The role of language in building 1 and 2-place predicates

Event imitation in homesigners

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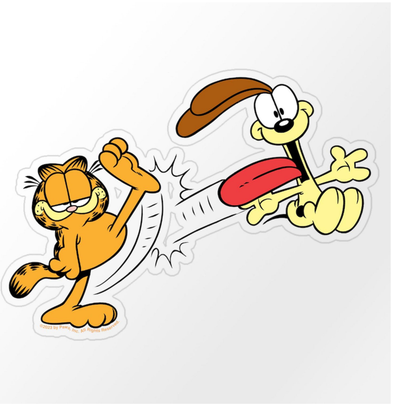
Language and concepts

- Language may have a role in creating some concepts (e.g. numerals)

- What role does language play in conceptualizing an event as a member of category of events?
    - Test case: generic 2-place events (de Villiers, 2014; Hinzen et al., 2022)
    - Conceptualized not as individuals: Garfield kicks Odie
    - But as kind-based generalizations: Cats kick Dogs
    - Asymmetric (kicker-kickee/ agent-patient)



The role of language in 2-place events

Two different hypotheses

External language input

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External language input

Distinct role representations

(Shukla and de Villiers, 2021; de Villiers, 2014; Hinzen et al, 2022)

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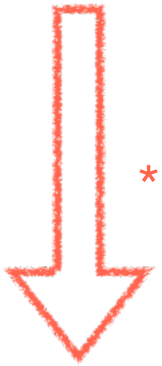

*(Conceptual change)

Distinct role representations

(Shukla and de Villiers, 2021; de Villiers, 2014; Hinzen et al, 2022)

The role of language in 2-place events

External language input

Acquiring transitive syntax

Distinct role representations

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Conceptual capacity

Distinct role representations

(Gleitman, 1990; Pinker, 1996; Carey, 2009; Fillmore, 1968, Calvin & Bickerton, 2000...)

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Acquiring transitive syntax

Distinct role representations

(Shukla and de Villiers, 2021; de Villiers, 2014; Hinzen et al, 2022)

Conceptual capacity

Creating/acquiring transitive syntax

Distinct role representations

(Gleitman, 1990; Pinker, 1996; Carey, 2009; Fillmore, 1968, Calvin & Bickerton, 2000...)

The hypothesis: Language needed for 2-place events

External language input

Acquiring transitive syntax

Distinct role representations

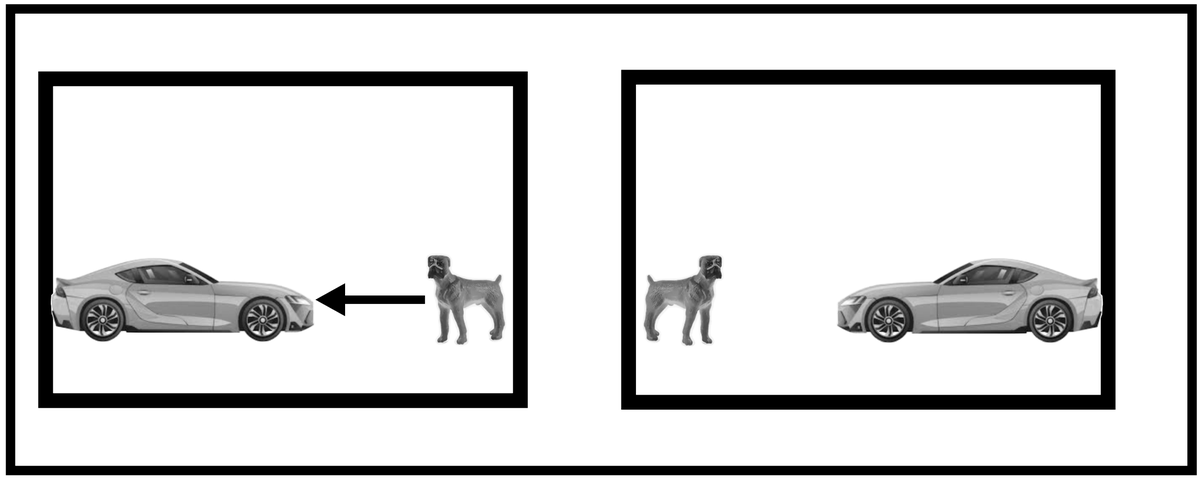
- Children are initially unable to represent 2-place events
- Requires propositional thought (unavailable without external language)
- By acquiring the grammar of transitive sentences, they gain the ability to represent 2-place events

Evidence in favor of this theory comes from 2 sets of studies:

- Anticipation paradigm *(Shukla and de Villiers, 2021)*
- Imitation task *(de Villiers, 2014; Hinzen et al, 2022)*

Shukla and de Villiers (2021)

An anticipation paradigm



(figure adapted from Shukla and de Villiers, 2021)

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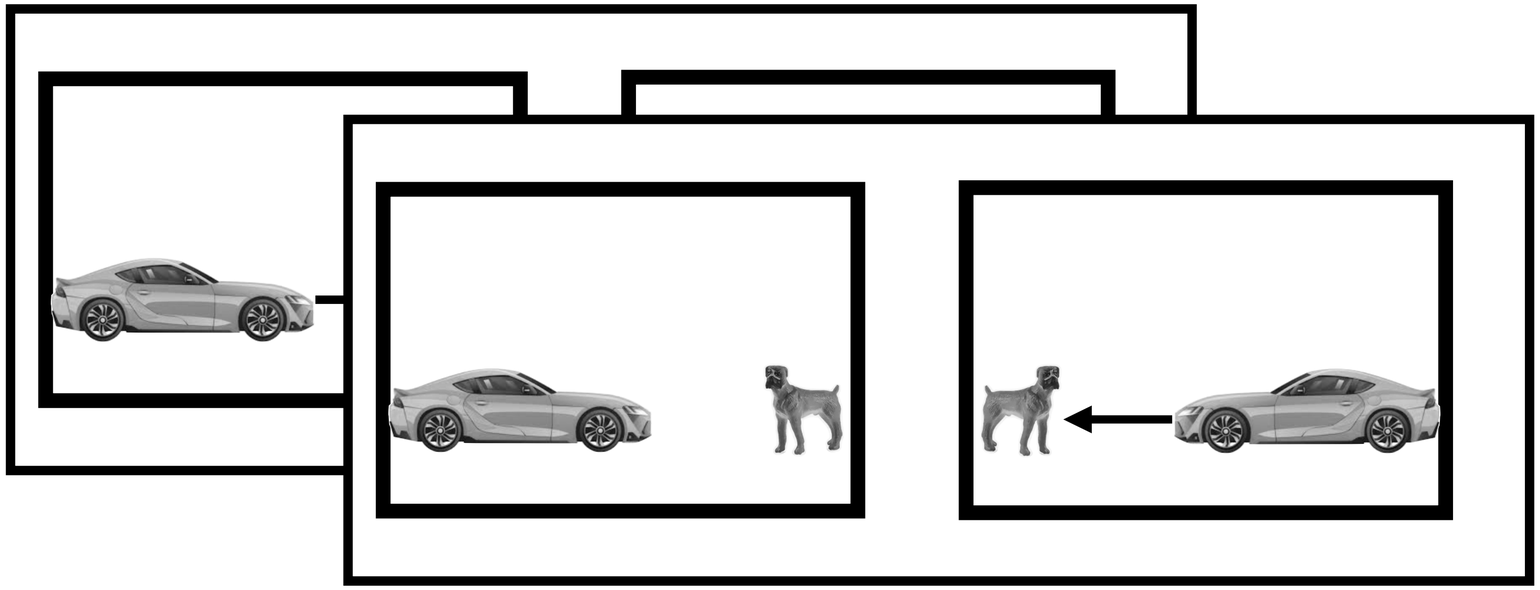

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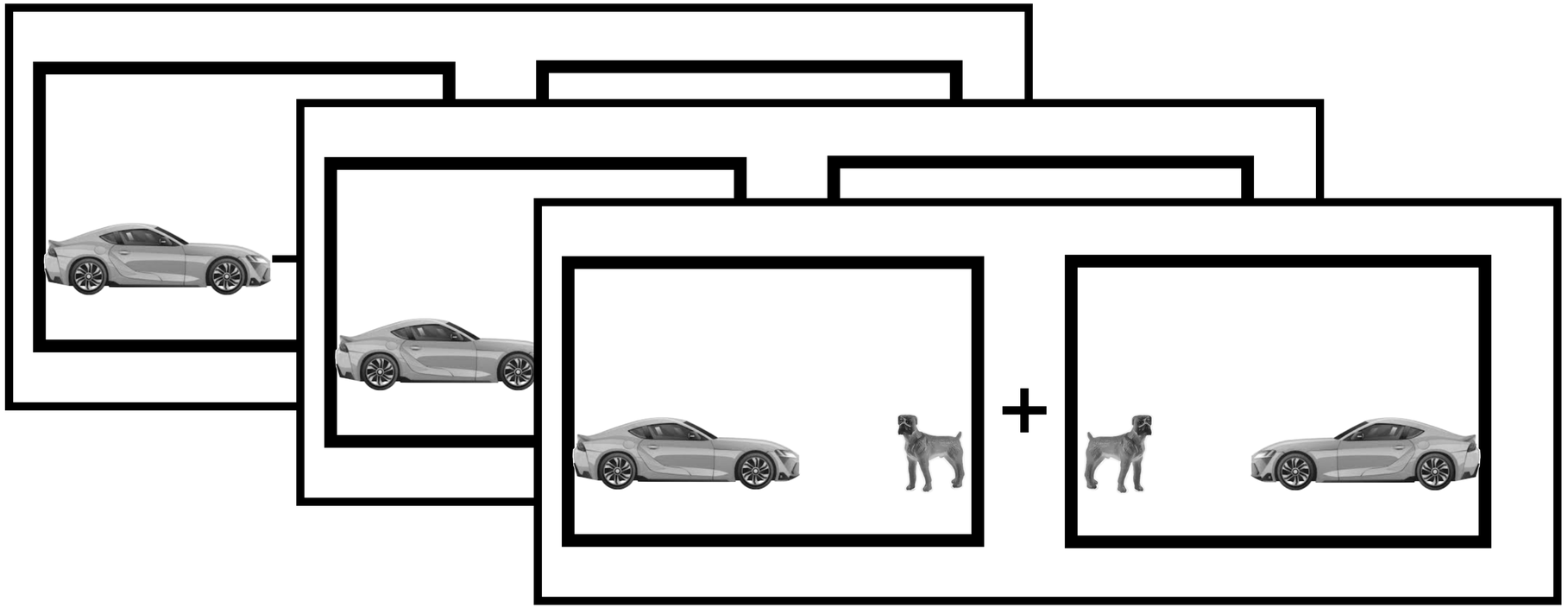

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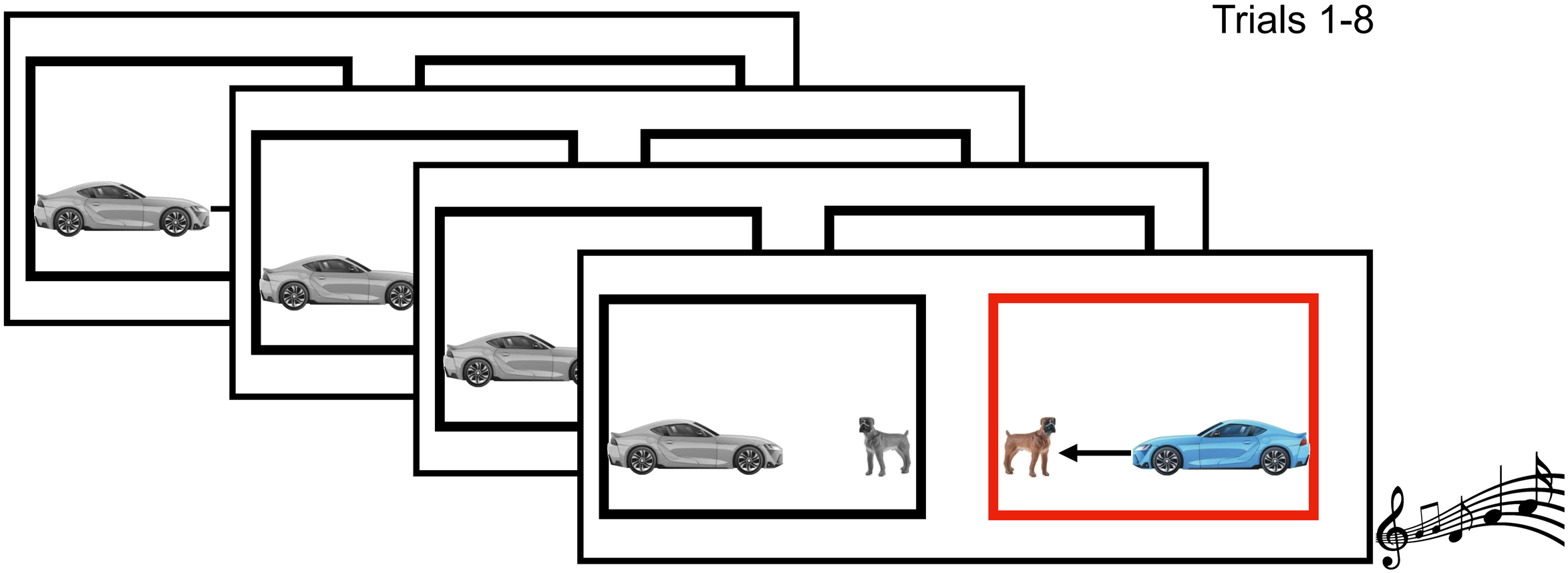

