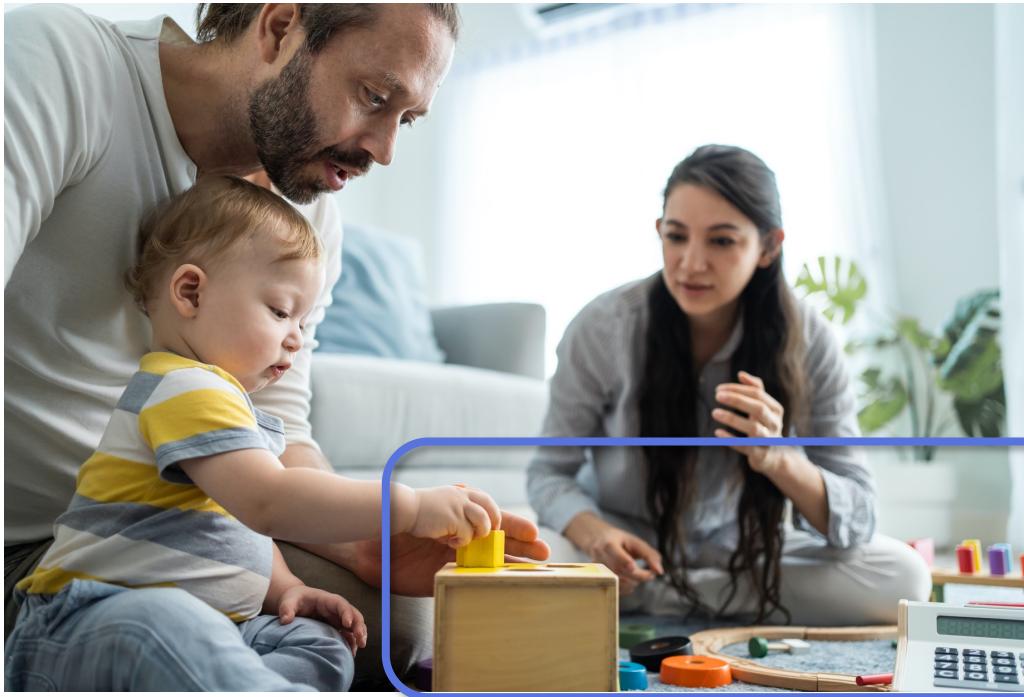


To Learn or Not to Learn? Surprise-Induced Learning Following Violations of Social Expectations

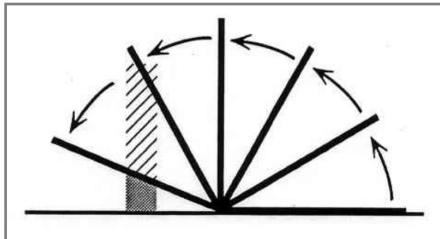
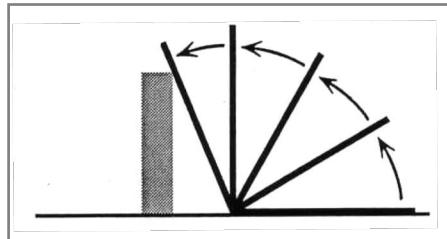
Qiong Cao¹, Alexis Smith-Flores^{1,2}, Jasmin Perez¹, & Lisa Feigenson¹

¹Johns Hopkins University, ²University of California San Diego

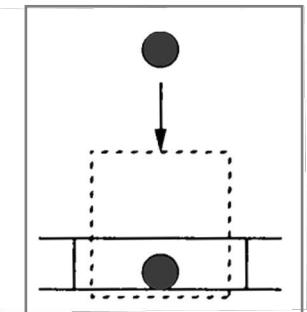
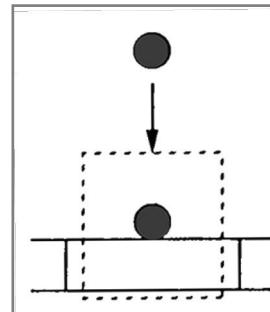
SRCD 2023, Salt Lake City



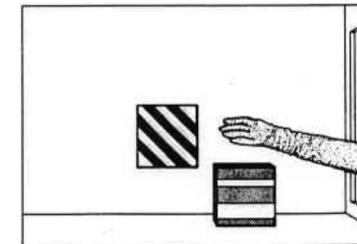
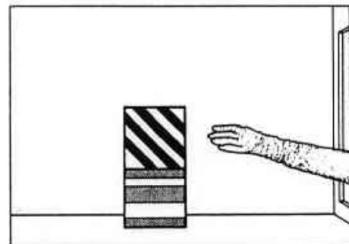
Infants hold expectations about the **physical** world



