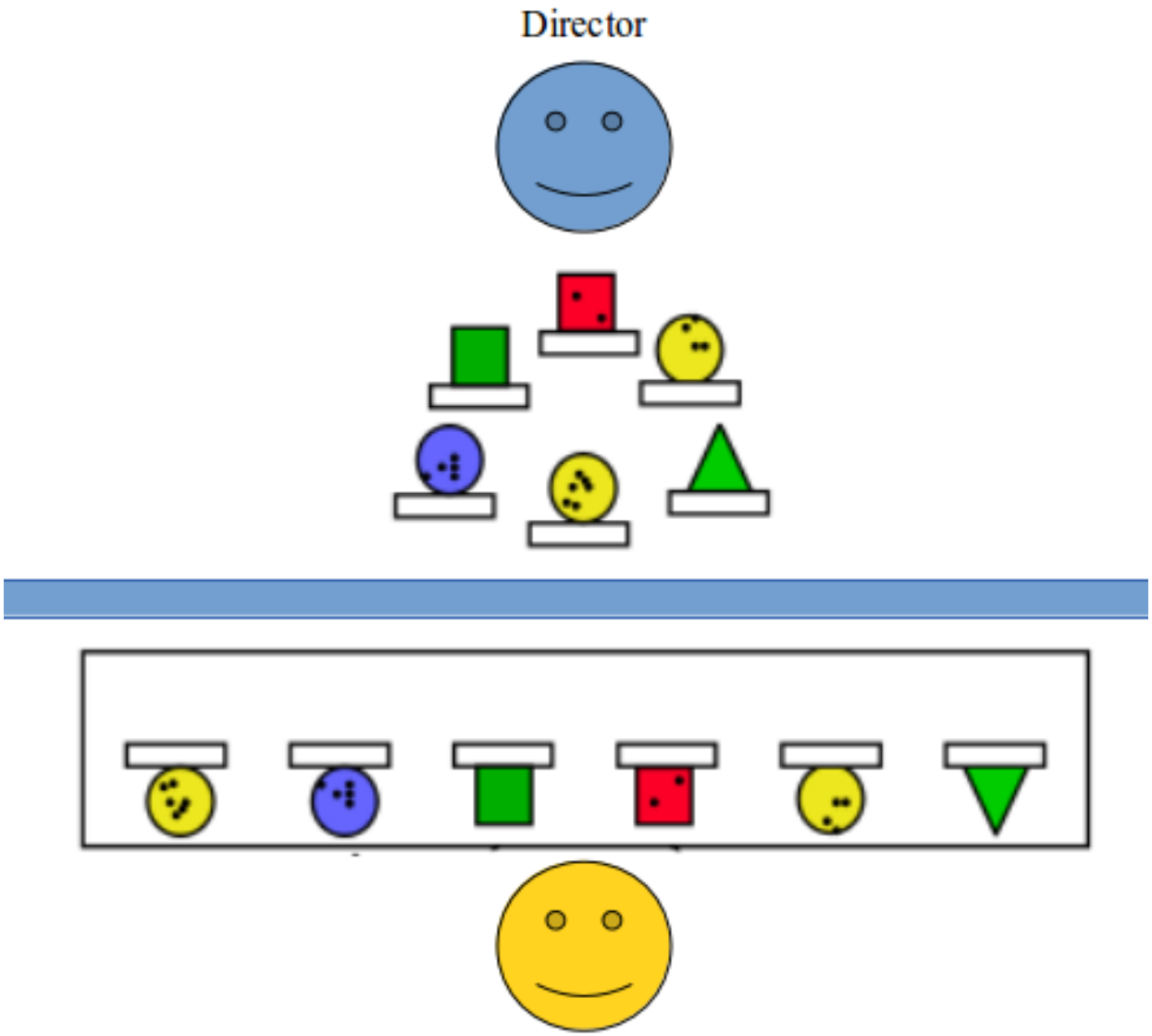
2 referential communication experiments

- Time course and flexibility of eye gaze were explored
- Participants worked in pairs (director, matcher)
- Director's head and eye orientation can potentially help to resolve ambiguity