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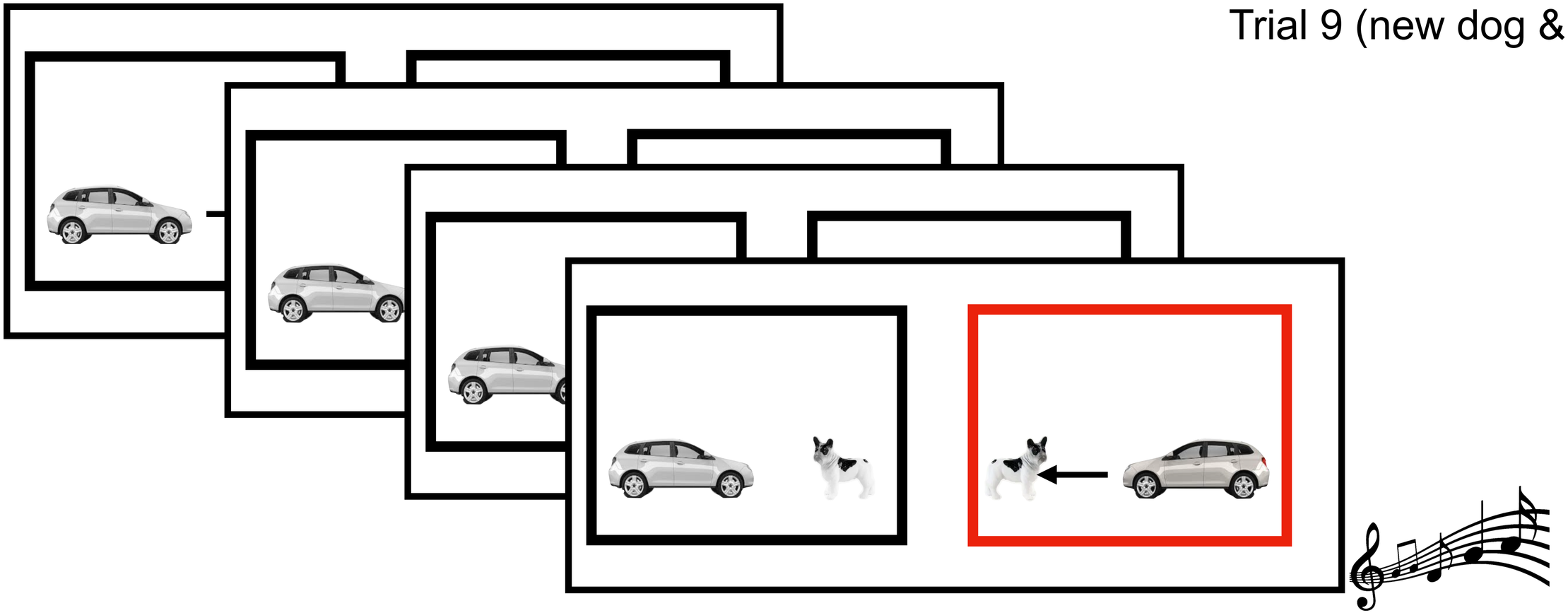

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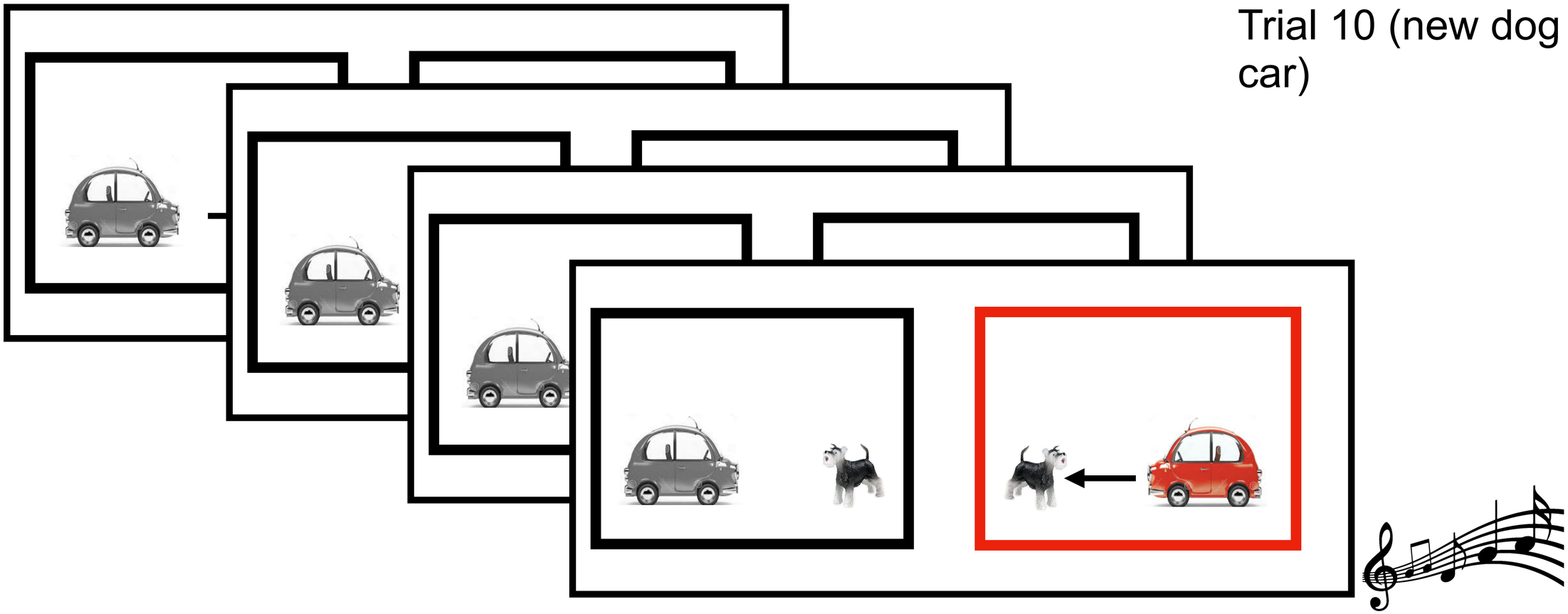

Trial 10 (new dog & car)

Shukla and de Villiers (2021)

Do participants anticipate to…

	1- participant event	2-participant event
	(e.g. a dog rolls)	(e.g. a dog pushes a car)
Adults		
Infants (12-24 months)		

Shukla and de Villiers (2021)

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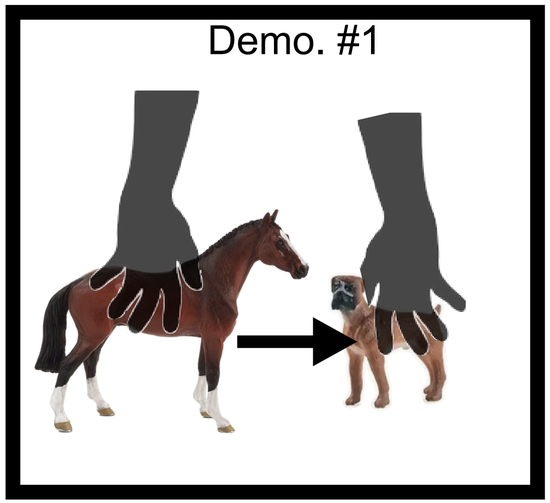
Adults		
Infants (12-24 months) ***AND*** ***verbally shadowing adults***		

De Villiers (2014), Hinzen et al (2022)

An imitation task



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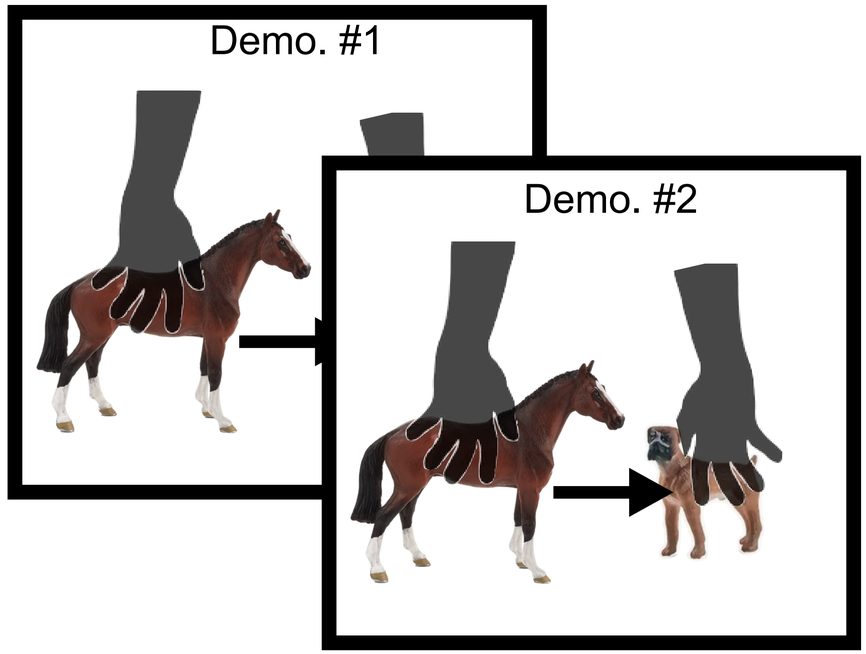

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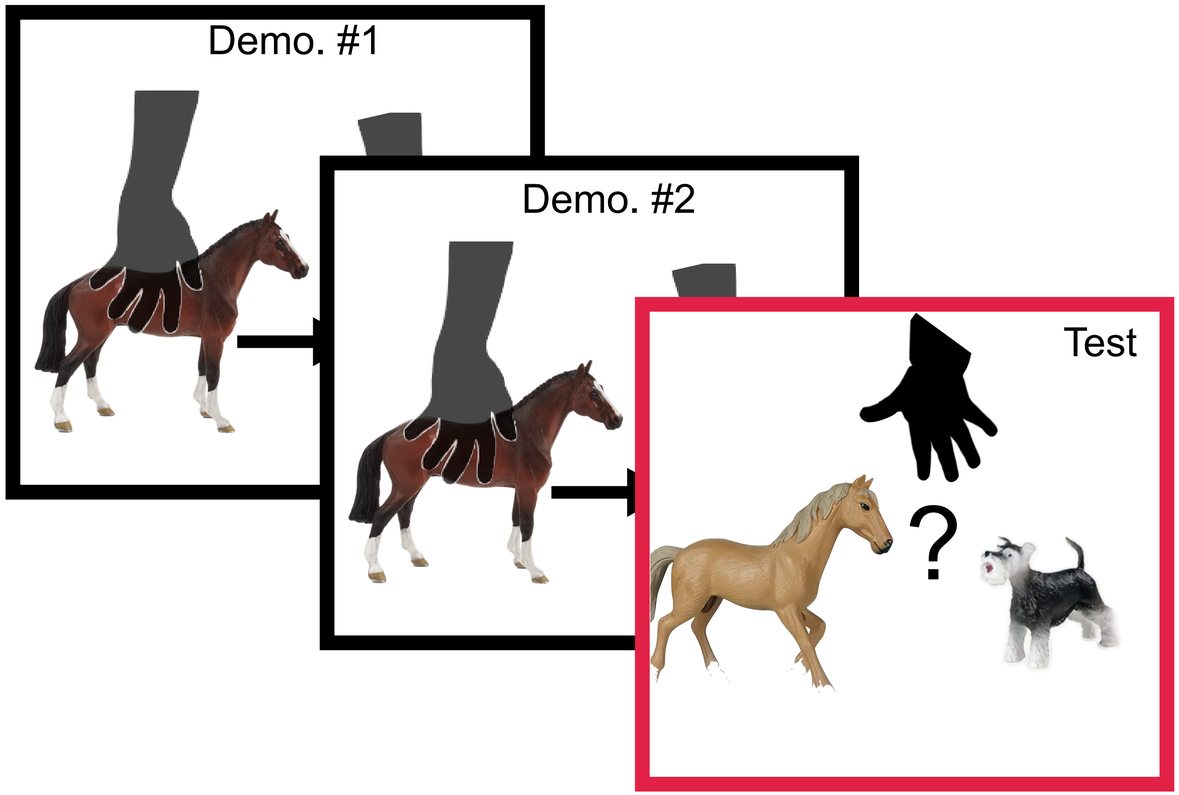

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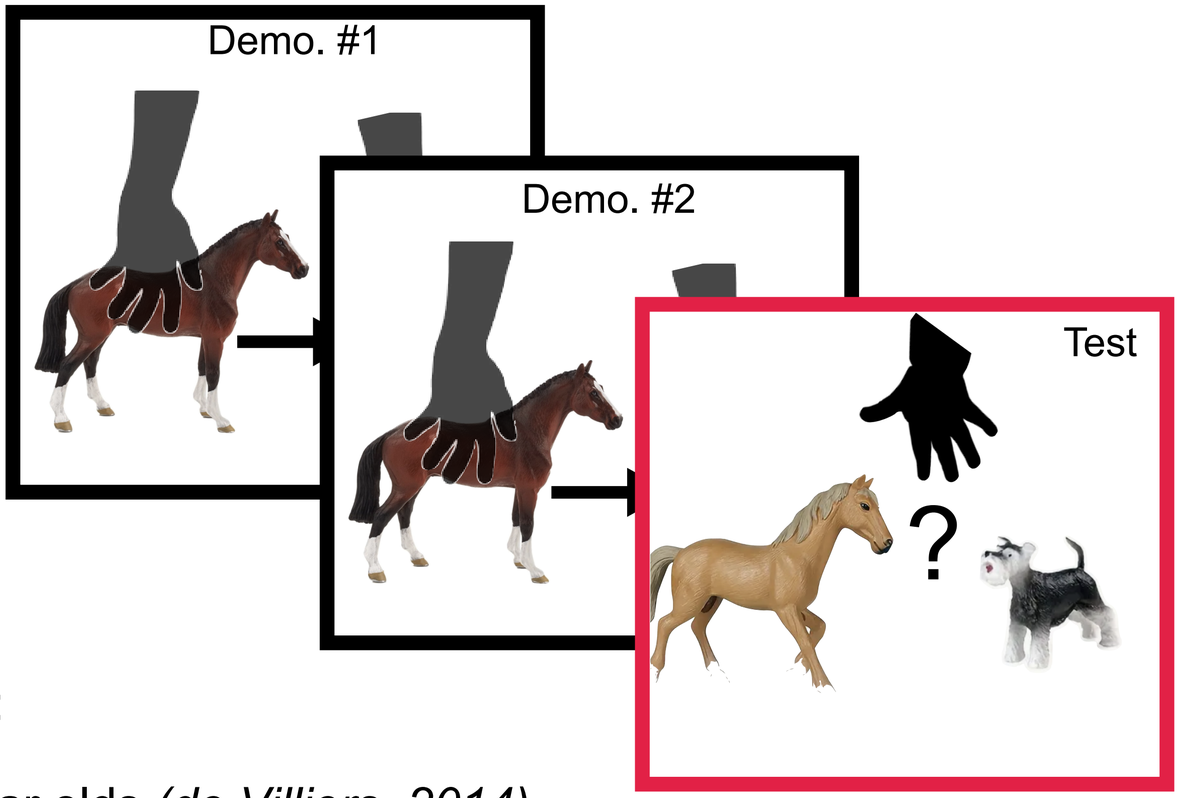