Object permanence



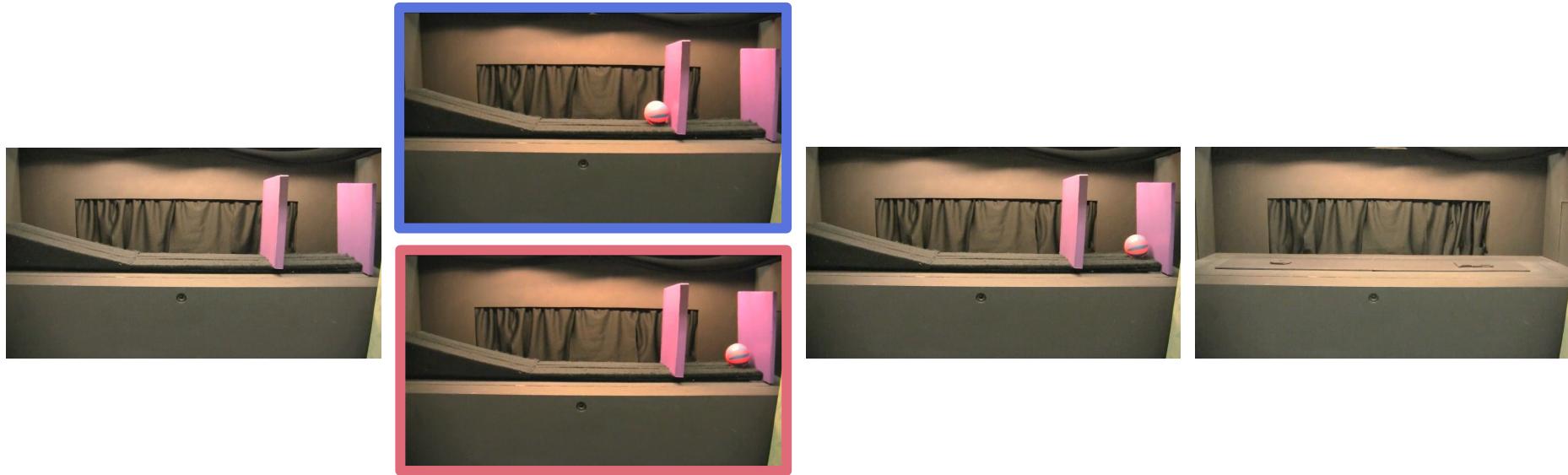
Solidity



Support

(Spelke et. al, 1992; Baillargeon, 1991, 1994)