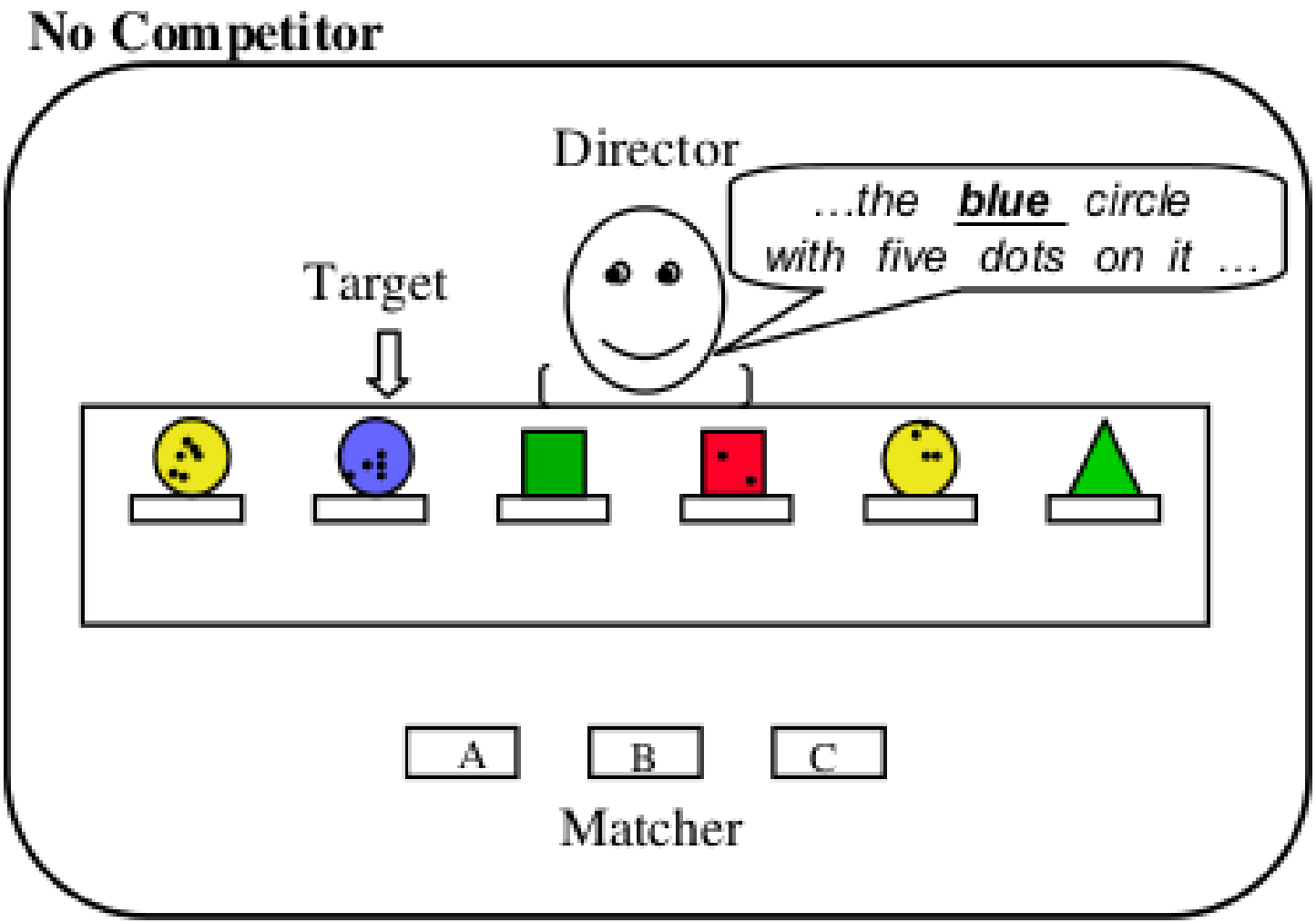
Experiment 1 - Congruent displays



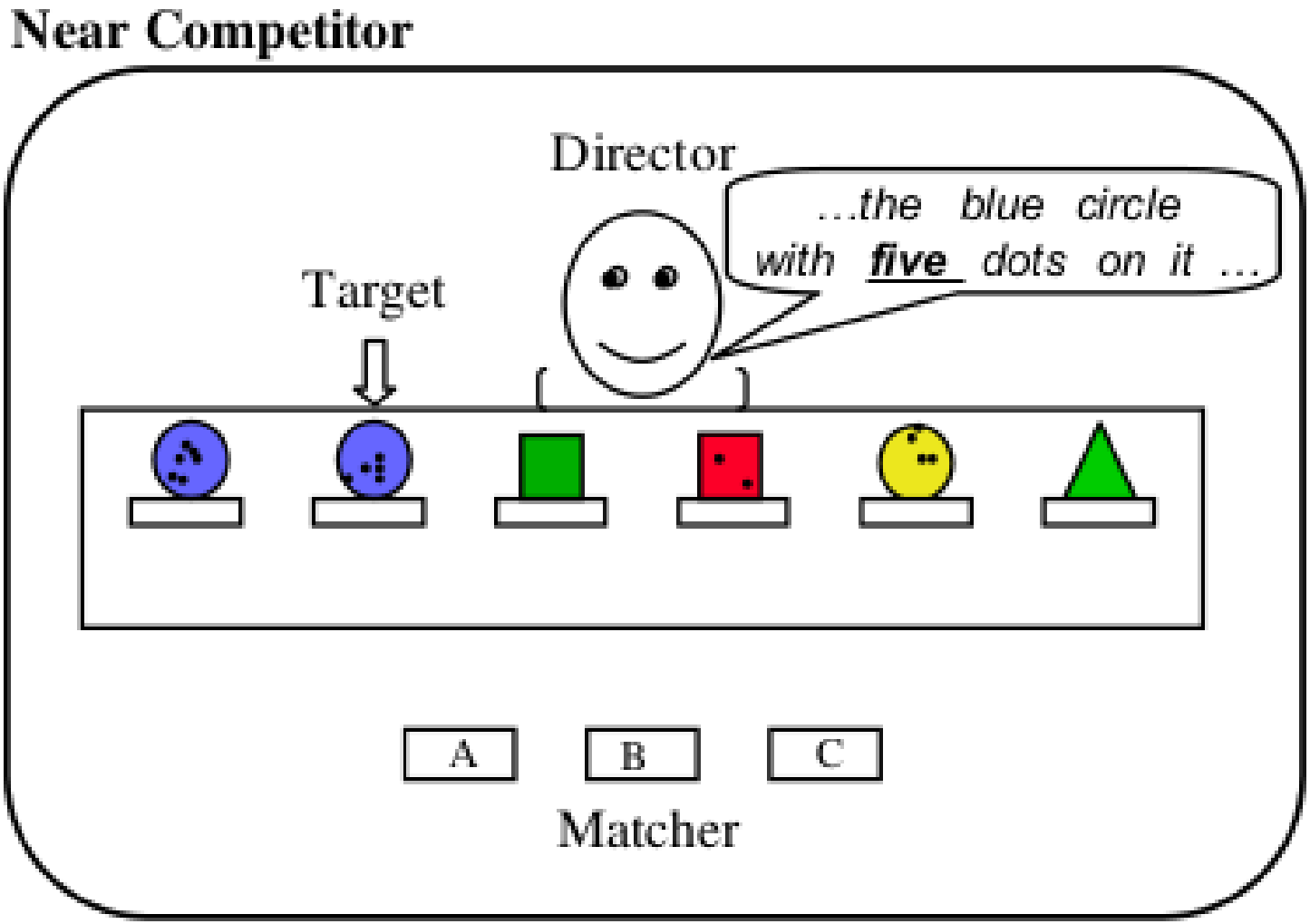
Experiment 1 - Non-congruent displays



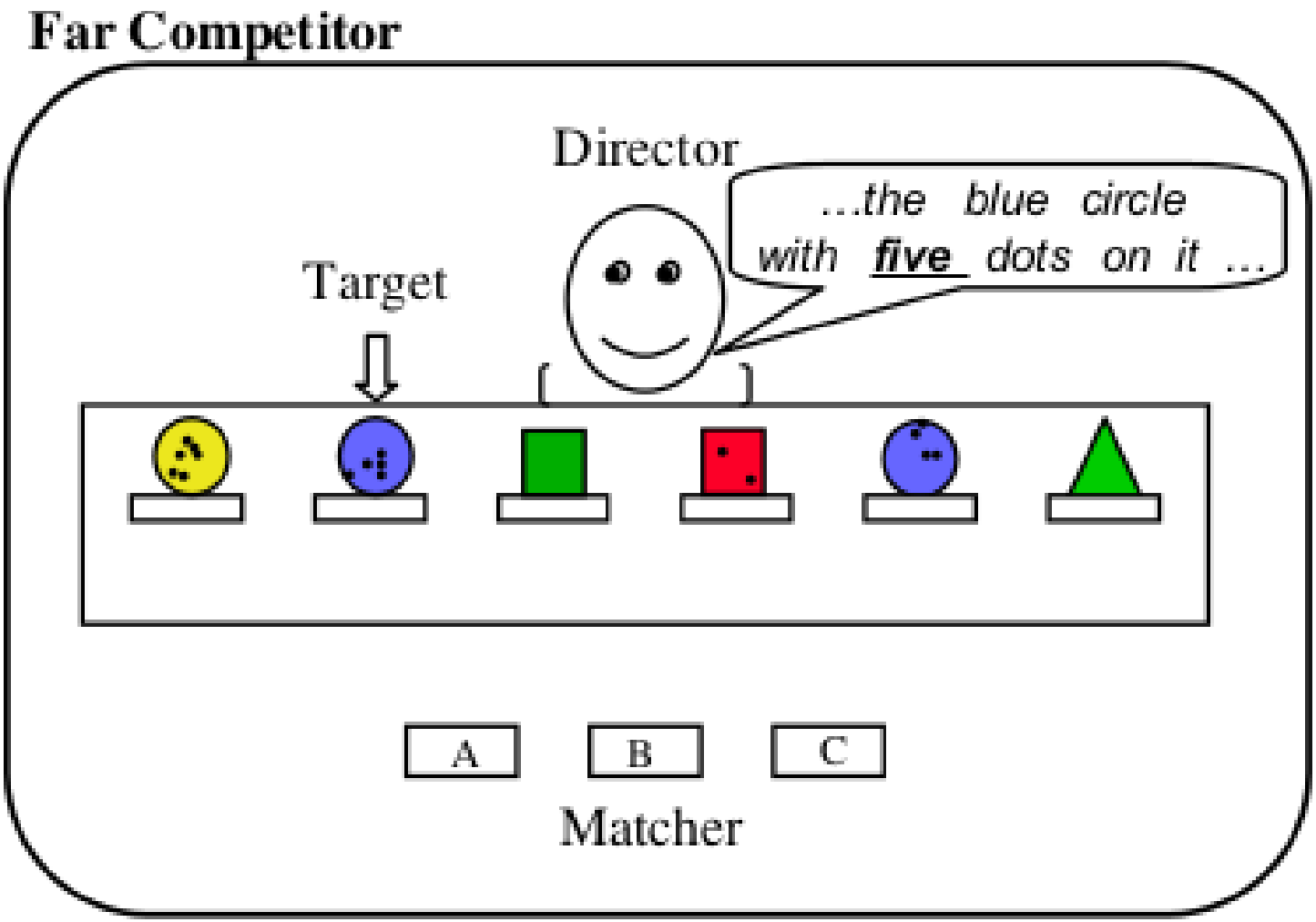
Experiment 1 - No competitor



Experiment 1 - Near competitor



Experiment 1 - Far competitor