Performance depended on language proficiency

Age ranges:

- 2;6- 5 year olds *(de Villiers, 2014)*
- 3;4-15;3 year olds, including children with neurodevelopmental disorders *(Hinzen et al 2022)*

The role of language in 2-place events

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Acquiring transitive syntax

Distinct role representations

Conceptual capacity

Creating/acquiring transitive syntax

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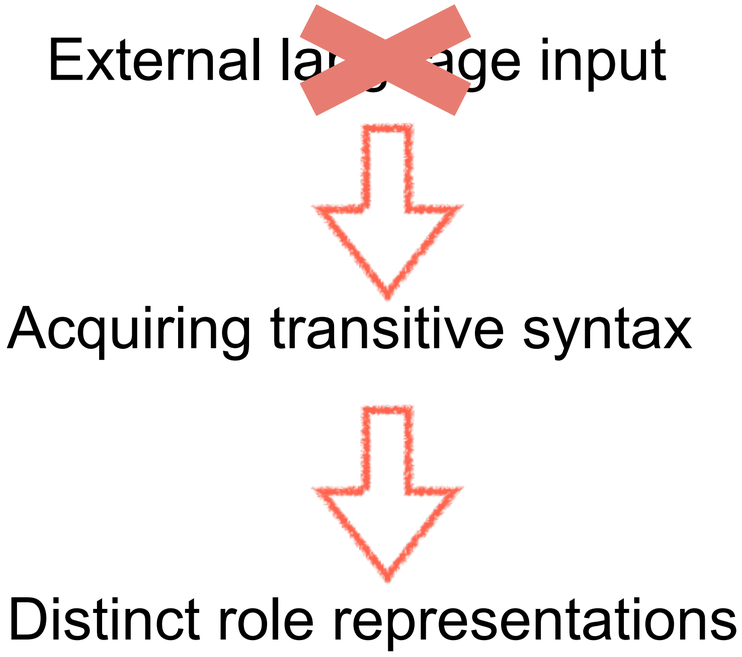
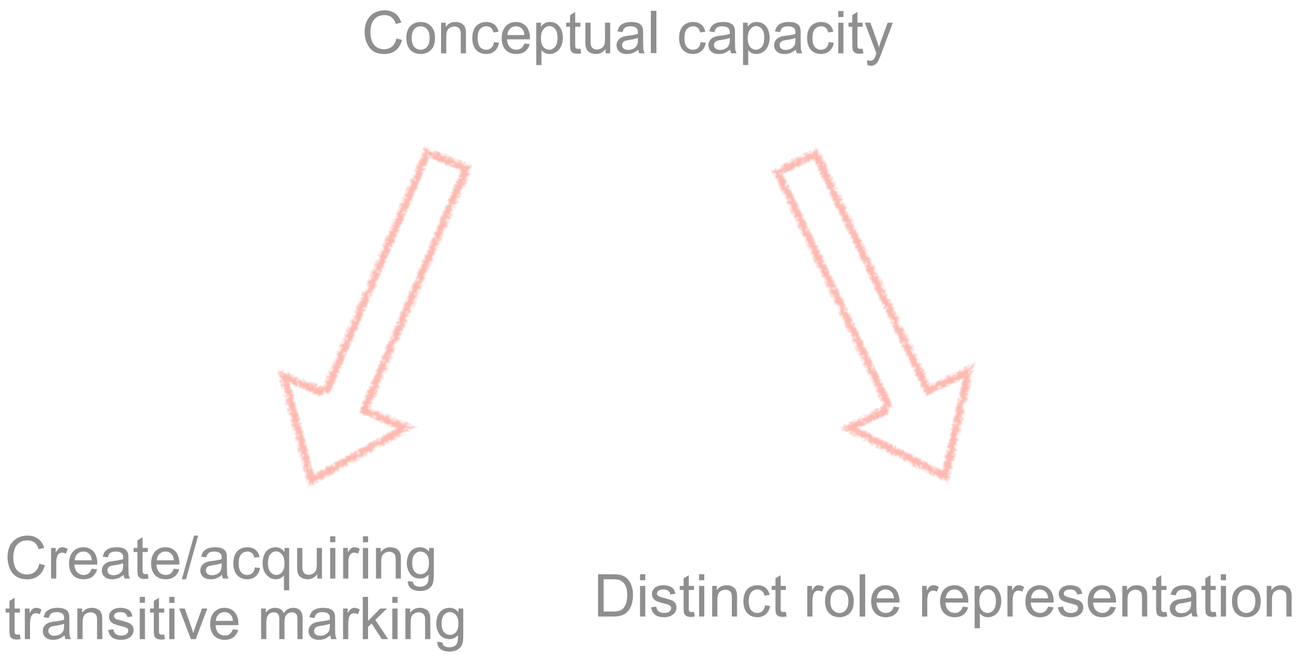
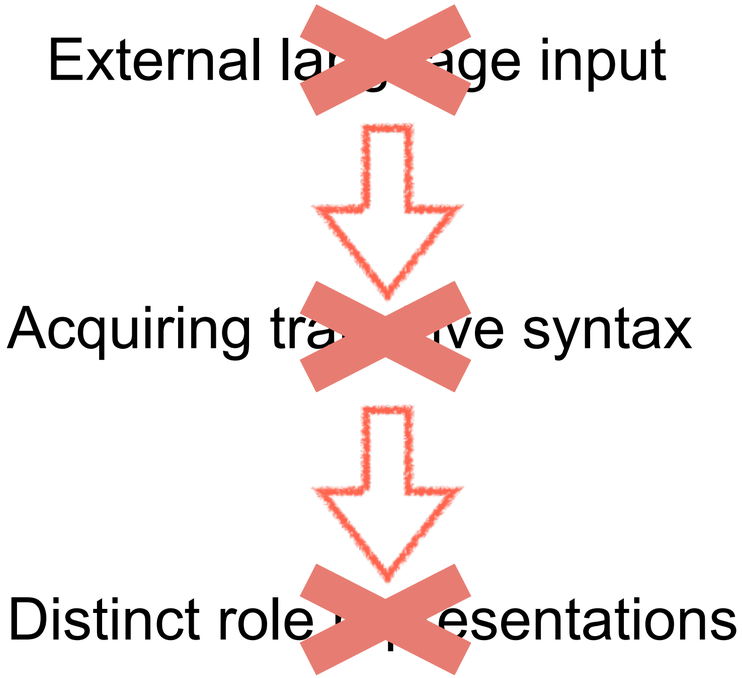
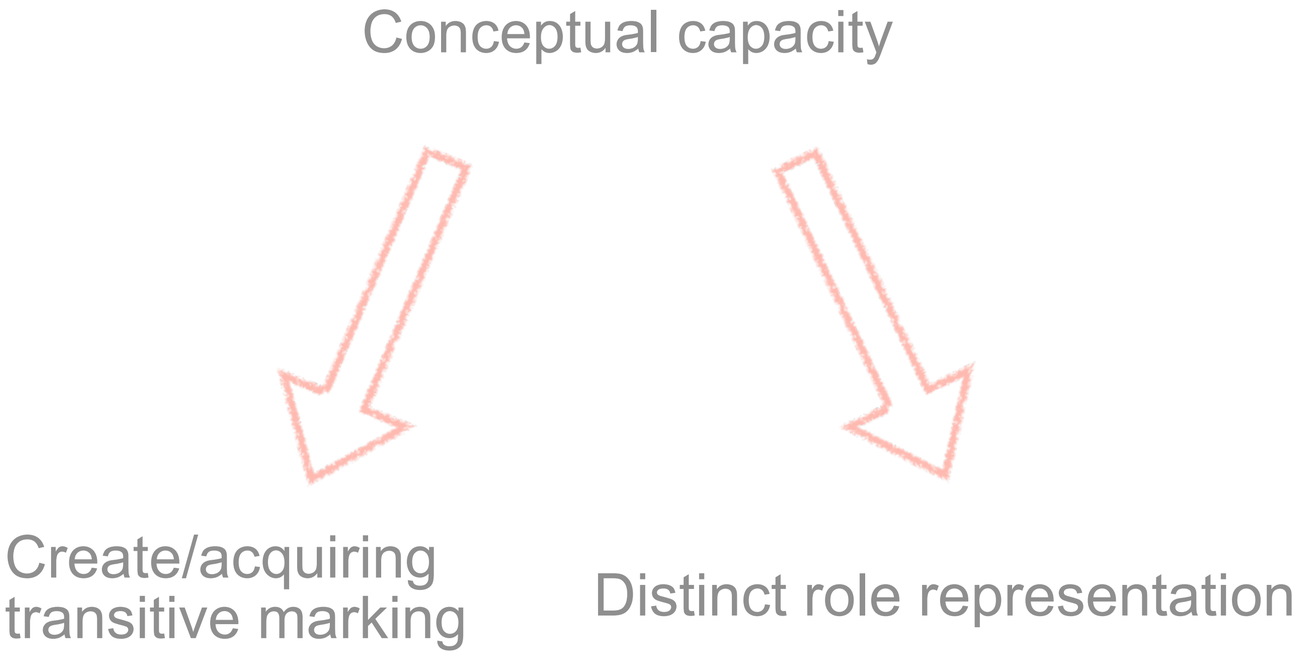
The role of language in 2-place events





The role of language in 2-place events





Nicaragua homesigners

- Deaf people who didn’t have access to Language input when they were growing up
- Have their own structured system of communication (e.g. Goldin-Meadow & Mylander, 1983)
- Structure of their communication system not coming from parental input (Carrigan & Coppola, 2017)

Participants

Two different groups

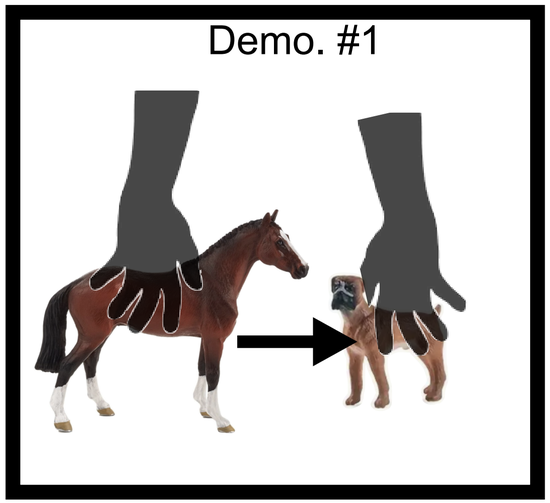
5 year olds

- Baseline validation of the task in group with transitive syntax
- N = 15

Adult Homesigners

- **Can they represent distinct roles?**
- N = 8

Methods



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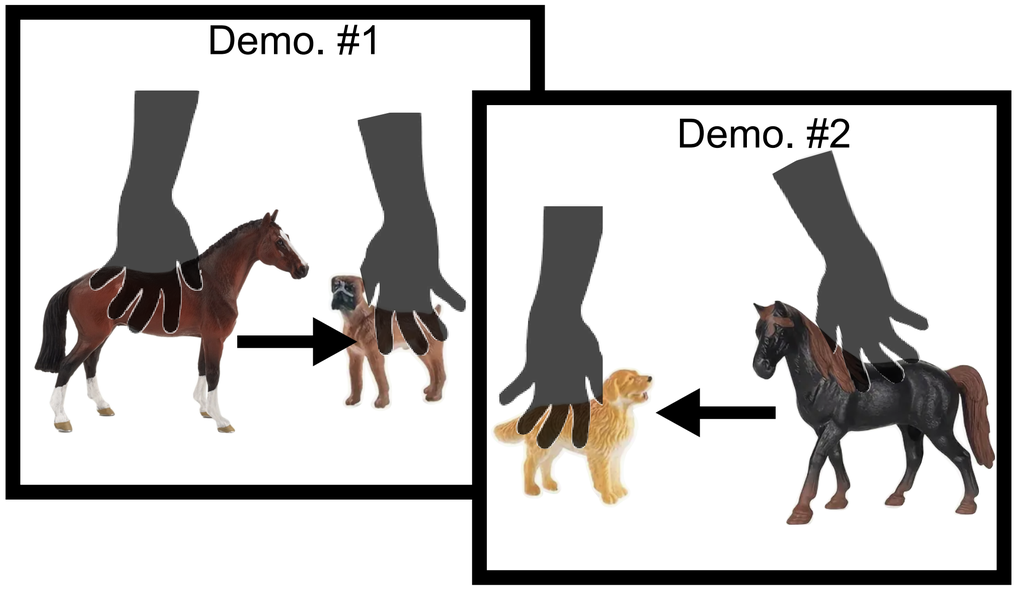