Surprise-induced learning after seeing physical violations



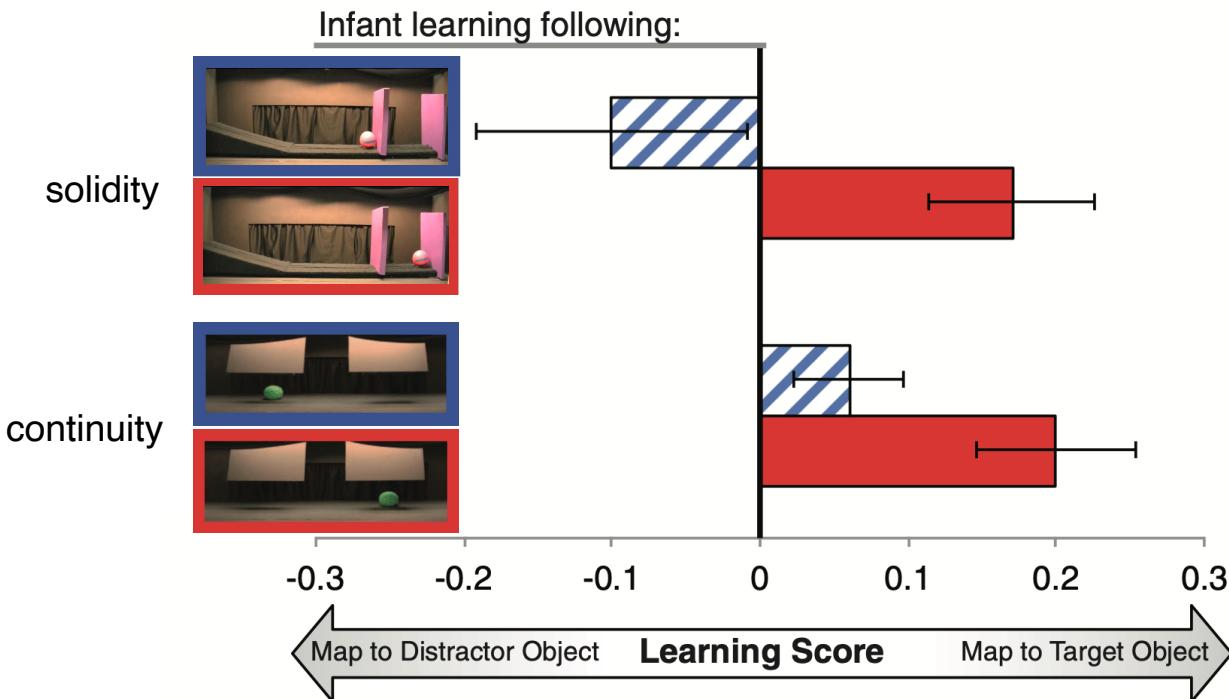
Physical Event

*Expected or
Surprising Outcome*

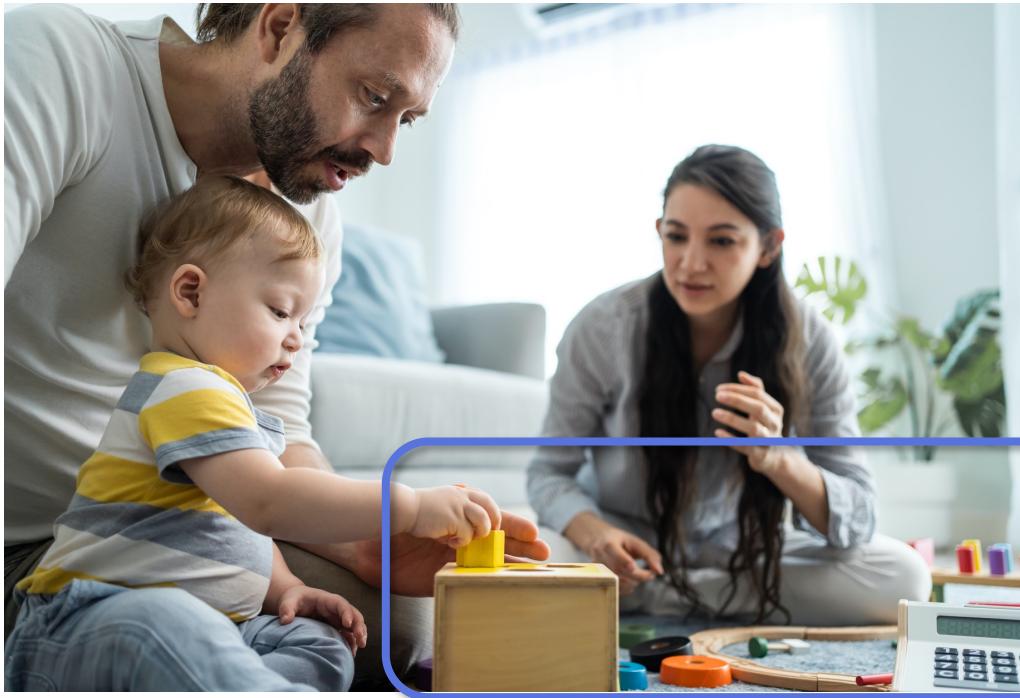
Teaching

*Testing
(Baseline & Mapping)*

Surprise-induced learning after seeing physical violations



Surprise-induced learning in the **physical** domain



Detect violations



Enhanced learning



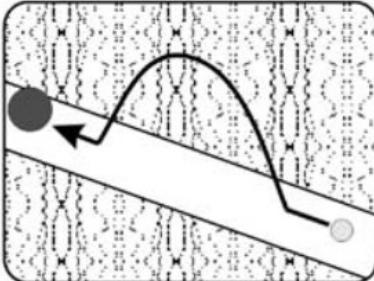
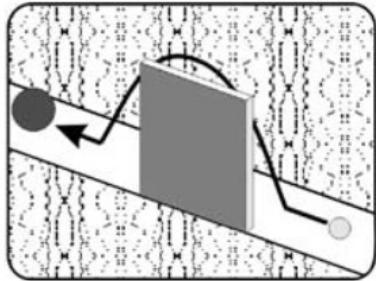
Surprise-induced learning in the **social** domain?



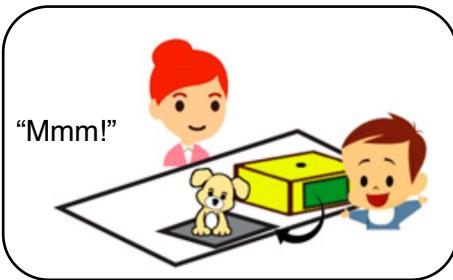
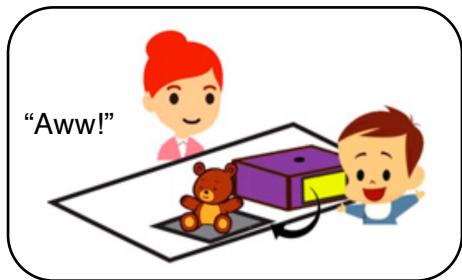
Detect violations

Enhanced learning

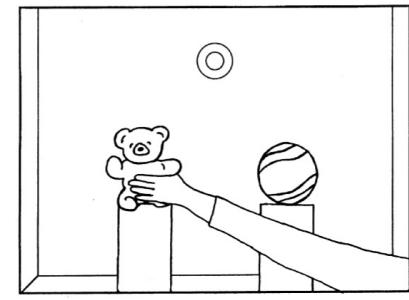
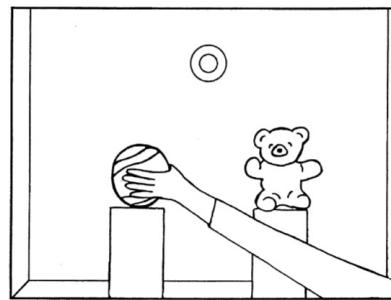
Infants hold expectations about the **social** world



Efficiency of action



Appropriate emotion



Consistent preference of goals

Surprise-induced learning in the **social** domain?



Detect violations



Enhanced learning?

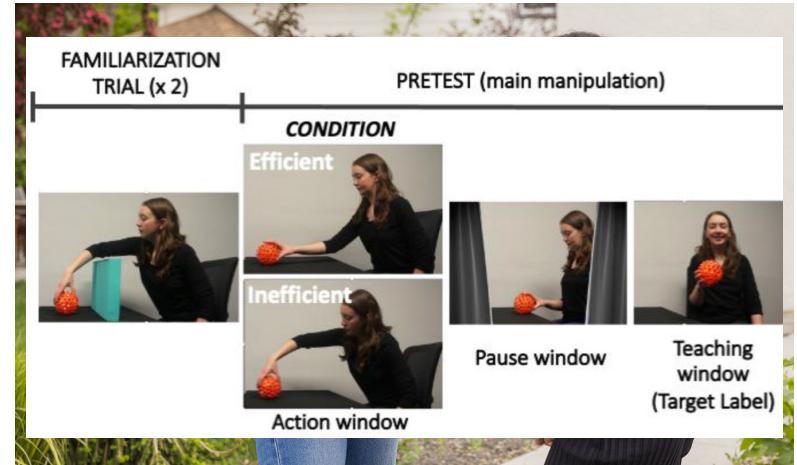


Surprise-induced learning in the **social** domain?

To Learn?



Not to Learn?