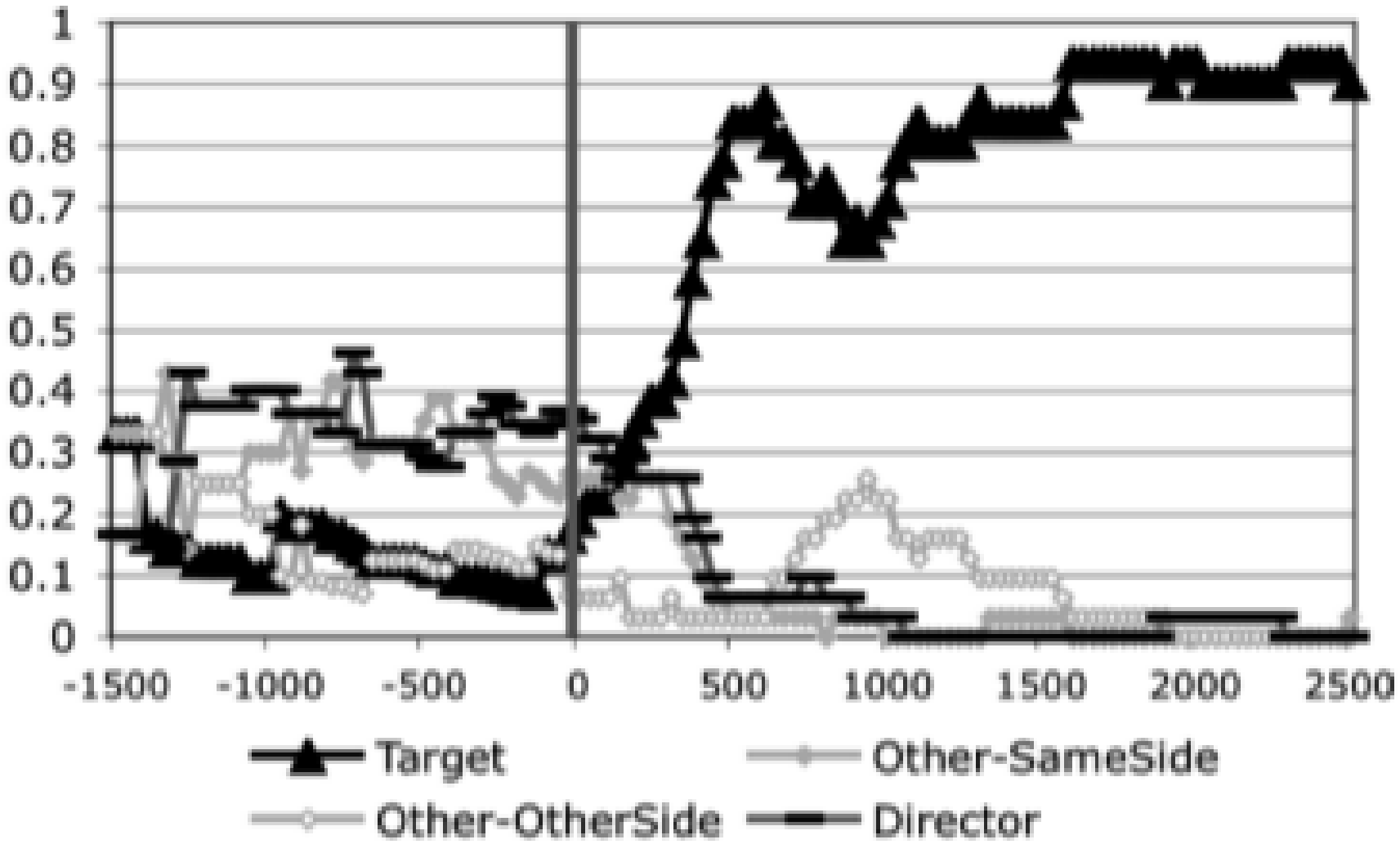
Experiment 1 - Overview

- Objects: circles, triangles, squares (red, yellow, green, blue); either blank or with a random number of dots
- 12 critical shape arrays repeated with different spatial locations
- Participants: 41 women, 7 men - university undergraduates (native speakers of English)