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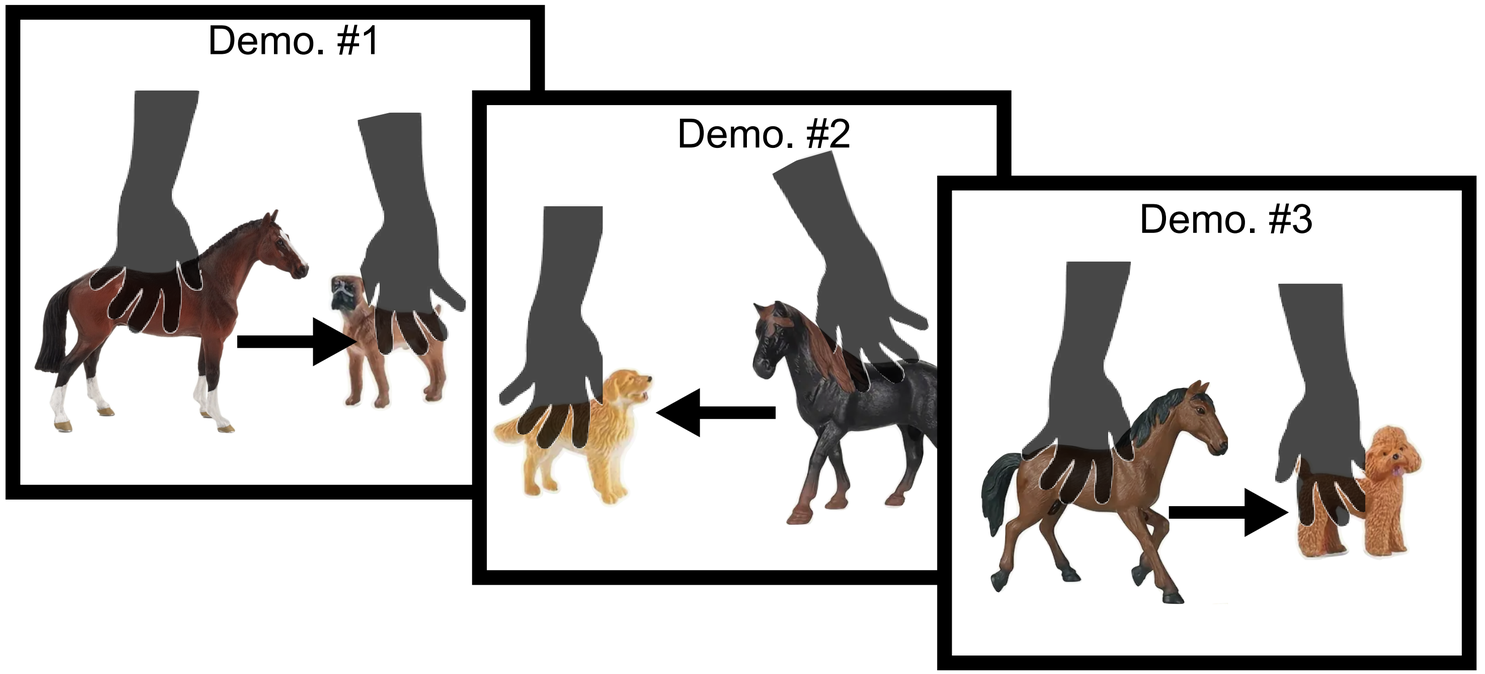
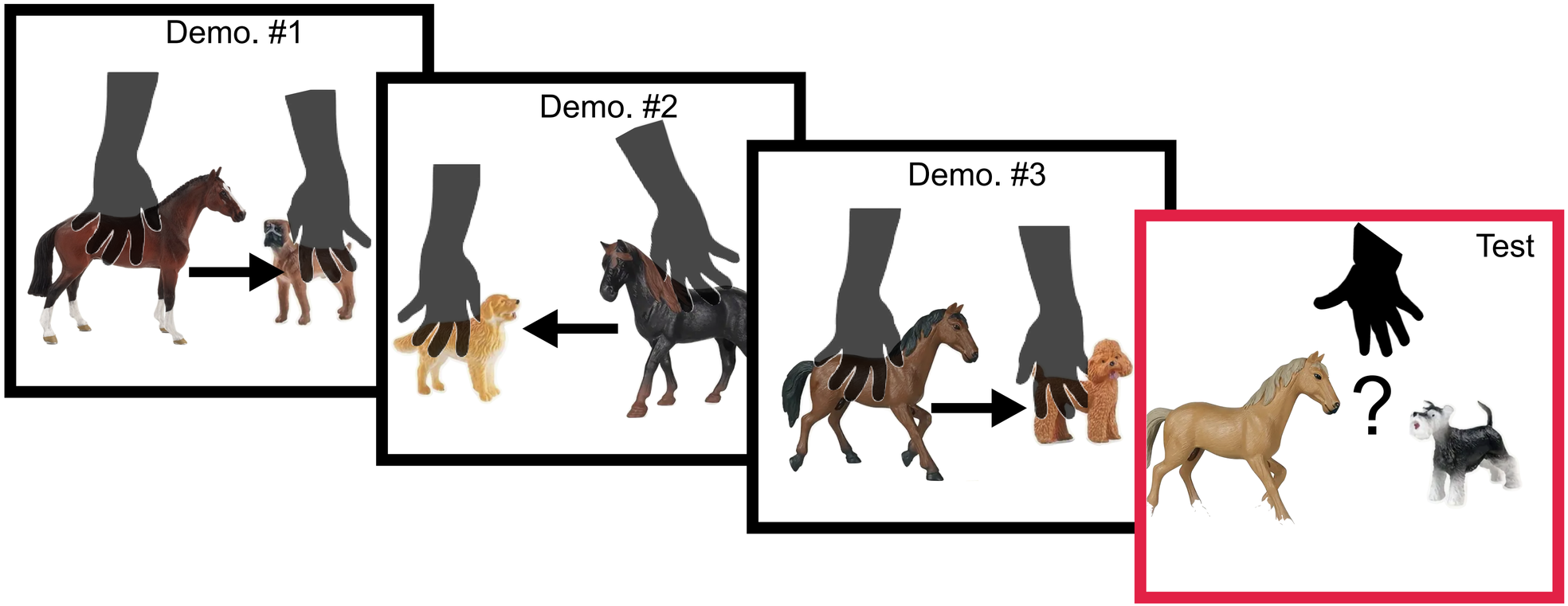


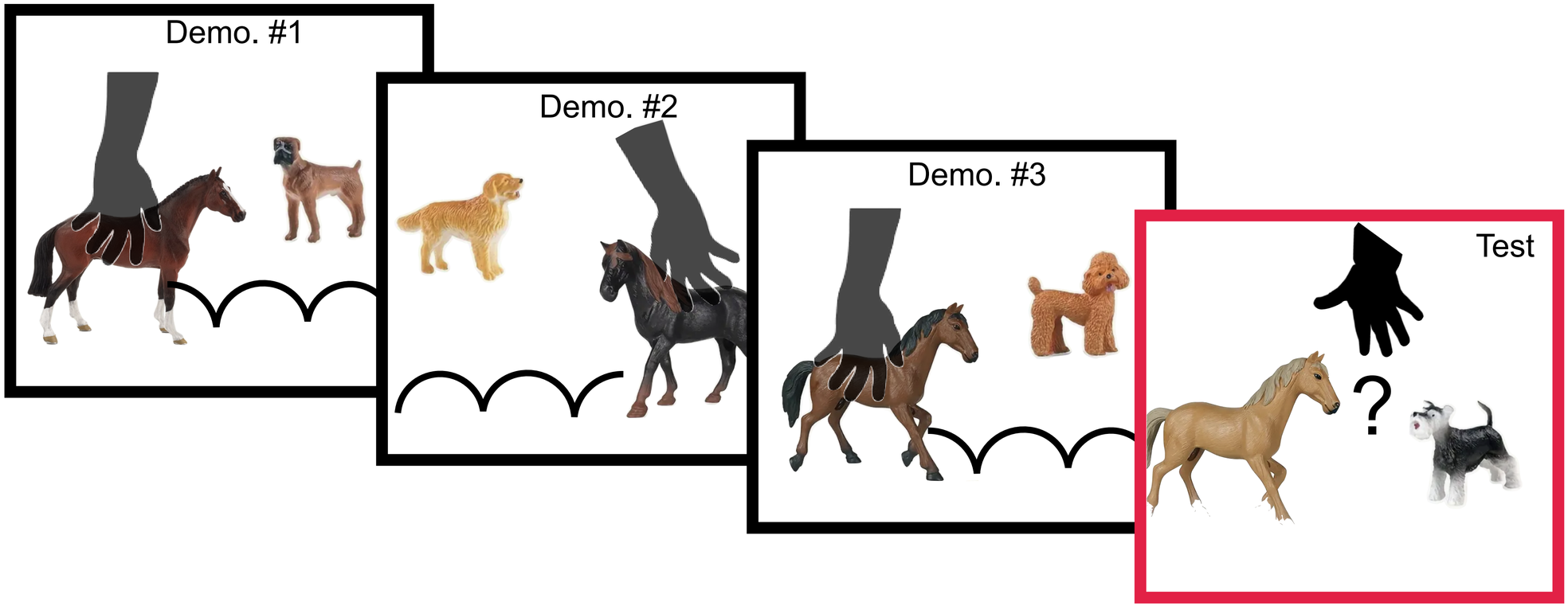
Methods

2-place event trial



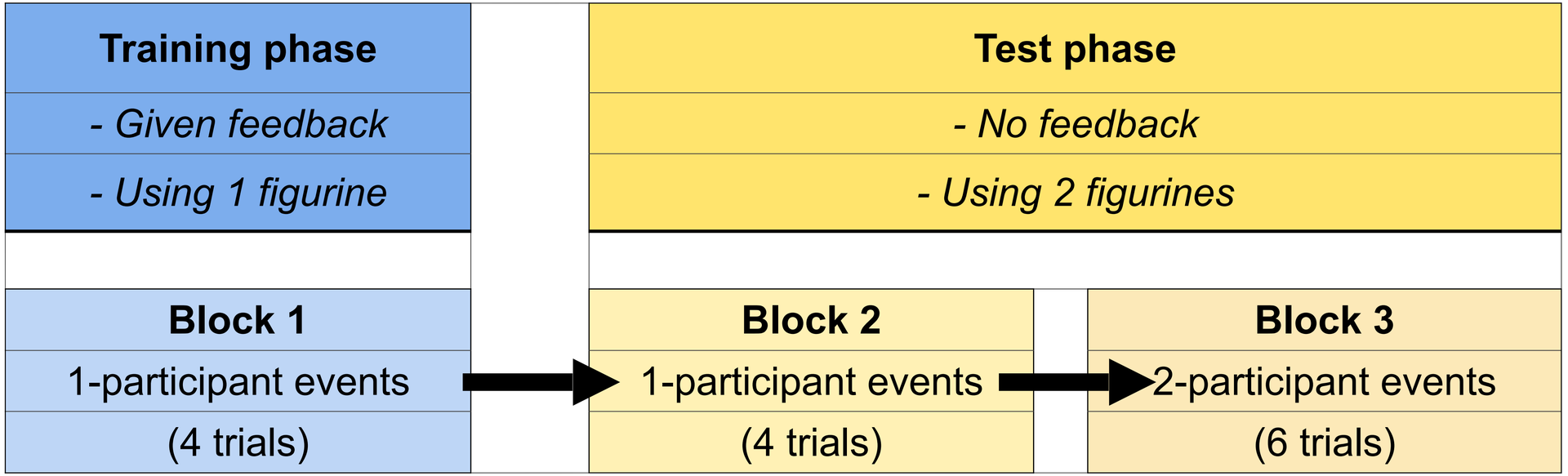
Methods

1-place event trial



Methods

Procedure



Example of a 1-place event trial

Example of a 2-place event trial

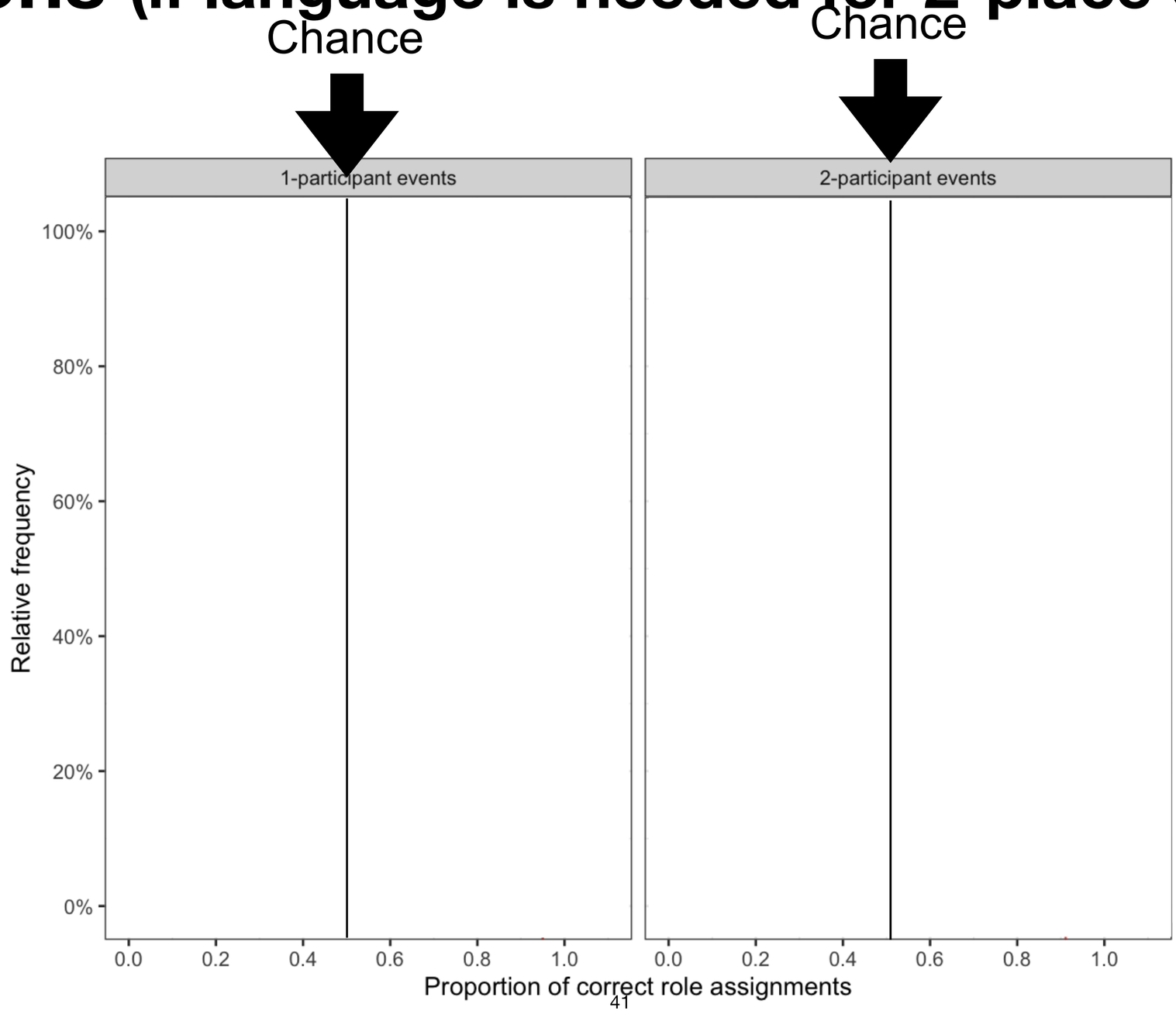
Coding the results

- Coding strategy:
    1. Isolate participant response (coder unaware to original action)
    2. Code action (task validation)
    3. Code agent (critical)