(Colomer & Woodward, 2023; Hirai et. al., 2021)

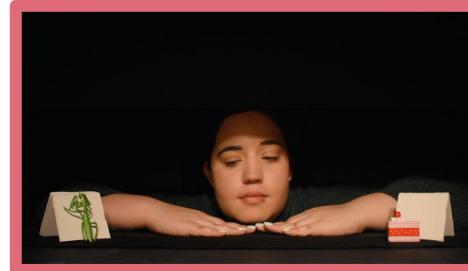
Expt. 1: Expectations about others' emotions



Expt. 1: Expectations about others' emotions



Expt. 1: Expectations about others' emotions



Familiarized with Agents

*Agent Produces **Expected** or
Surprising Emotional Response*



*Different Person
Teaches Object Label*

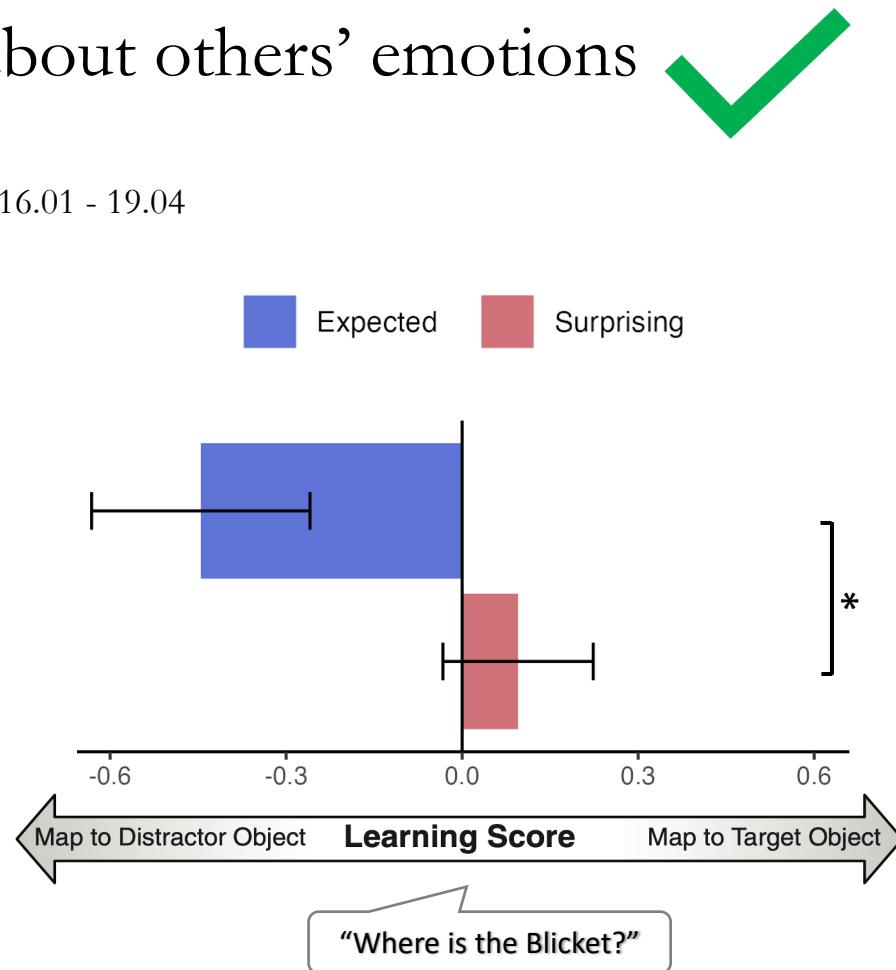
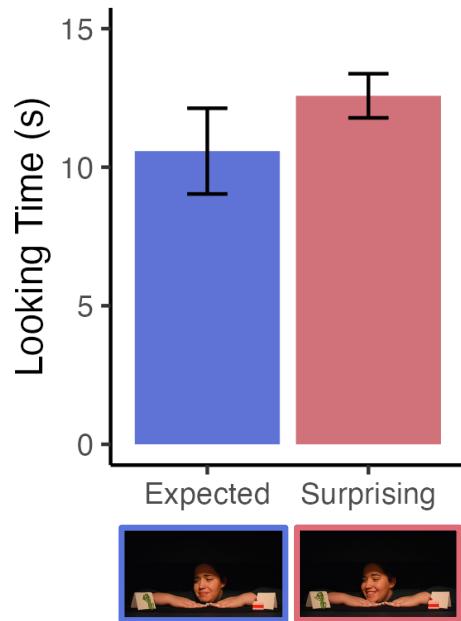


*Test of Learning
(Baseline & Mapping)*

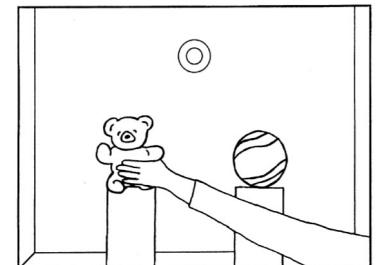
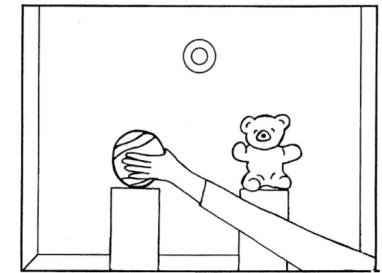
Expt. 1: Expectations about others' emotions