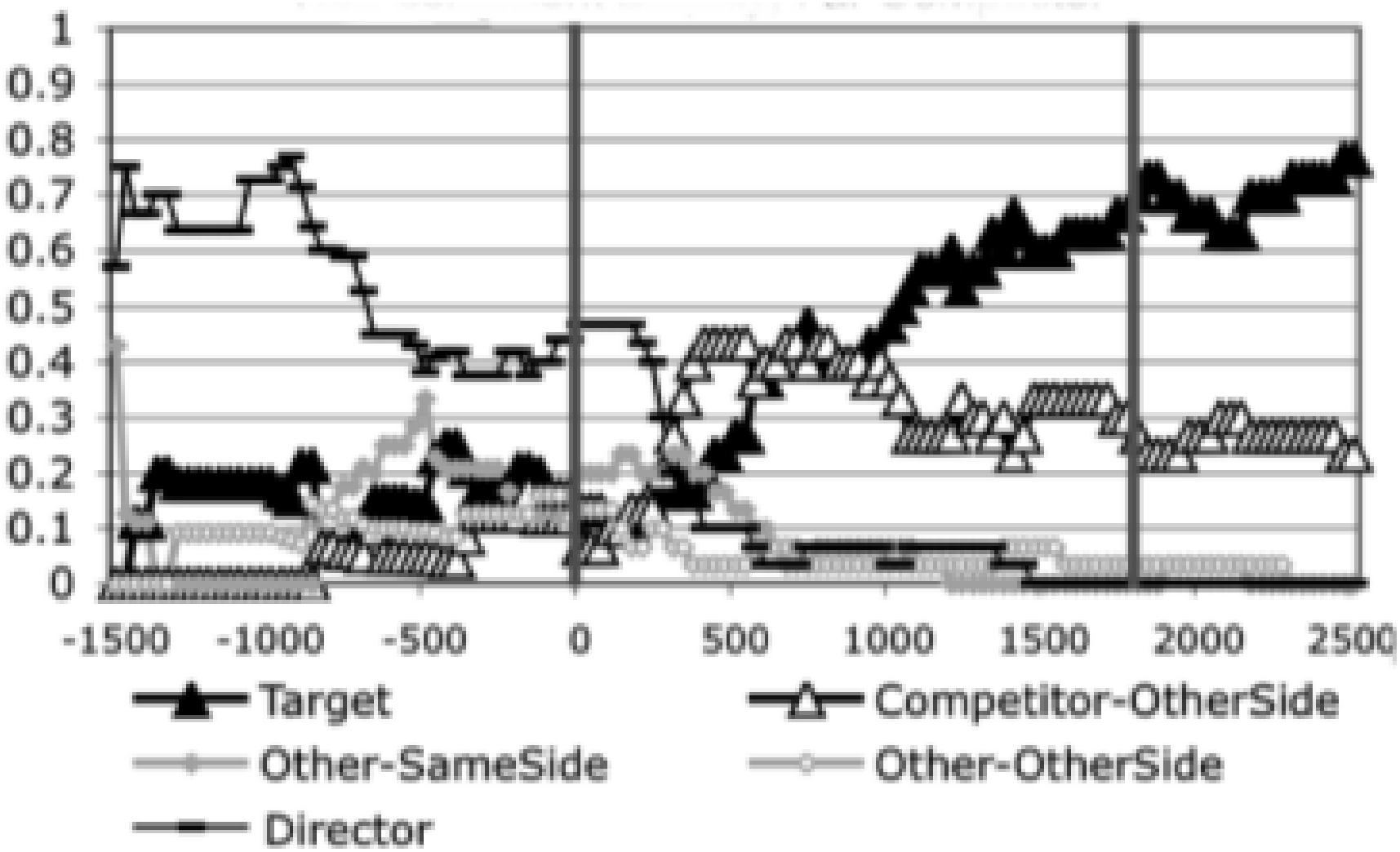
Experiment 1 - Results

- Without competitors targets were quickly identified
- In non-congruent setup participants learned to ignore directors' gaze
- Having a competitor did result in ambiguity
- Director's eye gaze can be used to resolve a temporary ambiguity

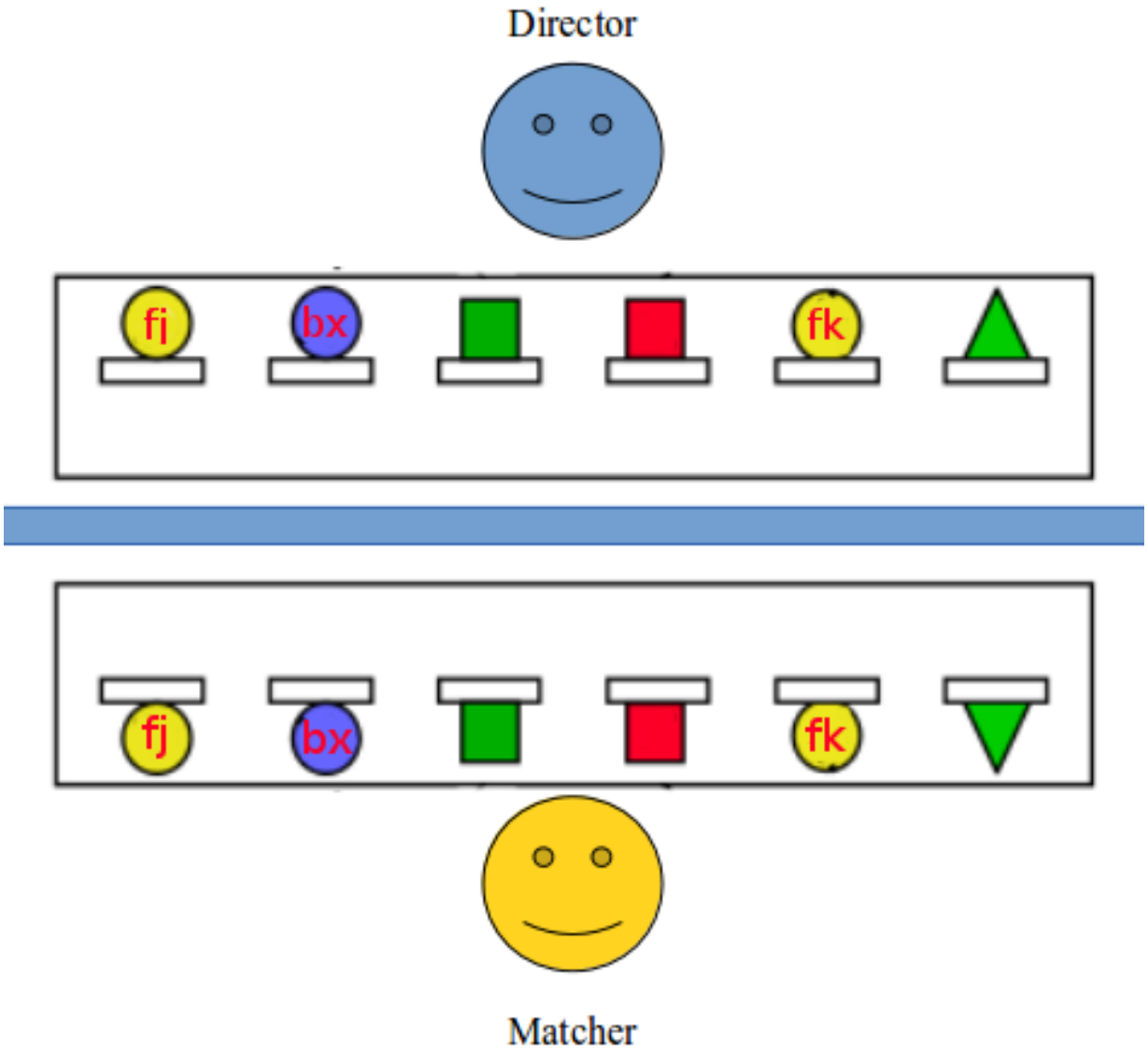
Experiment 1 - Congruent Displays, No Competitor