Coding the results

- Coding strategy:
  1. Isolate participant response (coder aware to original action)
  2. Code action (task validation)
  3. Code agent (critical)
- 2 coders, unaware to condition:
  - 93% agreement for agent
  - 91% agreement for action

Predictions (if language is needed for 2-place events)



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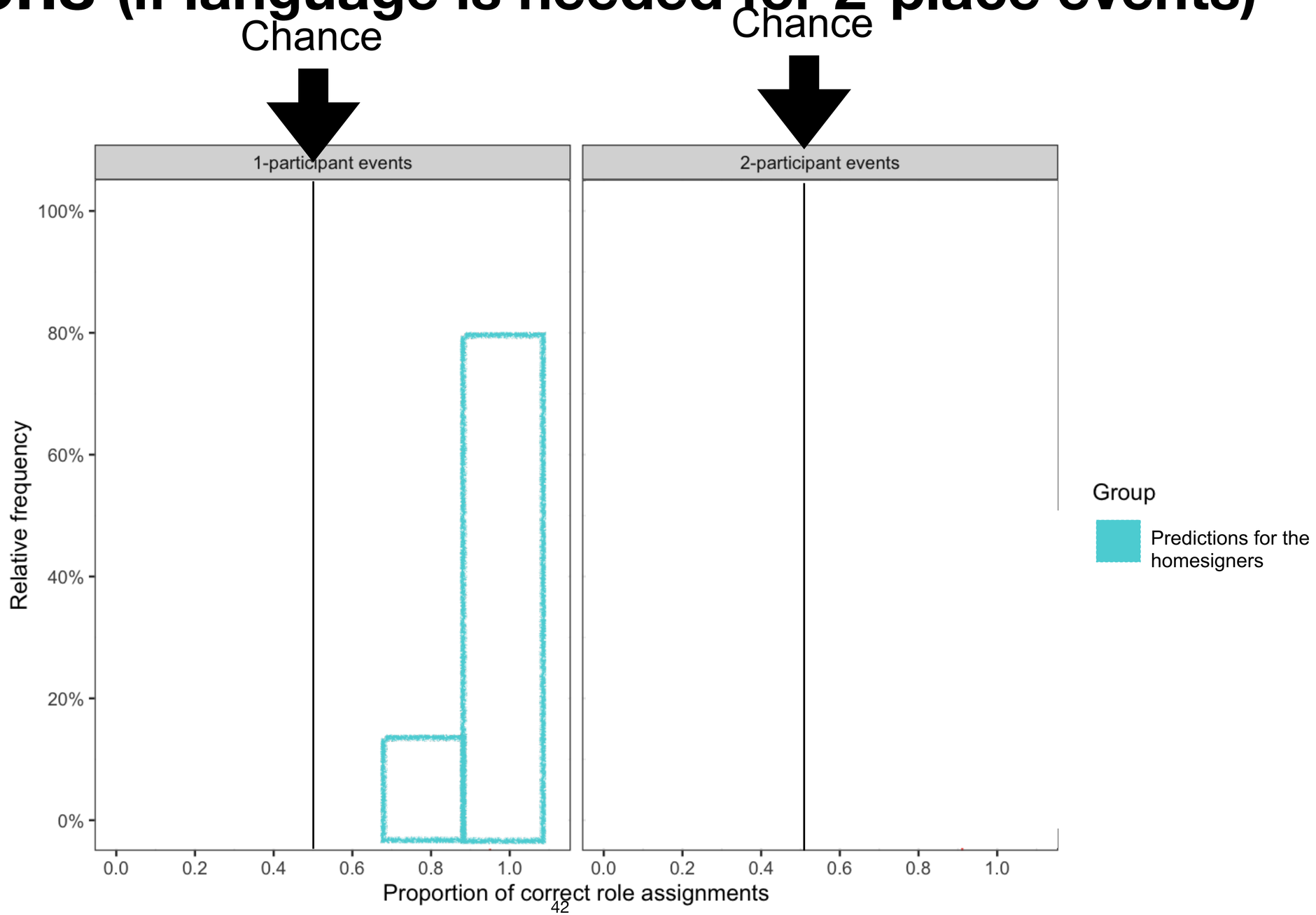

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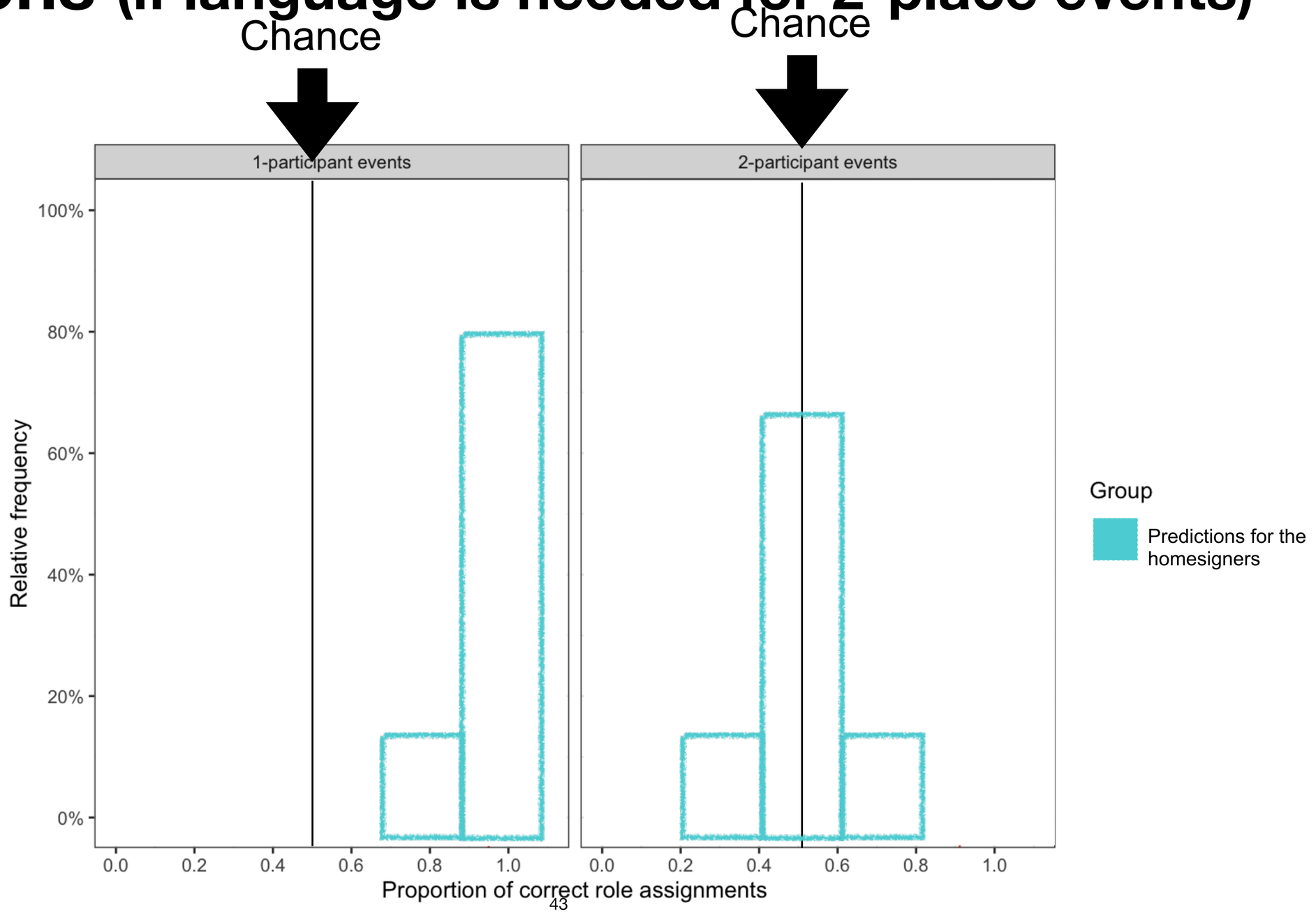
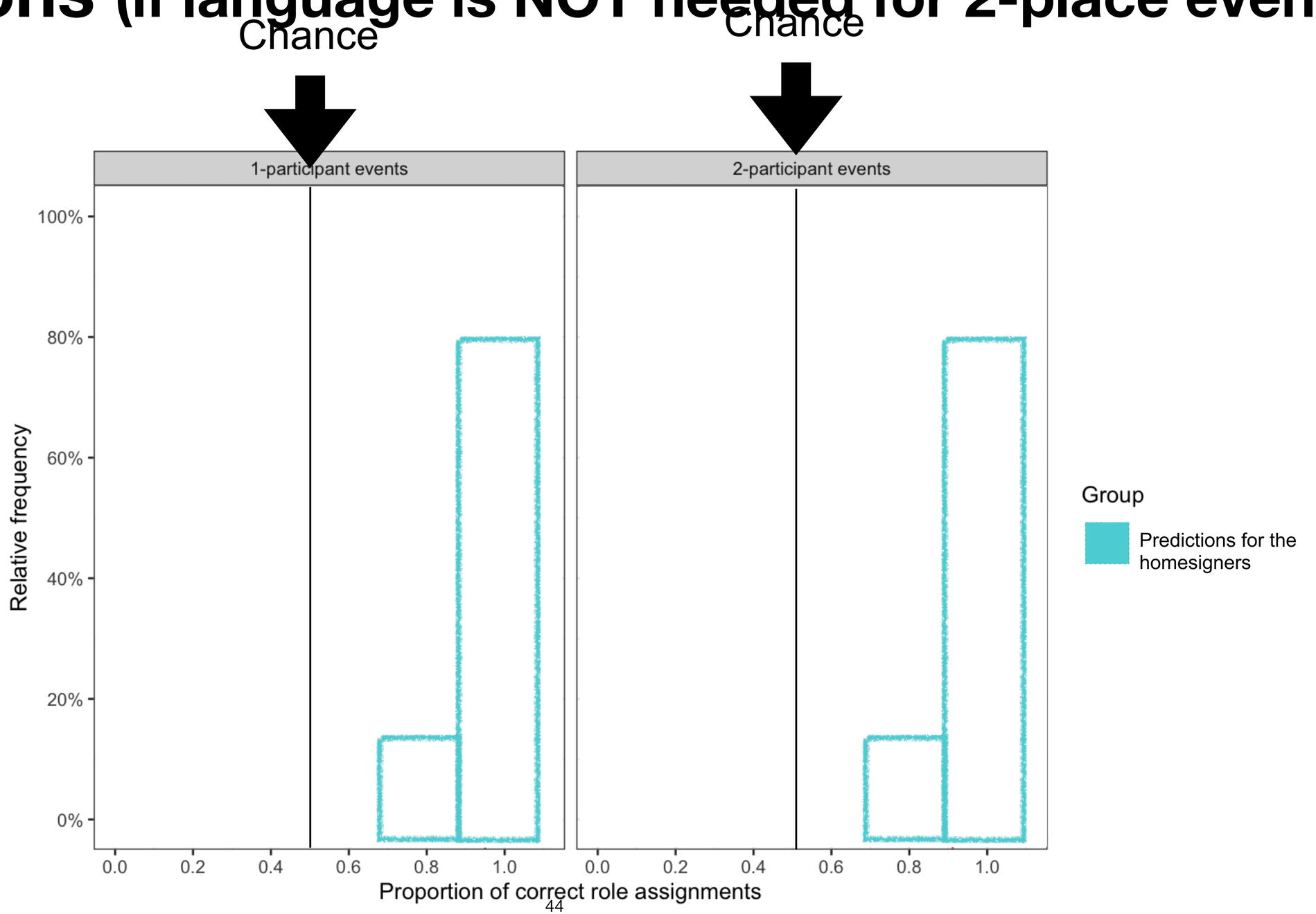
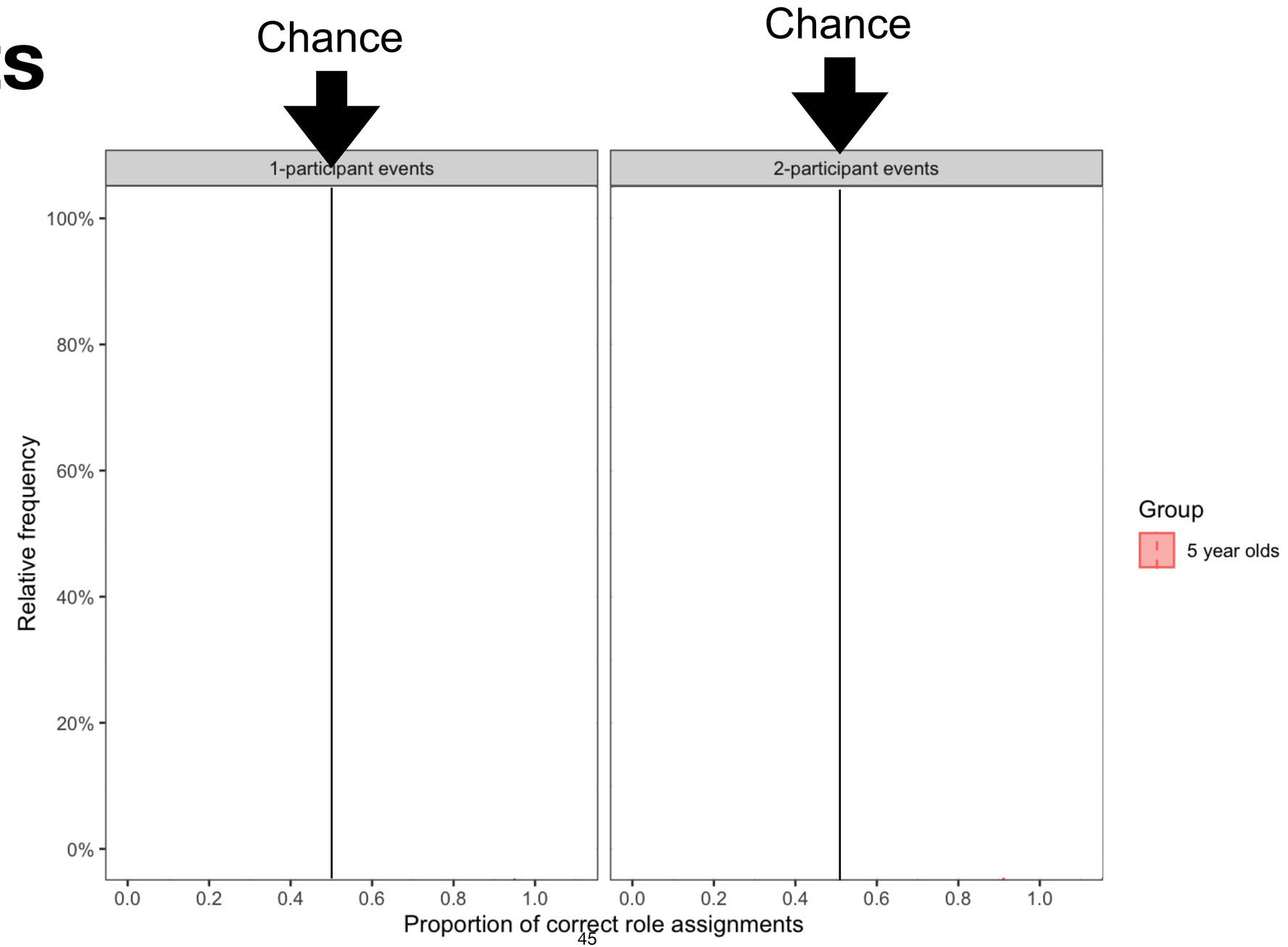


