The Ontogeny of Cultural Learning

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Imitation is a tool for cultural learning

Instrumental learning





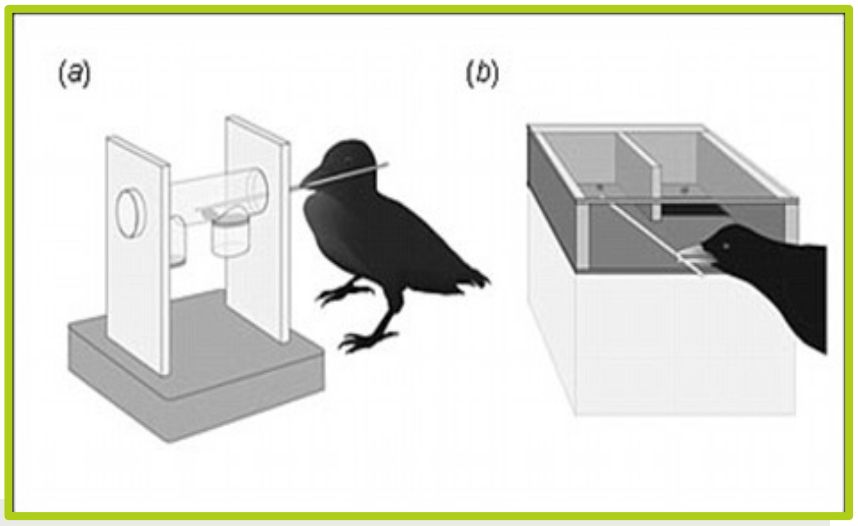

- Children use imitation to learn instrumental skills
  - Focus on physical causality
  - Overimitation
  - Comparative psychology

Carpenter, Call, & Tomasello (2005)
Heyes (2012)
Horner, & Whiten (2005)
Lyons, Young, & Keil (2007)
Nielsen & Tomaselli (2010)

Precocious causal reasoning

- Amsterlaw & Wellman (2006)
- Baillargeon (2002)
- Baldwin, Markman, & Melartin (1993)
- Bindra, Clarke & Shultz (1980)
- Bonawitz, Chang, Clark, & Lombrozo (2011)
- Bonawitz, Lim, & Schulz (2009)
- Callanan & Oakes (1992)
- Chen & Klahr (1999)
- Chi, Bassok, Lewis, Reimann, & Glaser (1989)
- Chi, DeLeeuw, Chiu, & LaVancher (1994)
- Chinn & Brewer (1993)
- Crowley & Siegler (1999)
- De Leeuw & Chi (2003)
- Dunbar & Klahr (1988)
- Frazier, Gelman, & Wellman (2009)
- Fay & Klahr (1996)
- Gopnik (2000)
- Gopnik & Sobel (2000)
- Gopnik, Sobel, Schulz, & Glymour (2001)
- Gweon & Schulz (2008)
- Hickling & Wellman (2001)
- Hutt & Bhavnani (1972)
- Karmiloff-Smith & Inhelder (1978)
- Keil (2006)
- Keil & Wilson (2000)
- Kuhn (1989; 2009)
- Kushnir & Gopnik (2005)
- **Legare (2012) *Child Dev***
- **Legare, Gelman, & Wellman (2010) *Child Dev***
- **Legare, Wellman, & Gelman (2009) *Cog Psych***
- Schulz & Bonawitz (2007)
- Schulz, Hooppell, & Jenkins (2008)
- Schulz, Standing, & Bonawitz,(2008)
- Shultz (1982)
- Siegler (1995)
- Sobel & Sommerville (2010)
- Switzky, Haywood, & Isett (1974)
- Vosniadou & Brewer (1992; 1994)
- Wellman (2012)
- Wellman, Hickling & Schult (1997)