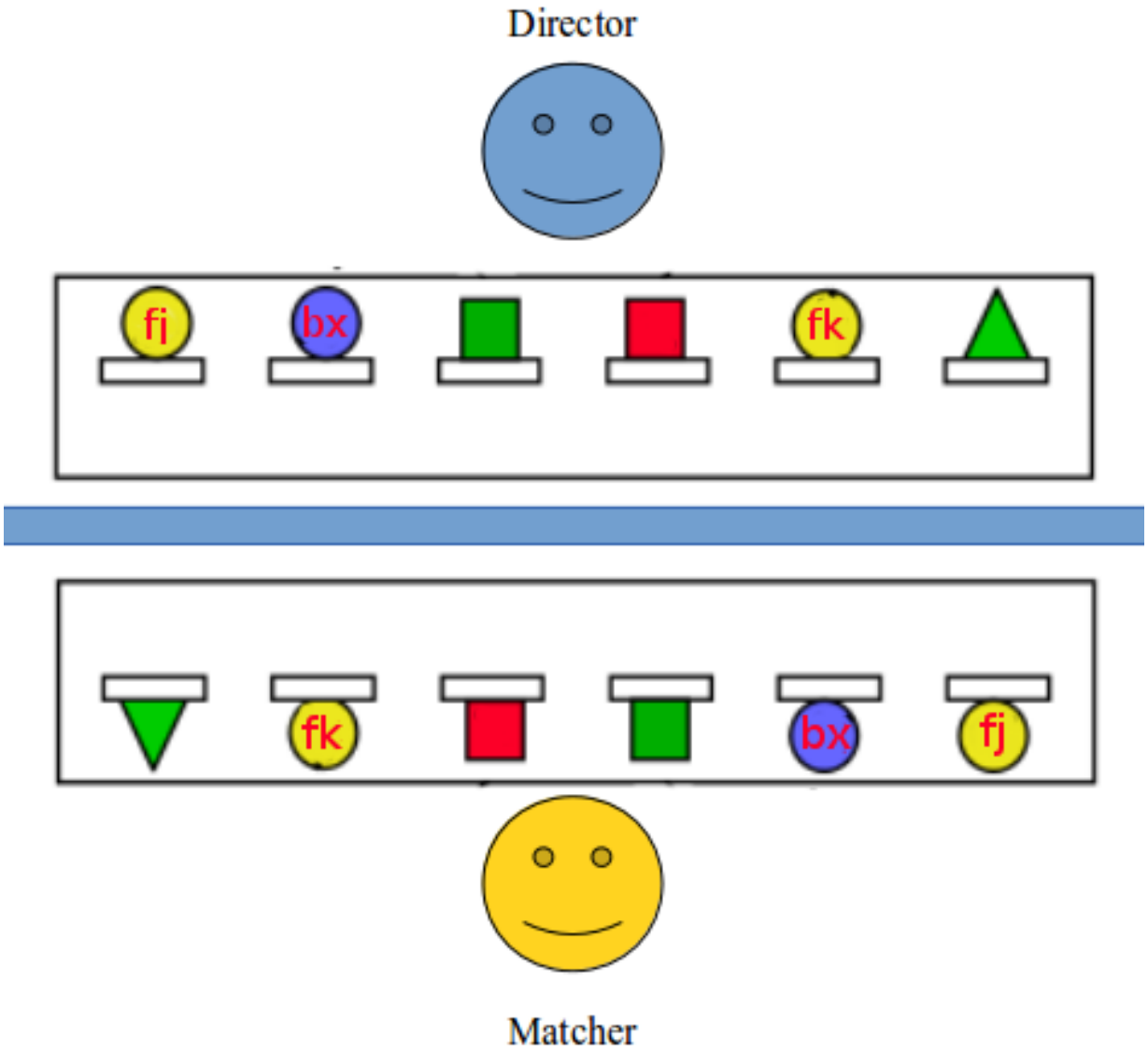
Experiment 1 - Non-Congruent Displays, Far Competitor



Experiment 2 - Mirror displays



Experiment 2 - Reverse displays



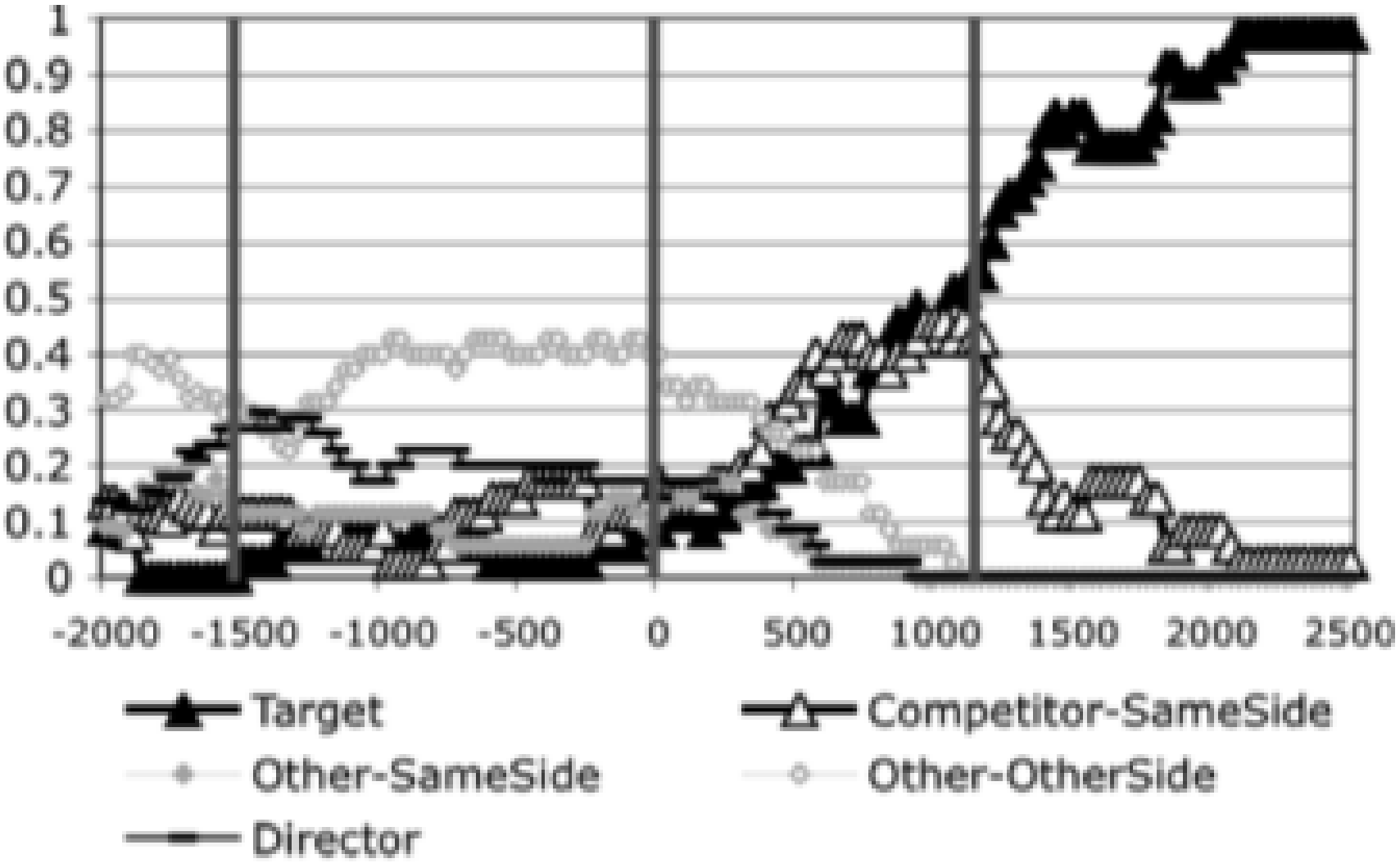
Experiment 2 - Overview

- Objects: circles, triangles, squares (red, yellow, green, blue); either blank or with letters
- 8 filler trials
- Participants: 11 women, 13 men - university undergraduates (native speakers of English)