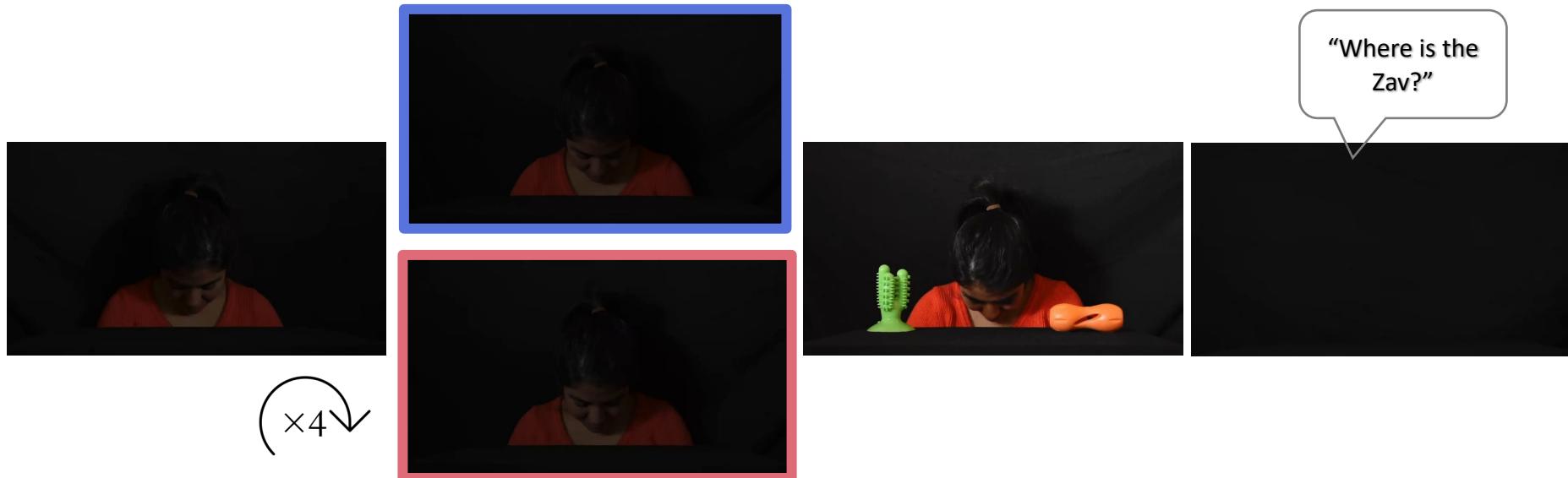
N = 15, age Mean = 17.42 months, range: 16.01 - 19.04



Expt. 2: Expectations about others' preferences



Expt. 2: Expectations about others' preferences



*Agent Exhibits
Consistent Preference*

*Agent then Reaches for
Expected or Surprising Goal Object*

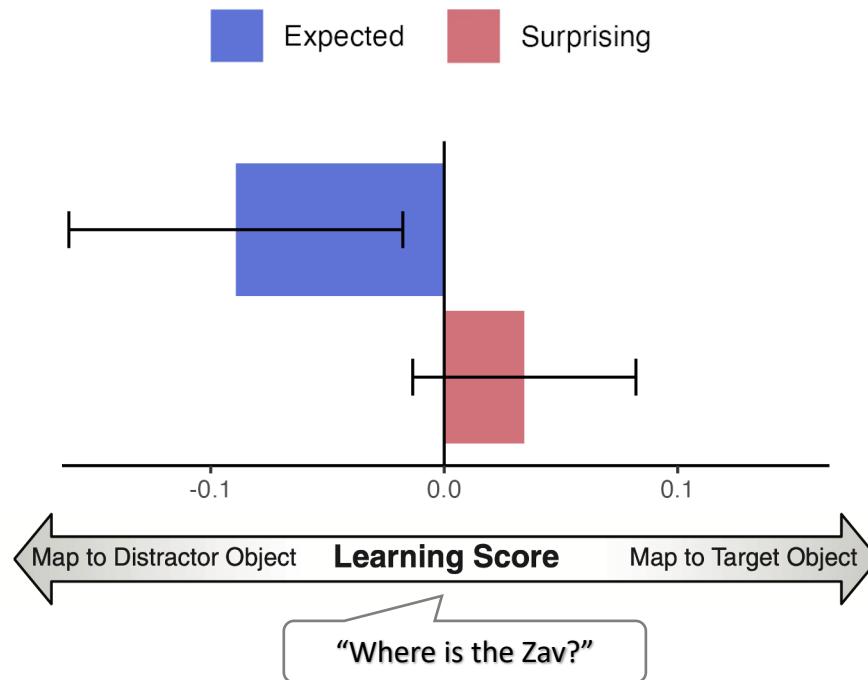
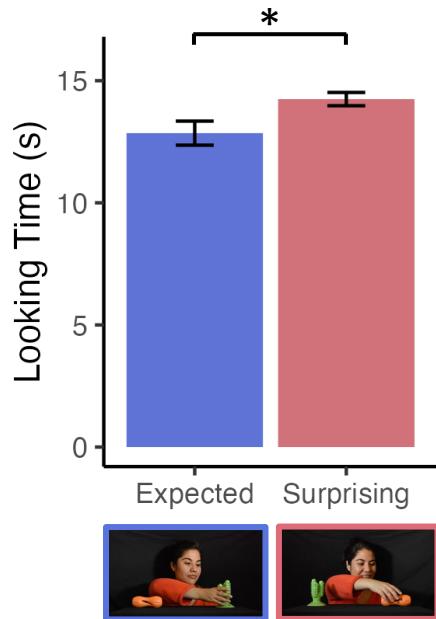
*Different Person
Teaches Object Label*