Predictions (if language is NOT needed for 2-place events)



Results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1-participant events
2-participant events
100%
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Proportion of correct role assignments
Group
5 year olds

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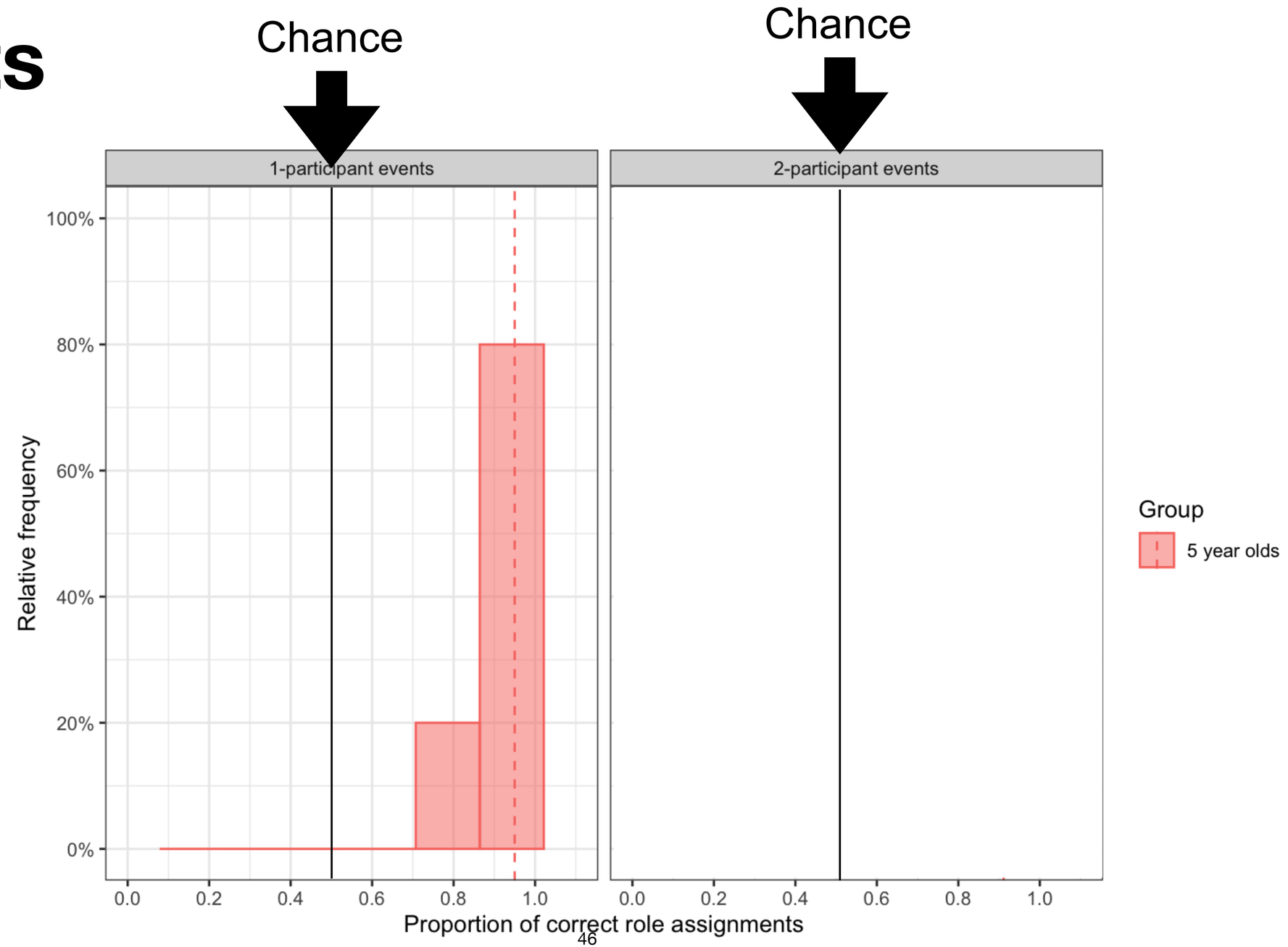
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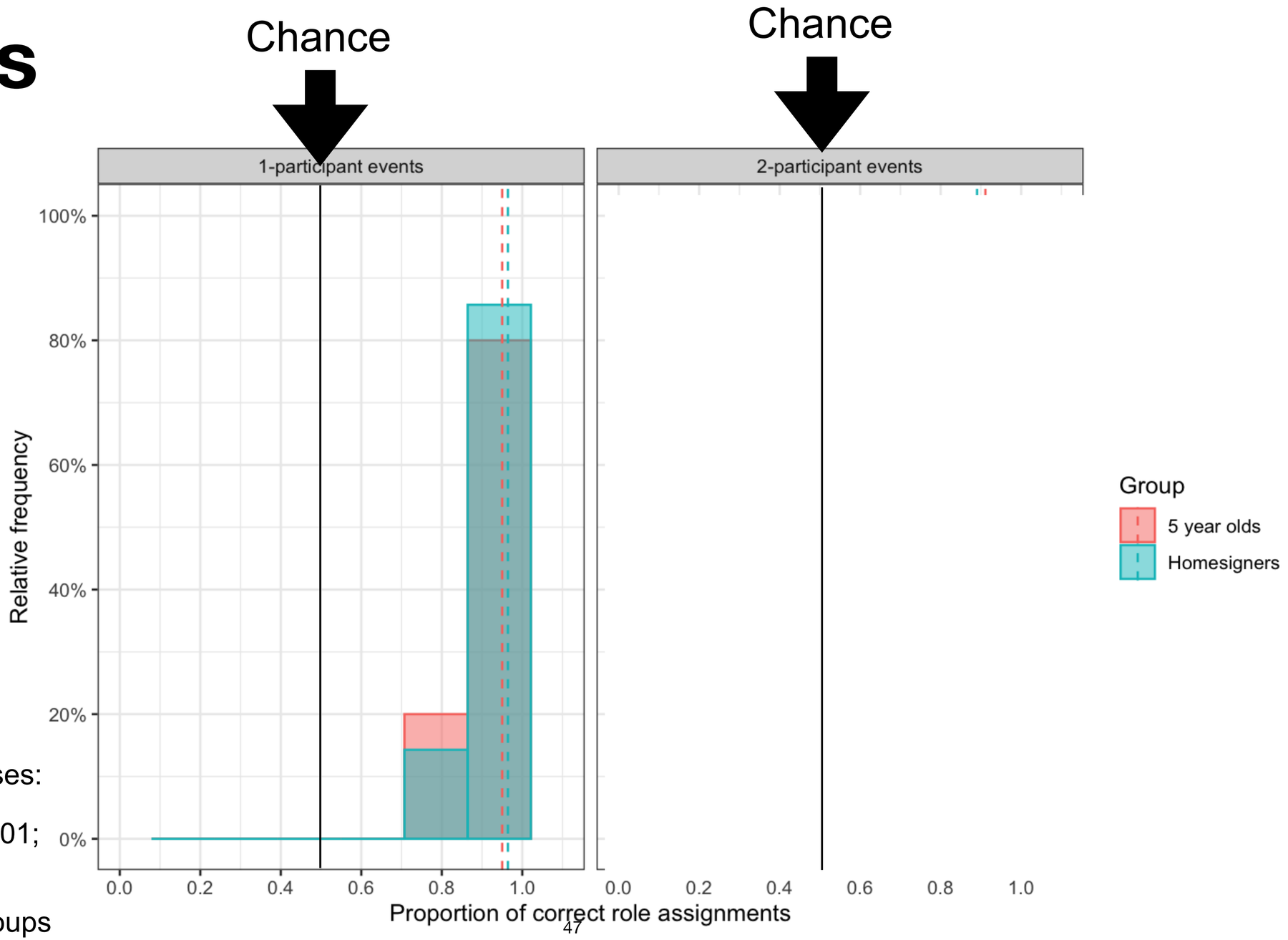
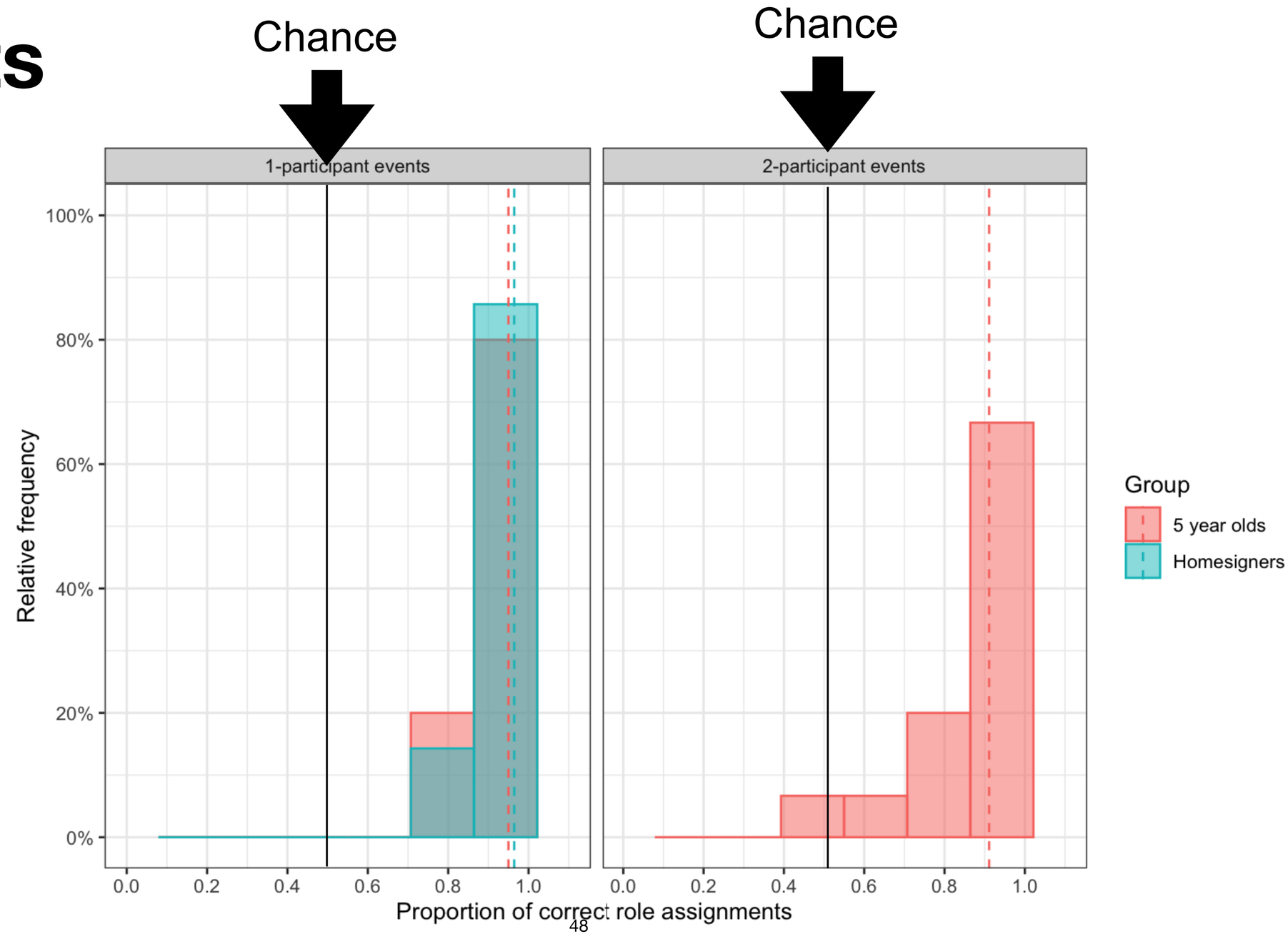


Logistic regression analyses:
Above 50% chance:
5 year olds: β= 3.01, p<.001;
Homesigners, β= 2.05, p<.001
no difference between groups