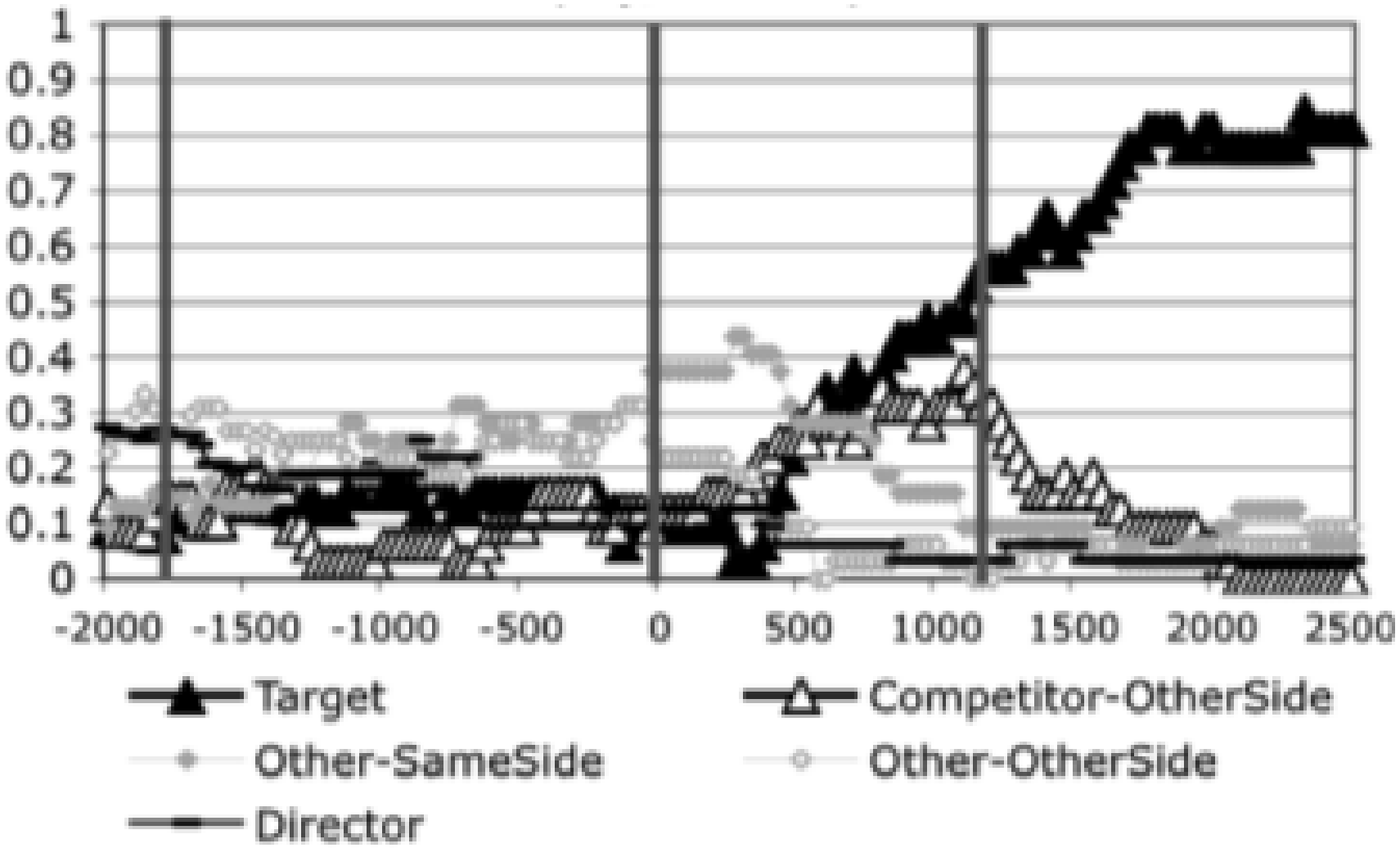
Experiment 2 - Results

- Directors' looks were uninformative only 14.1%, and 2.5% misleading of the time
- No evidence that matchers avoided looking at directors when their displays were reversed
- Matchers could use directors' eye gaze to disambiguate referring expressions, even when displays were reversed (re-mapping)

Experiment 2 - Reverse Display, Near Competitor



Experiment 2 - Reverse Display, Far Competitor



Conclusions

- Eye gaze produced by a speaker can be used by an addressee to resolve temporary ambiguity
- Matchers were able to distinguish the target from the competitor significantly earlier than the linguistic point of disambiguation
- Eye gaze has an automatic, reflexive orienting effect on attention

Do as eye say: Gaze cueing and language in a real-world social interaction (Macdonald, Tatler)

Eye gaze as instruction

- People tend to pay attention to the faces and eyes of others
- Other people's eyes reflexively guide our own eye direction
- Gaze cues can supplement verbal information

Spoken language and gaze allocation

http://www.indiabix.com/_files/images/body-language/8-93-12.jpg

- Gaze towards the conversation object

Gaze following and language processing

- The more difficult language is to process the less listeners will utilize gaze cues

Example

1. Der Hase frißt gleich den Kohl (SVO)
   The hare-nom eats shortly the cabbage-acc
2. Den Hasen frißt gleich der Fuchs (OVS)
   The hare-acc eats shortly the fox-nom

Scope of the study

- How do people utilize gaze cues to complete a real-world task?
- Different availability level of cues
- Different specificity of verbal instructions

Assessment of gaze-cue utilization

1. Gaze seeking
2. Gaze following
3. Task performance

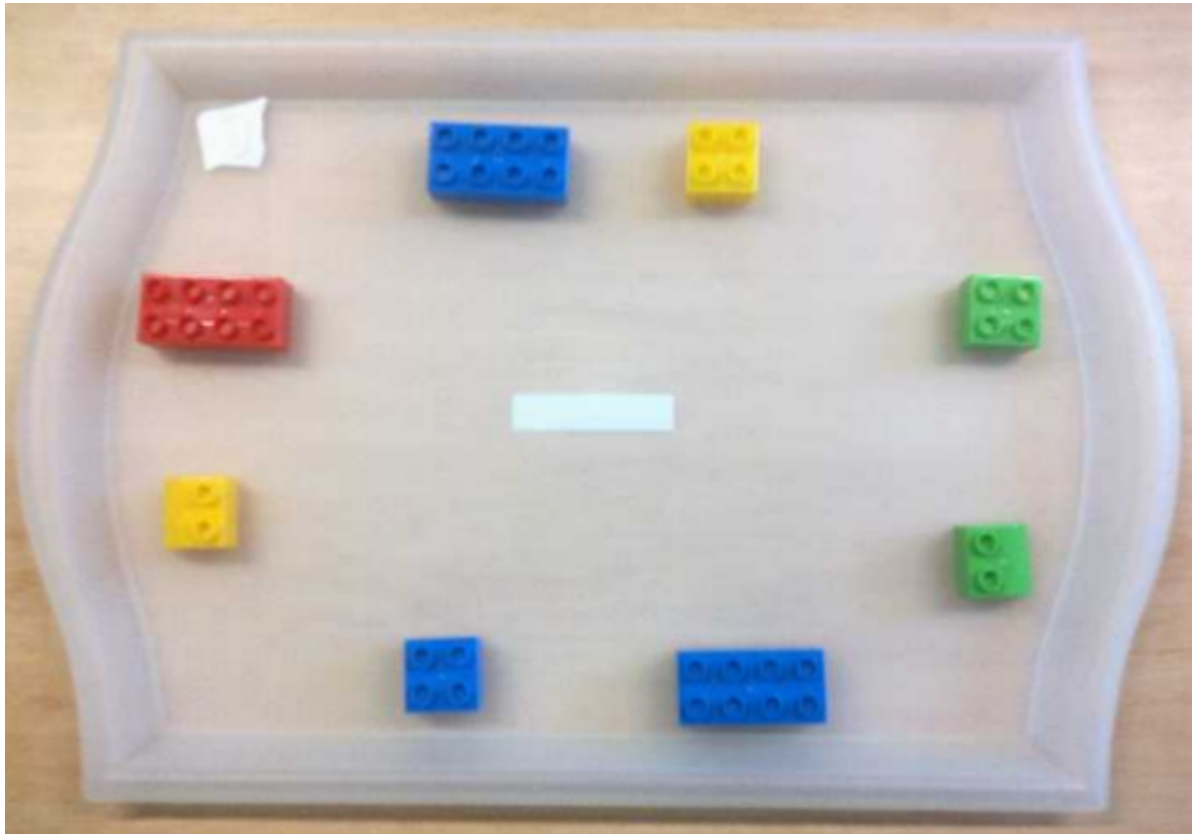
What is expected?