*Test of Learning
(Baseline & Mapping)*

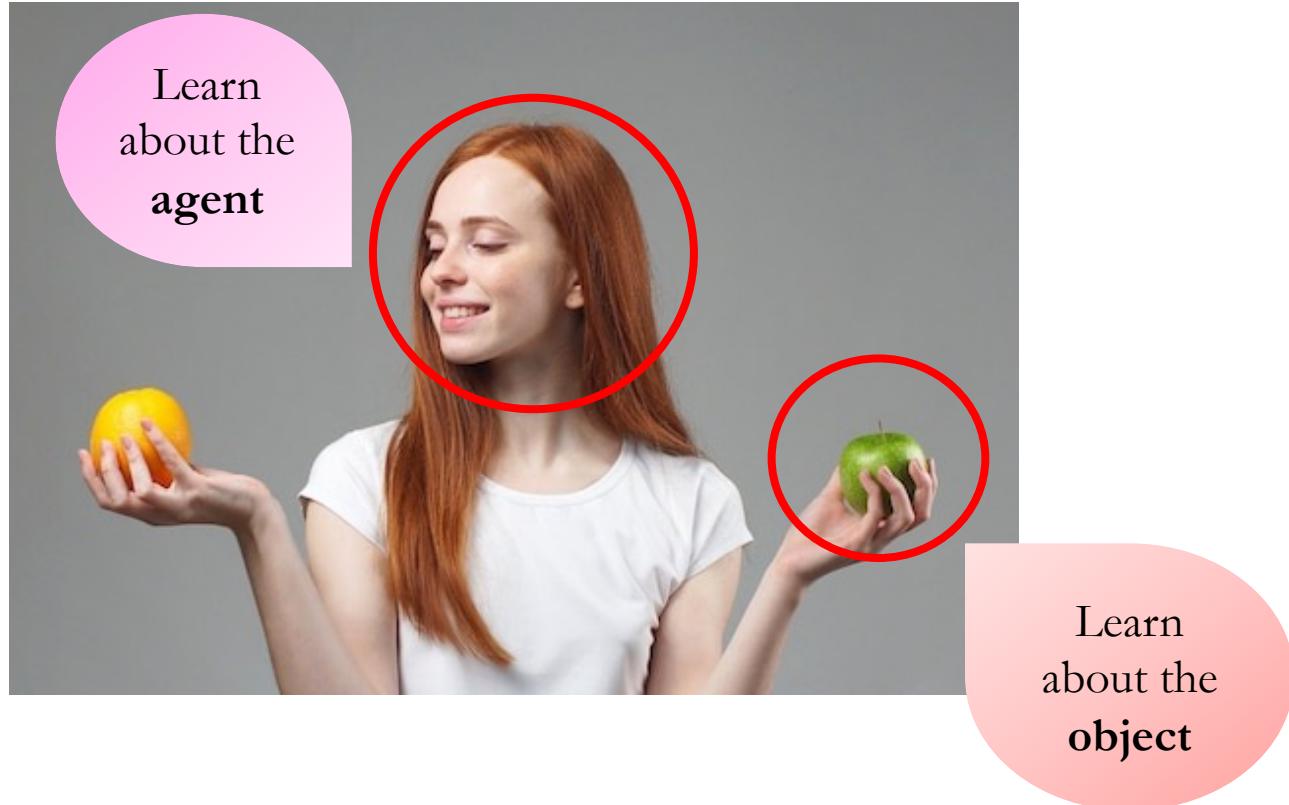
Expt. 2: Expectations about others' preferences



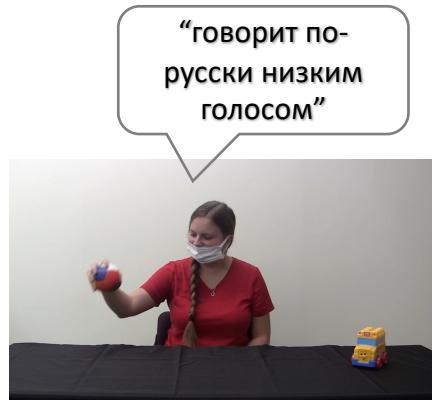
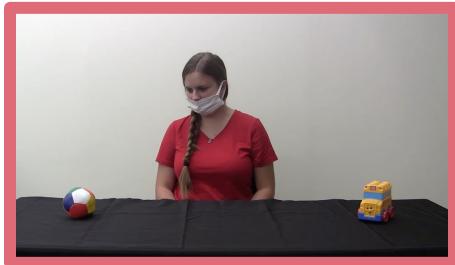
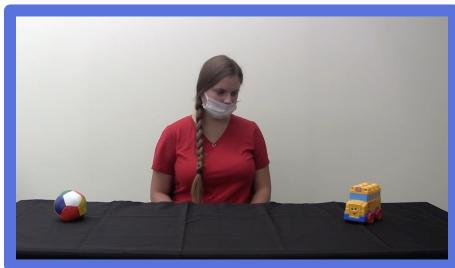
N = 30, Mean = 17.68 months, range: 16.59 - 19.00 months



Expt. 3: Expectations about others' preferences (learn about the agent)



Expt. 3: Expectations about others' preferences (learn about the agent)



*Agent Exhibits
Consistent Preference*

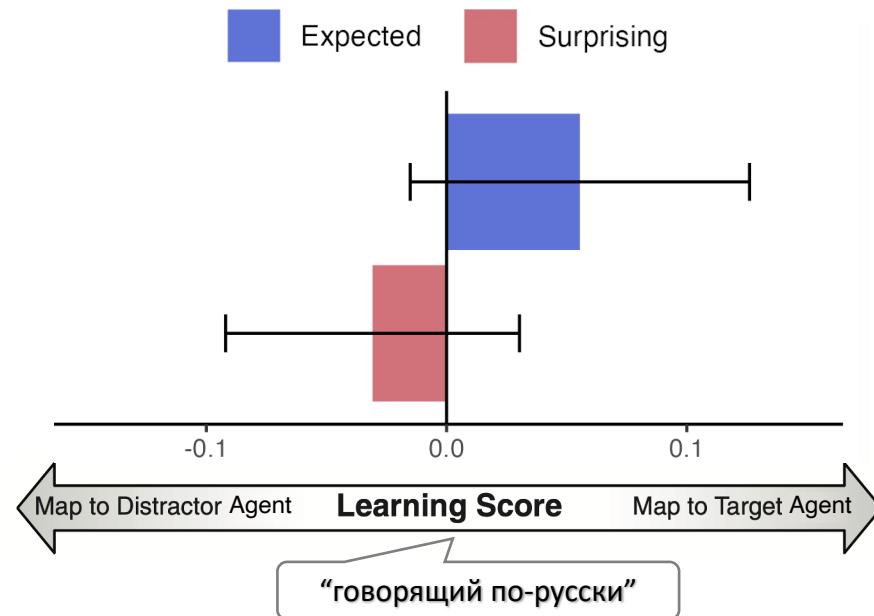
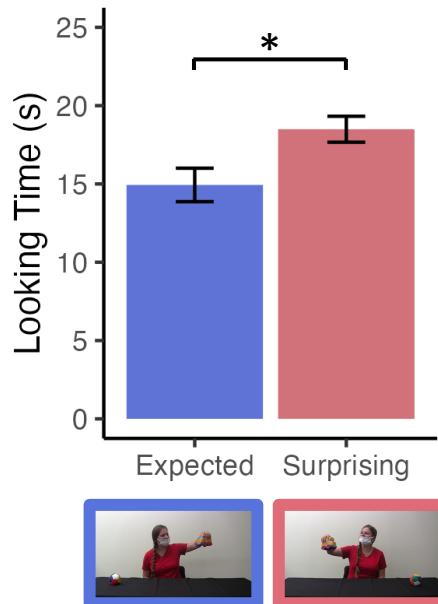
*Agent then Reaches for
Expected or Surprising Goal Object*