Results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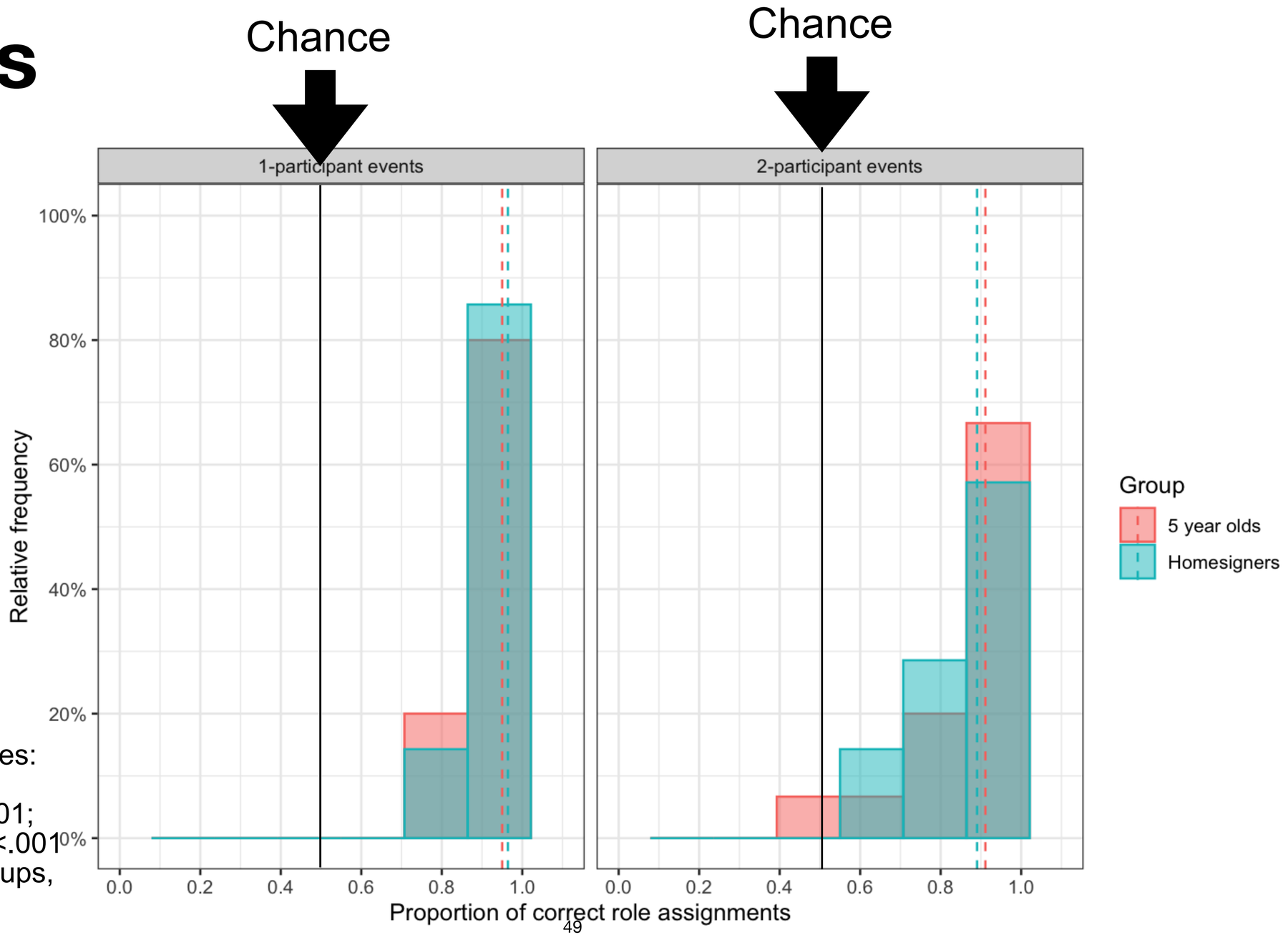

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Above 50% chance:
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Homesigners, β= 2.05, p<.001
no difference between groups, nor conditions

The role of language in abstract transitive relationships?

- People lacking a language model are able to encode and generalize 2-place relationships

The role of language in 2-place events

The two hypotheses revisited

External language input

Acquiring transitive syntax

Distinct role representations

Conceptual capacity

Creating/acquiring transitive syntax

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The role of language in abstract transitive relationships?

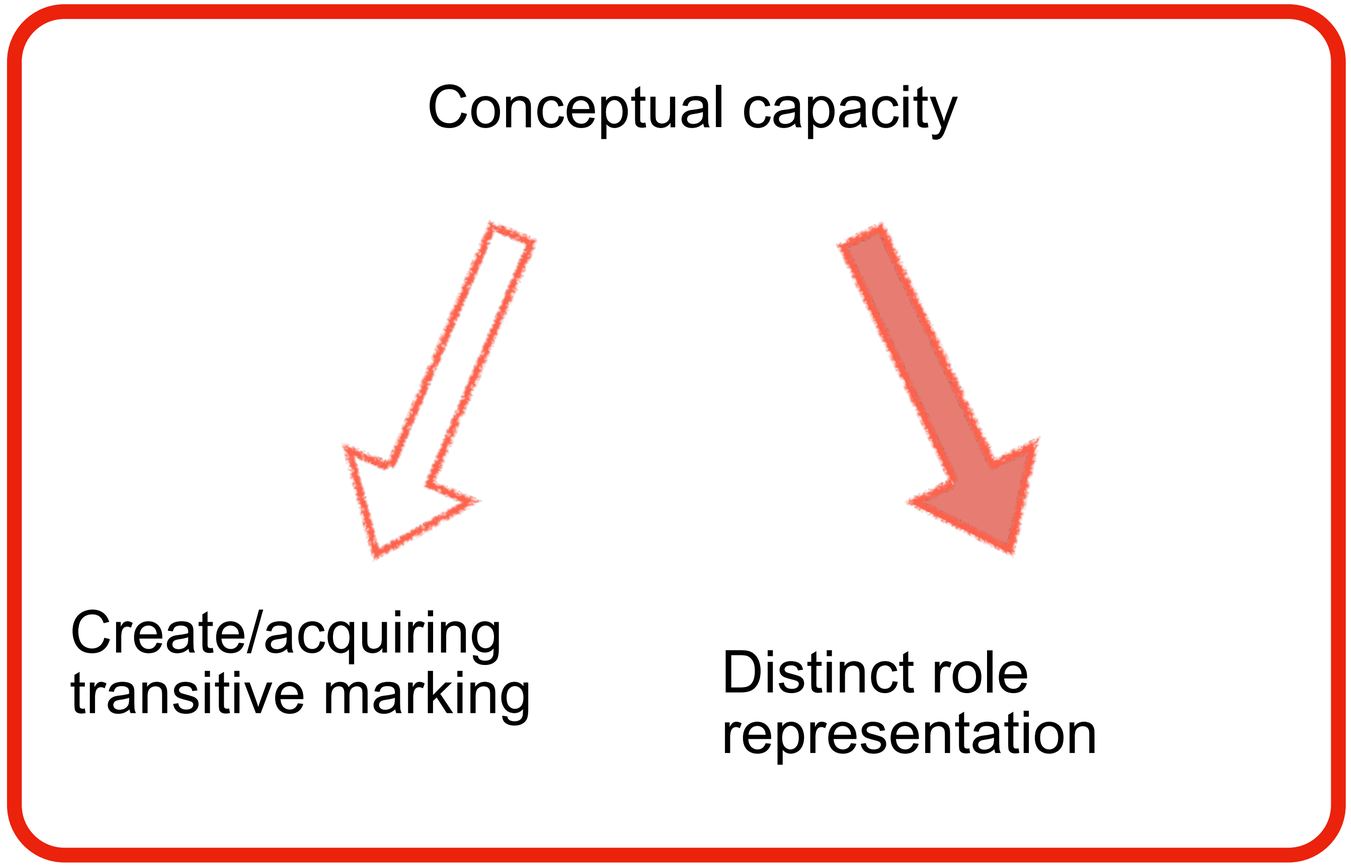
- People lacking a language model are able to encode and generalize 2-place relationships

- How were homesigners able to encode these relationships?

How were homesigners able to encode 2-place events?

- People lacking a language model are able to encode and generalize 2-place relationships

- How were homesigners able to encode these relationships?

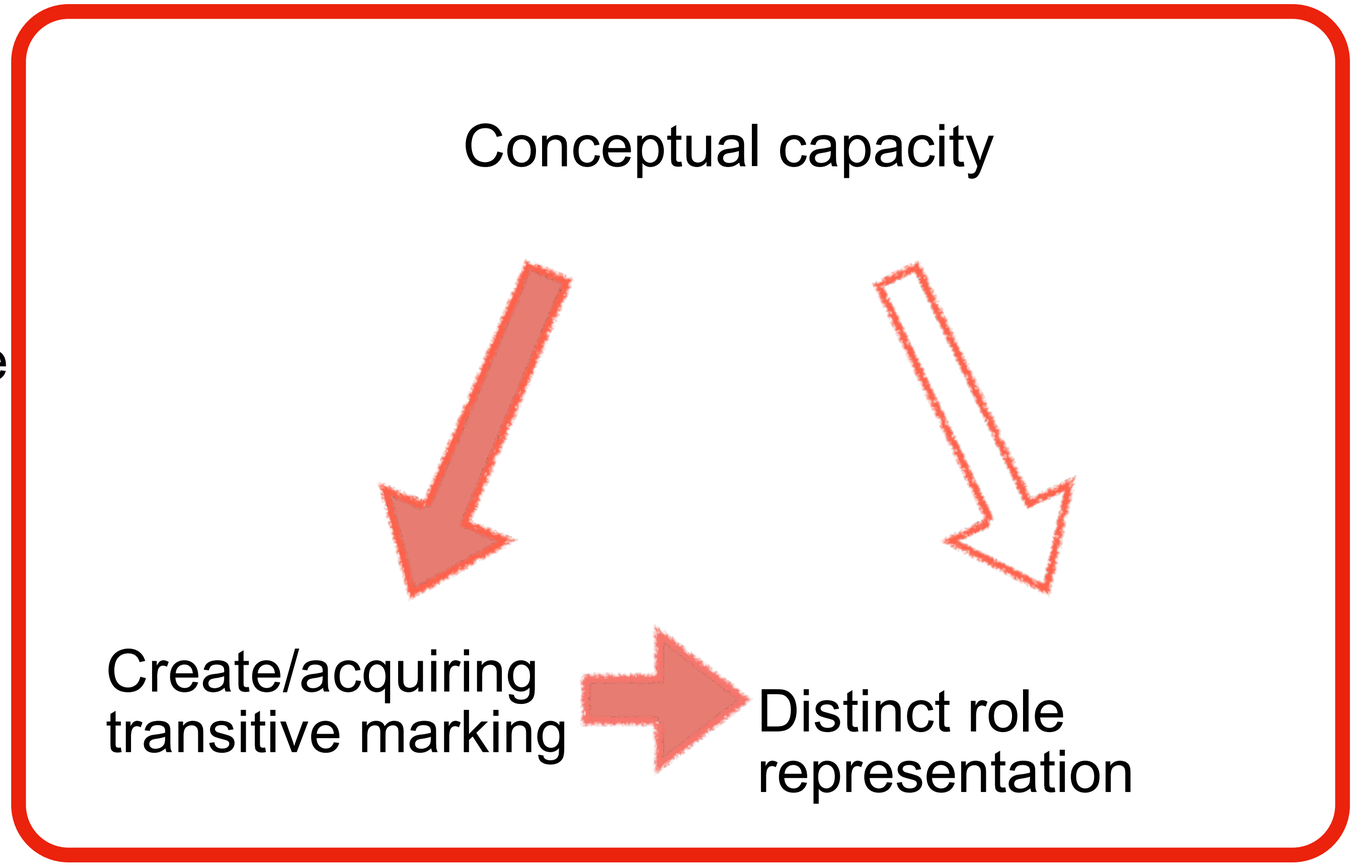


A. Linguistic encoding is unnecessary

How were homesigners able to encode 2-place events?

- People lacking a language model are able to encode and generalize 2-place relationships

- How were homesigners able to encode these relationships?



B Homesigners possess some means of linguistically-encoding role information

The role of language in abstract transitive relationships?

- People lacking a language model are able to encode and generalize 2-place transitive relationships

- How were homesigners able to encode these relationships?
  A. Linguistic encoding is unnecessary
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The role of language in abstract transitive relationships?

- People lacking a language model are able to encode and generalize 2-place transitive relationships

- How were homesigners able to encode these relationships?
  A. Linguistic encoding is unnecessary
  B. Homesigners possess some means of linguistically-encoding role information

- What resources do homesigners have to express role information? (Kocab et al, Sunday 10th @ 9am!)

Many thanks to all participants and their families!

Thank you!