Greater gaze-cue utilization when the spoken instructions are ambiguous than when they are unambiguous

Experiment setup

- Participants: 12 women, 4 men - university undergraduates
- Materials: 80 "Lego" blocks (23 red, 16 yellow, 14 green, 27 blue), 10 trays
- Design: between-subjects
- 2 independent variables: specificity of instruction, gaze-cueing condition

Procedure

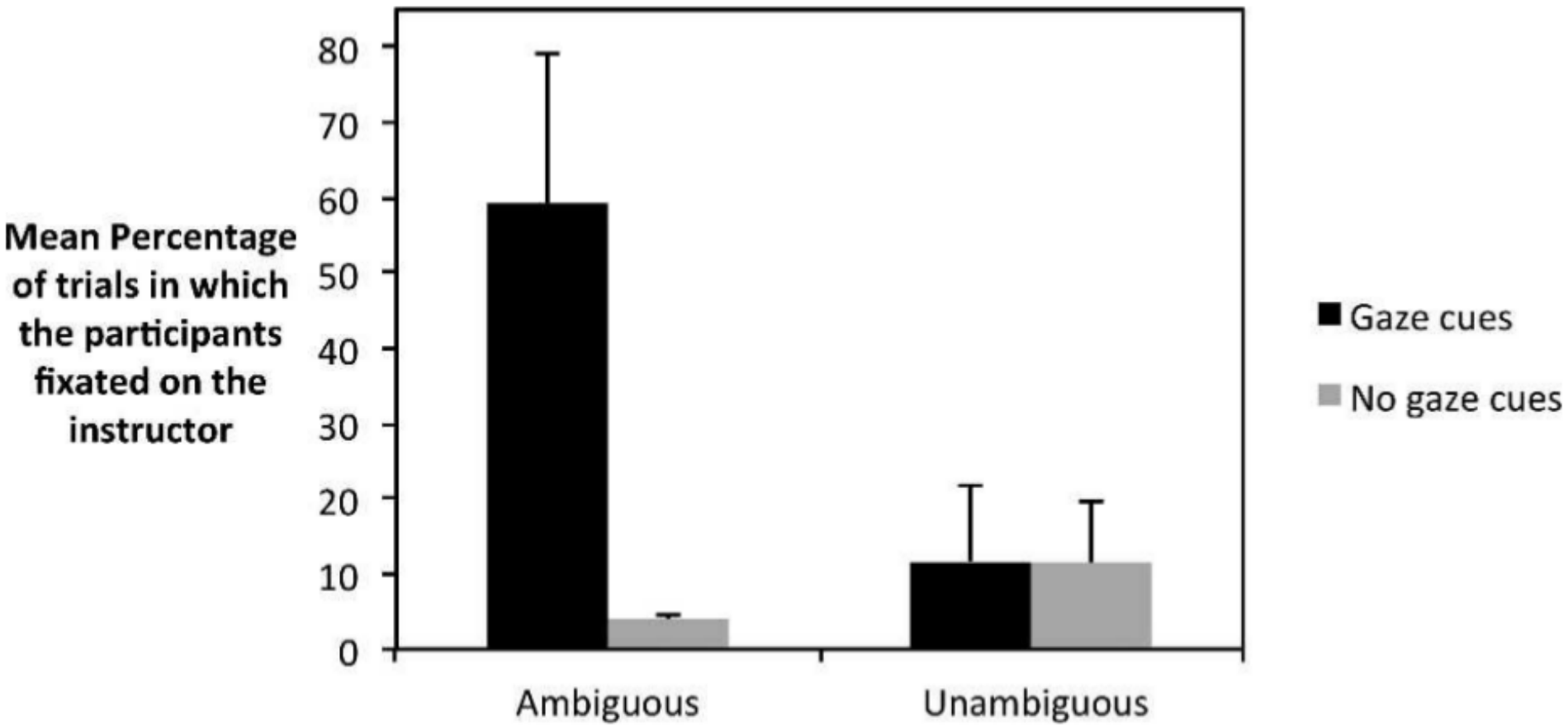


- Instructor: which block to take and where to put it
- 4 trials for each structure
- 40 trials in total