*Person Speaks
a Language*

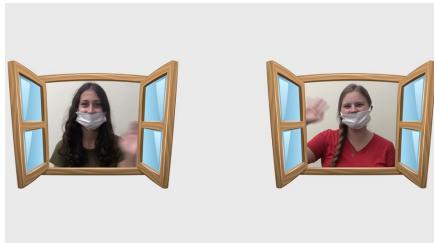
*Test of Learning
(Baseline & Mapping)*

Expt. 3: Expectations about others' preferences (learn about the agent)

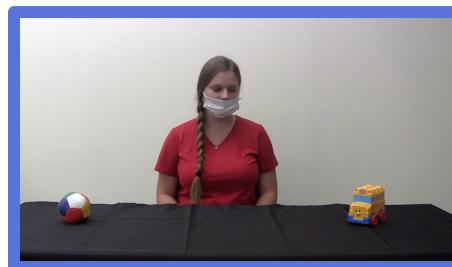
N = 24, Mean = 17.39 months, range: 16.13 - 18.85 months



Expt. 3: Expectations about others' preferences (learn about the agent)

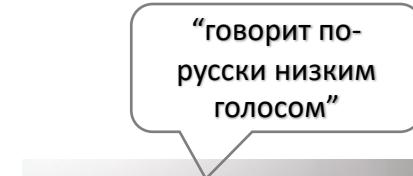


×4



*Agent Exhibits
Consistent Preference*

*Agent then Reaches for
Expected or Surprising Goal Object*



"говорящий
по-русски"



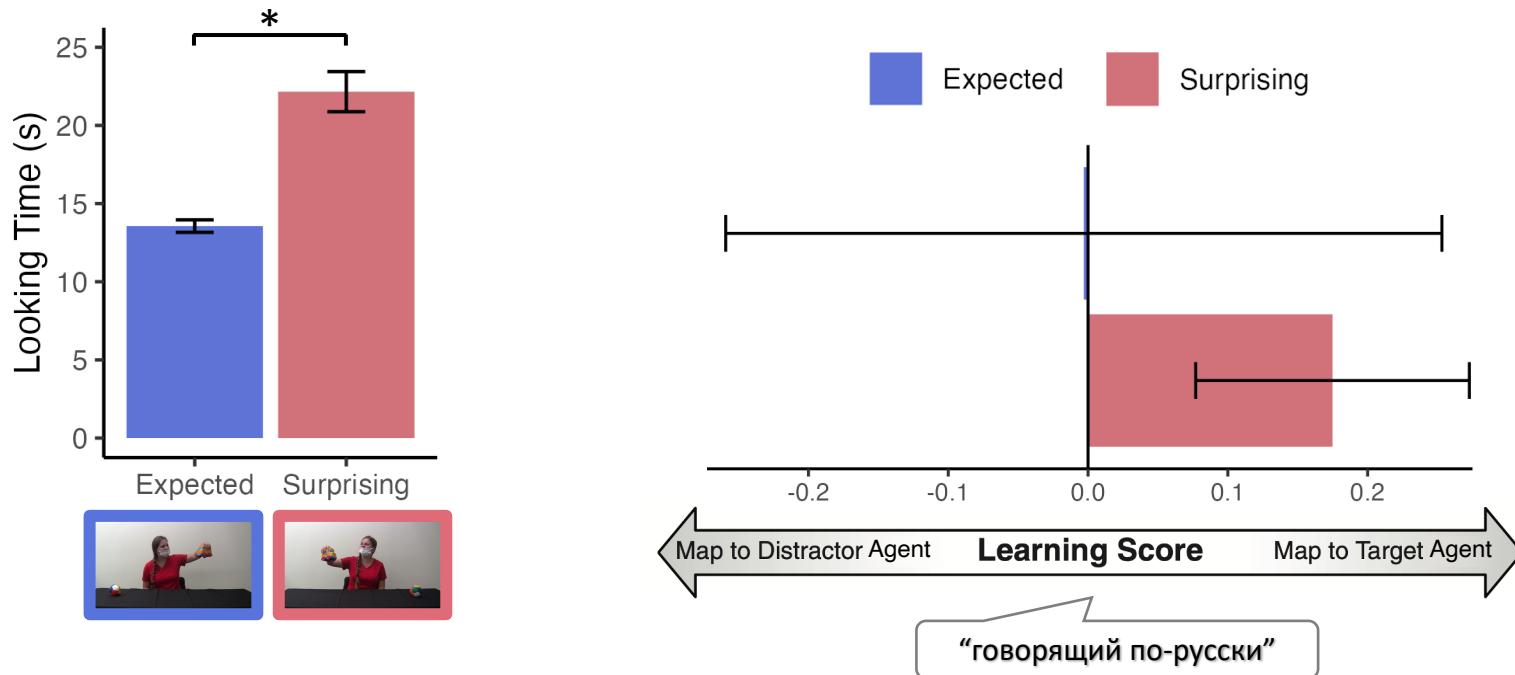
mapping (20s)