RA's involved in the project:


Eleni Livingston


Hanna Shine

Collaborators:


Madeline Quam


Marie Coppola


Jesse Snedeker


Annemarie Kocab

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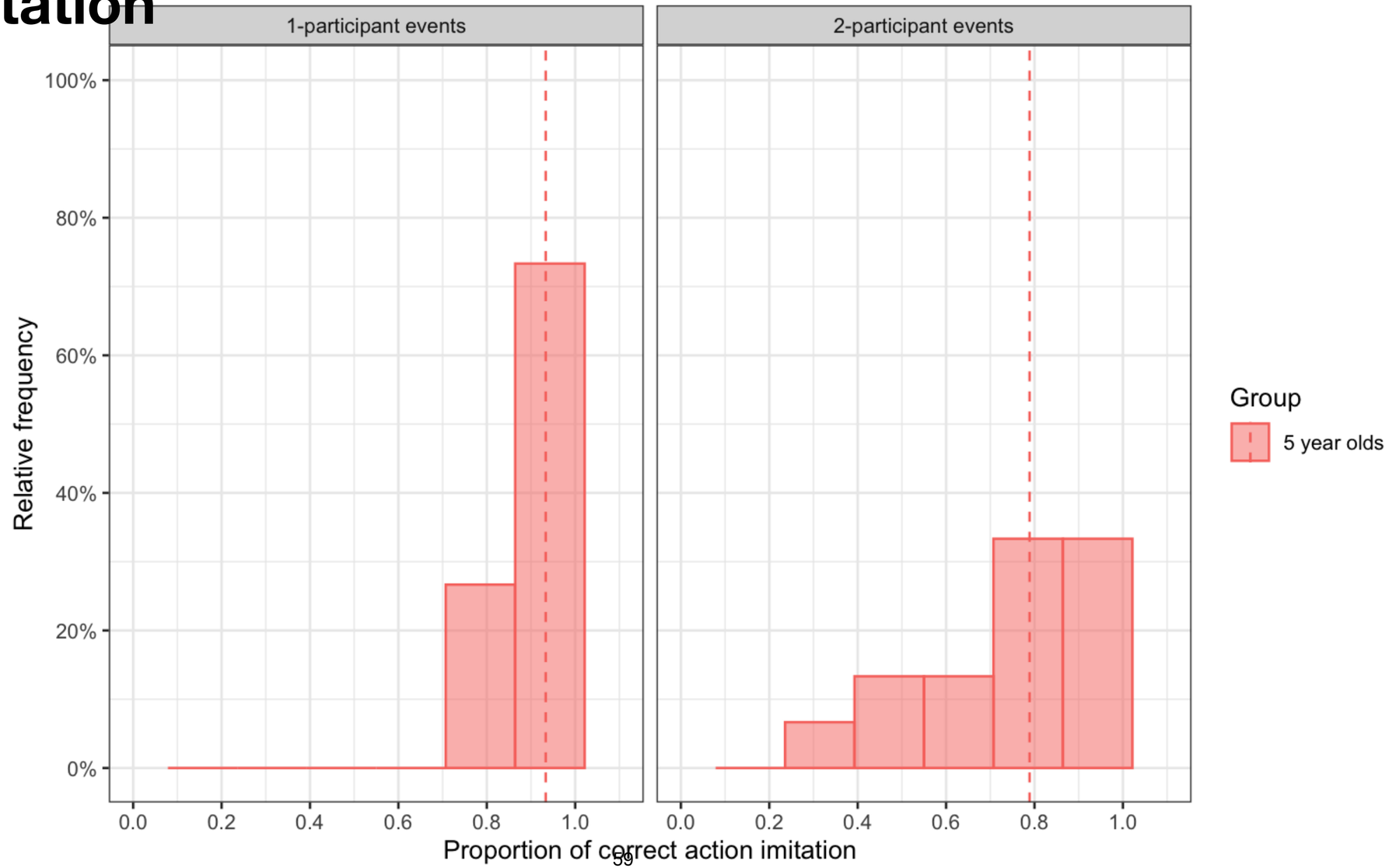
Imitation task

Action imitation



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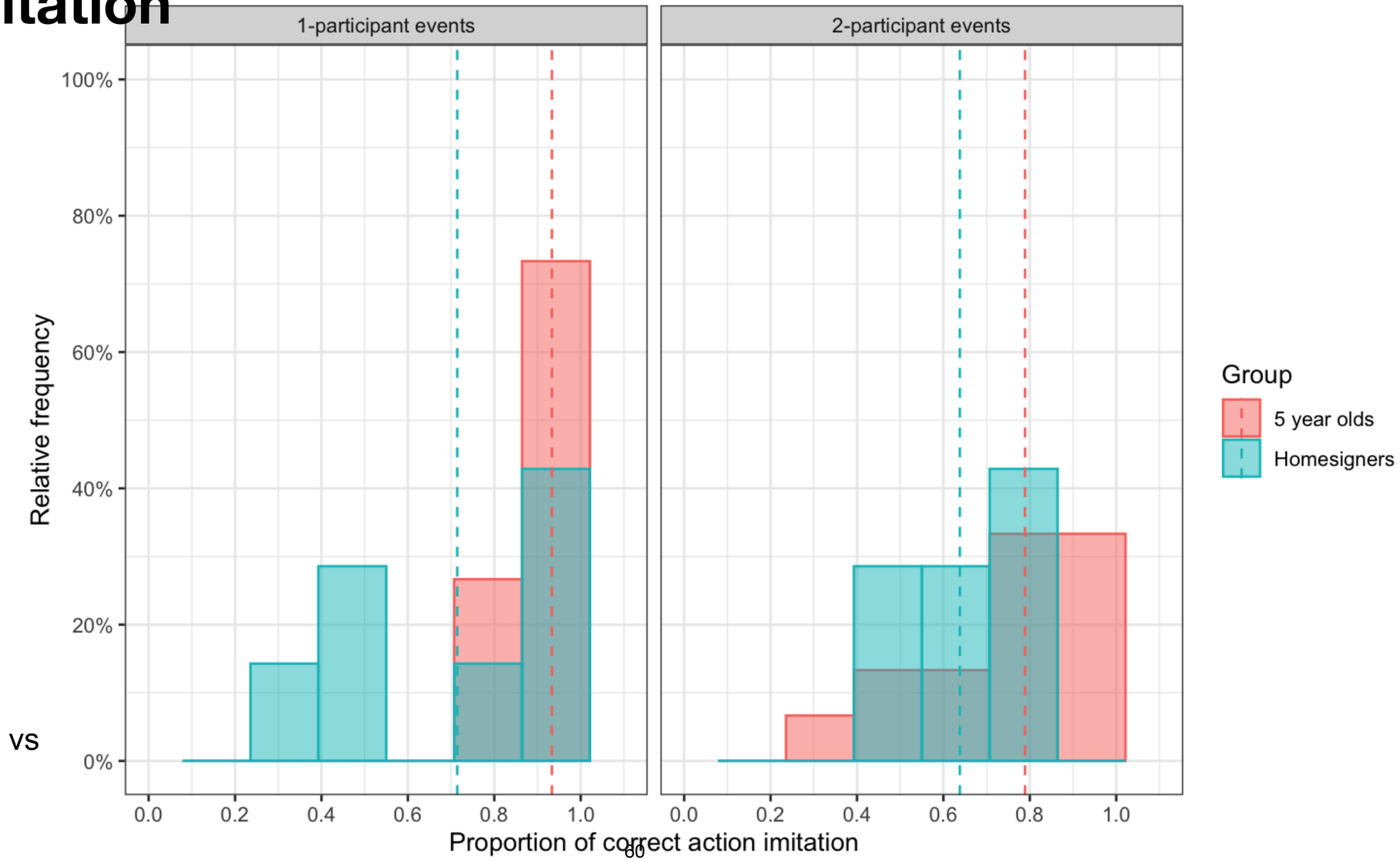

Logistic regression analyses:interaction between group (children vs homesigners) and event participants (β= 2.18 p<.001)

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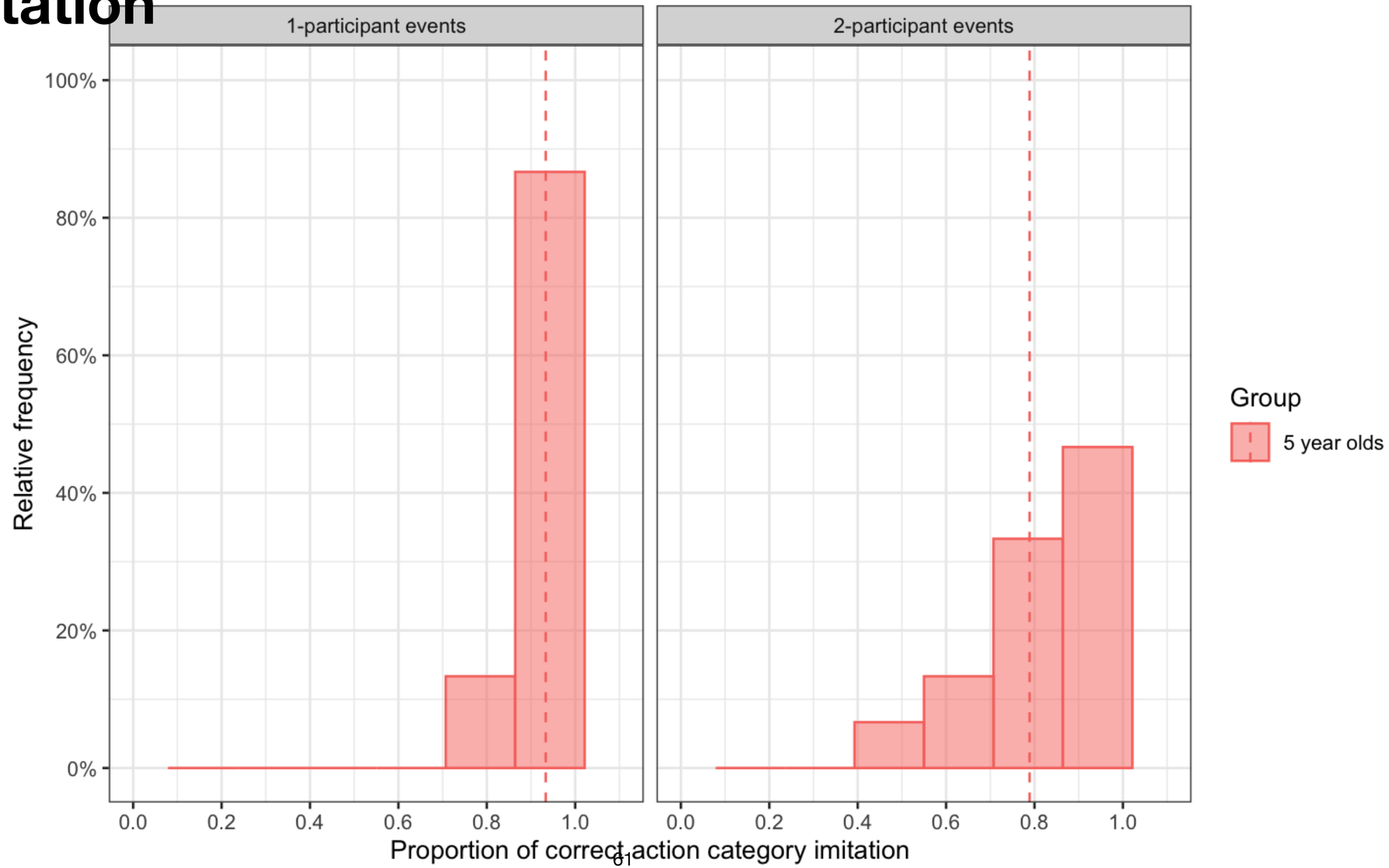

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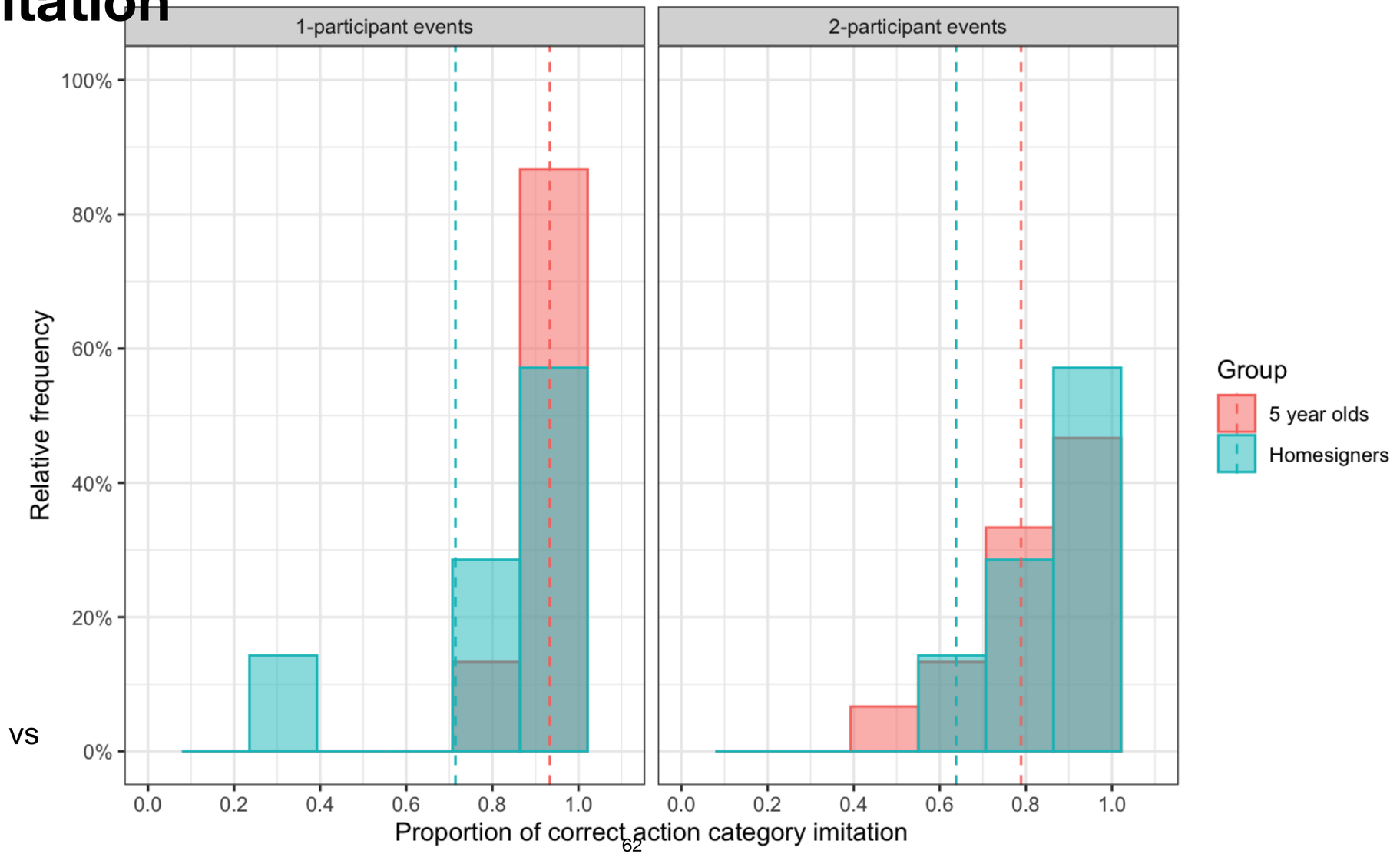

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