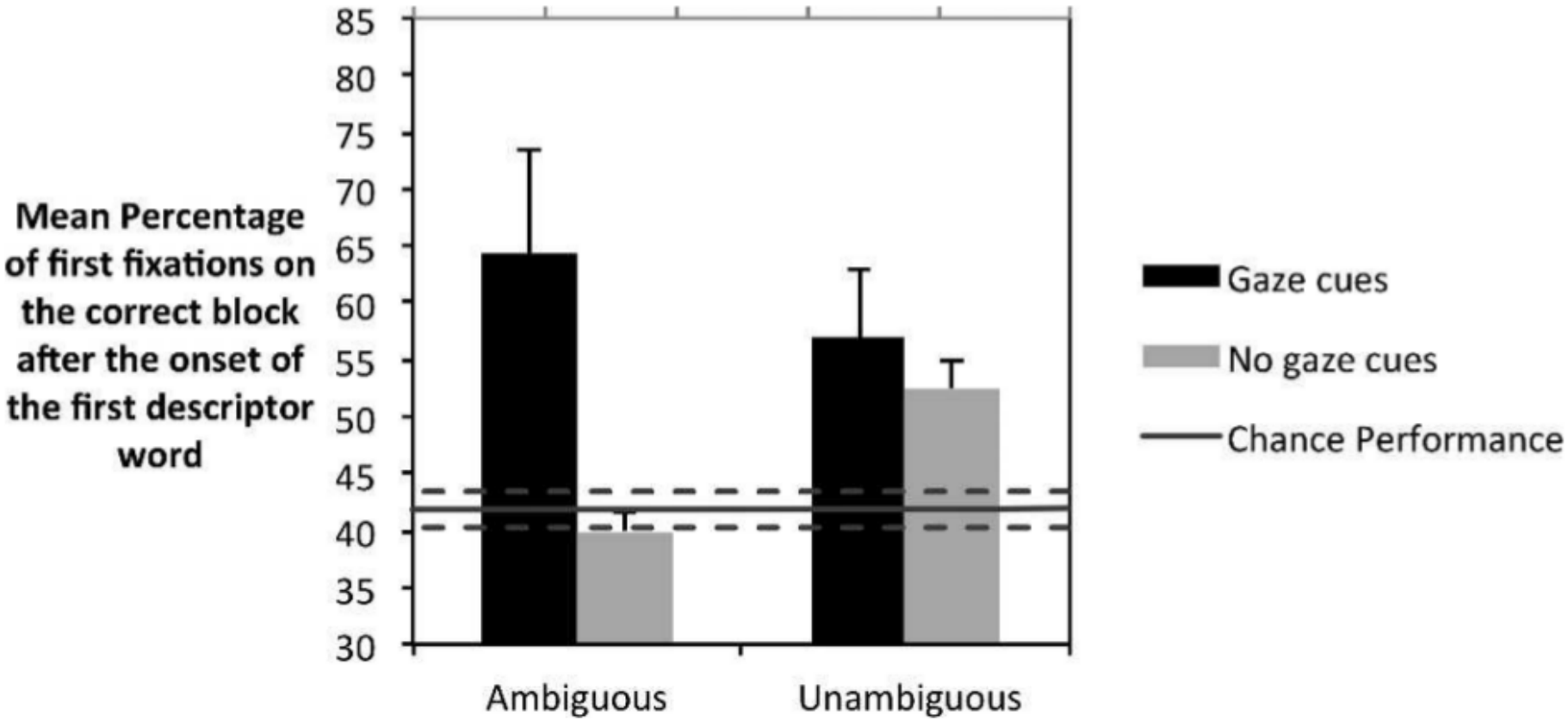
What was measured?

- Percentage of instructions in which the participant looked at the instructor
- Percentage of trials in which the first block fixated after the onset of the first descriptor word was the target block
- Percentage of correct pick-ups of the target block

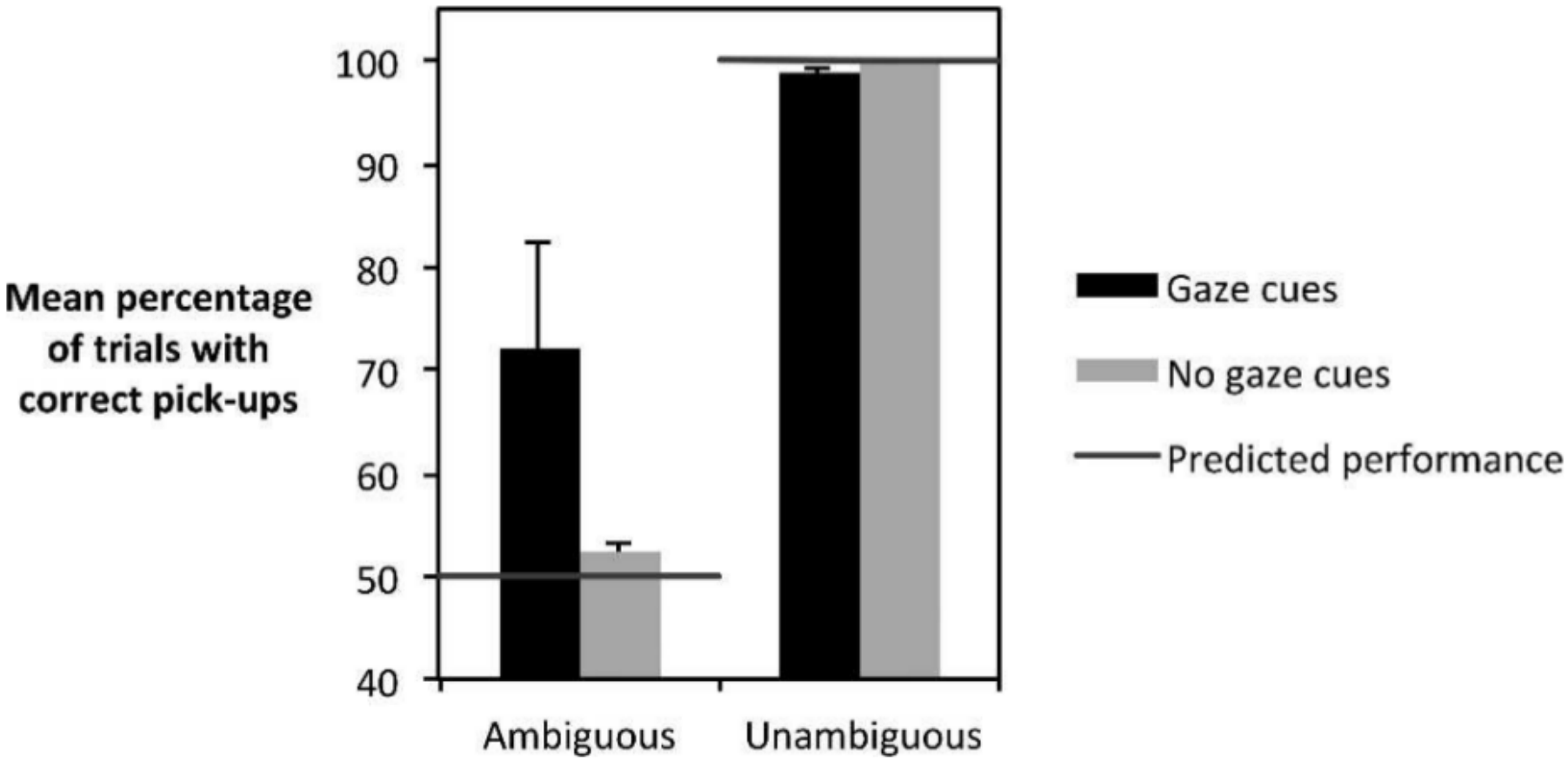
Results - gaze seeking



Results - gaze following



Results - task performance



Conclusions

- Gaze cues were utilized only when they provided information not included in the spoken instructions
- Percentage of looks was higher when the instructions were ambiguous
- Gaze is more important when spoken language is less effective at communicating a message or idea

Hanna and Brennan vs. Macdonald and Tatler

Hanna and Brennan	**Macdonald and Tatler**
Temporary ambiguity	Overall ambiguity
Measured time needed for disambiguation	Measured percentage of correctly identified targets
Points of fixation on competitors and eye direction in different time intervals	How often participants looked at the instructor and how often picked up the target object at once
Only participants	Experimenters involved
Within subjects design	Between subjects design
Eye gaze helps to resolve ambiguity	
In certain cases eye gaze is misleading or not used	
Fine-grained	Shallow

Thank you!

Thank you for your kind attention!

Do you have any questions?

References

1. Hanna J.E., Brennan S.E. (2007). Speakers' eye gaze disambiguates referring expressions early during face-to-face conversation. Journal Of Memory And Language 57: 596-615.
2. Macdonald R. G., Tatler, B. W. (2013). Do as eye say: Gaze cueing and language in a real-world social interaction. Journal of Vision, 13 (4):6, 1-12