*Person Speaks
a Language*

*Test of Learning
(Baseline & Mapping)*

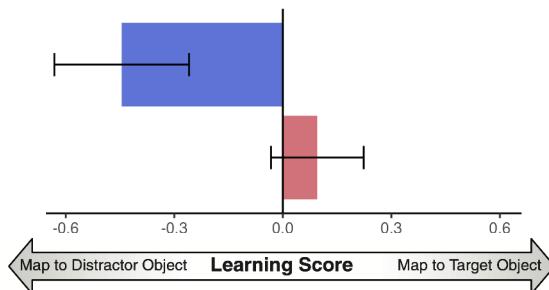
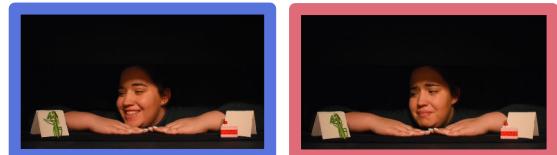
Expt. 3: Expectations about others' preferences (learn about the agent)

N = 3, Mean = 17.11 months, range: 16.39 - 18.36 months

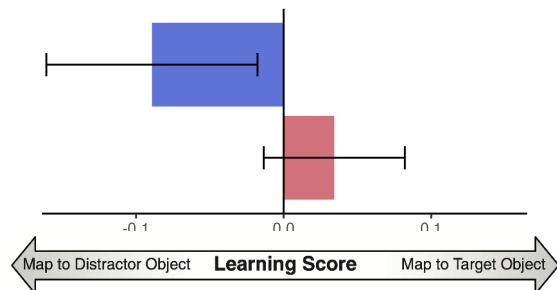


Surprise-induced learning in the **social** domain

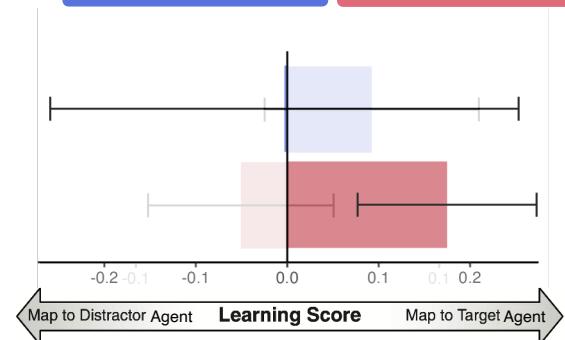
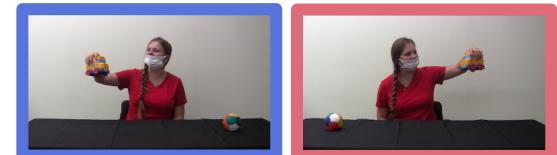
*Expt.1 Emotion
(learn about object)*



*Expt2. Preference
(learn about object)*



*Expt3. Preference
(learn about agent)*



Surprise-induced learning in the **social** domain

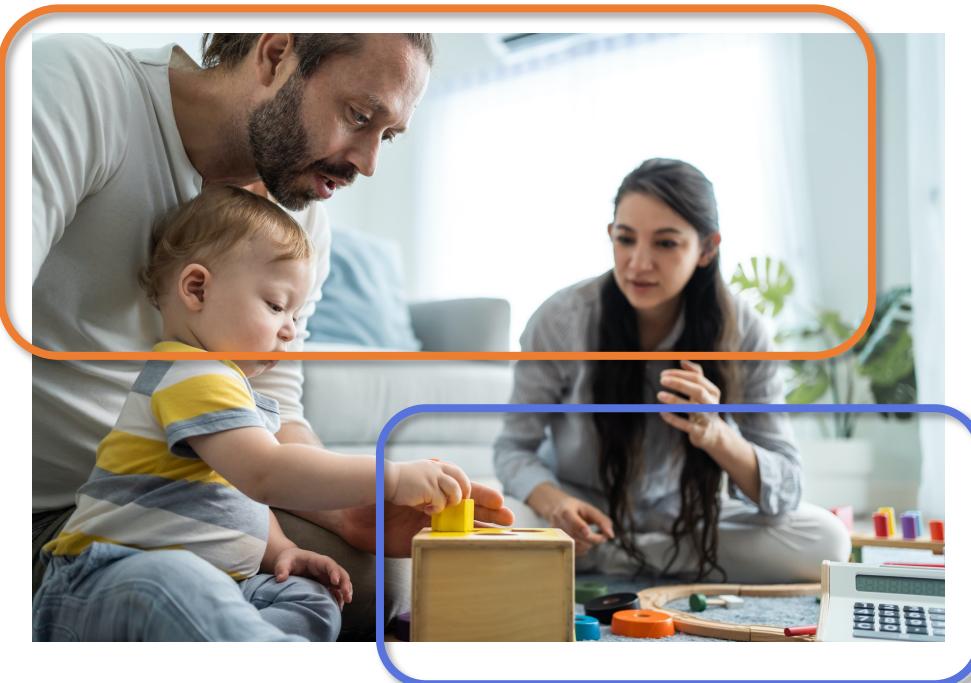
Stronger Learning



Weaker Learning



Surprise-induced learning in the **social** domain



Acknowledgements



Alexis Smith-Flores

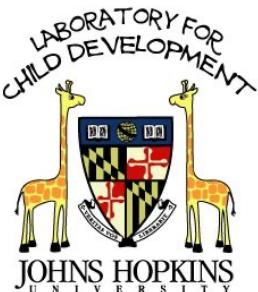


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