Comparative evidence



Causal opacity is pervasive

Homo ritualis

Cultural transmission

c. 1900-1930

2012

Ritual learning





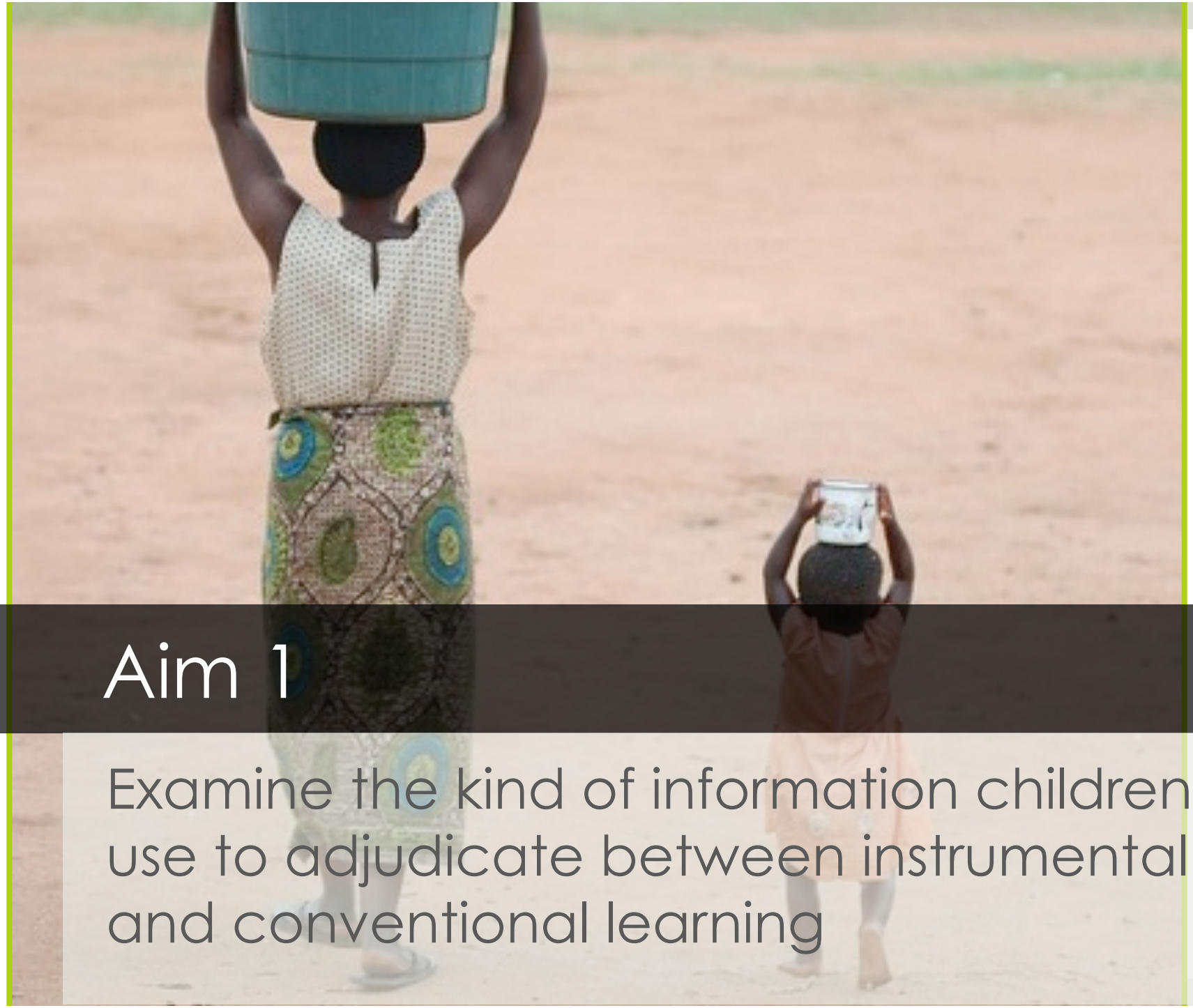

- Children use imitation to learn rituals
  - Rituals are causally opaque, conventional practices
  - Affiliation with social groups motivates imitative fidelity
  - "Not the author of your own acts"

Over & Carpenter (2011)
Kenward (2012)
Legare & Souza (2012; 2014)
Legare, Evans, Rosengren, & Harris (2012)

Predictions

	Instrumental Learning	Ritual Learning
Focus	Product	Process
Imitative fidelity	Lower	Higher
Innovation	Higher	Lower

Legare, Wen, Herrmann, & Whitehouse (resubmitted).
Herrmann, Legare, Harris, & Whitehouse (2013). *Cognition.*
Legare & Souza (2012). *Cognition.*
Legare & Souza (2014). *Cognitive Science.*
Watson-Jones, Legare, Whitehouse, & Clegg (2014). *Evolution and Human Behavior.*



Aim 1

Examine the kind of information children use to adjudicate between instrumental and conventional learning

Examining social cues

Candidate cues

Cue	Instrumental Learning	Ritual Learning
Verbal cues	Instrumental	Conventional
Consensus	Single actors	Multiple actors
Synchrony	Behavioral variation	Behavioral coordination

Research questions

- Can the instrumental and ritual stances be primed experimentally?
  - **Study 1 –** Verbal cues
  - **Study 2 –** Consensus and synchrony

Study 1: Verbal cues

- Do verbal cues adjudicate between instrumental and ritual learning?
  - ***Instrumental language → Instrumental goal***
  - ***Conventional language → Ritual goal***
- Developmental trajectory

Legare, Wen, Herrmann, & Whitehouse (resubmitted).

Methods

Video presentation

Instrumental condition:
Instrumental language
"She puts it in the box"

Ritual condition:
Conventional language
"She always does it that way"

Imitation task

N = 108 3-6-year-olds

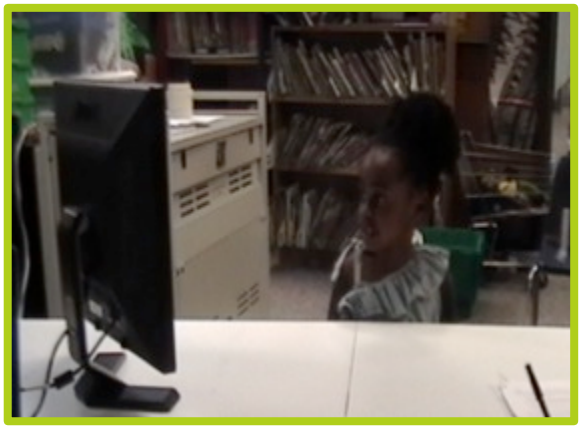
Predictions

Instrumental Condition

Instrumental language

Lower imitative fidelity

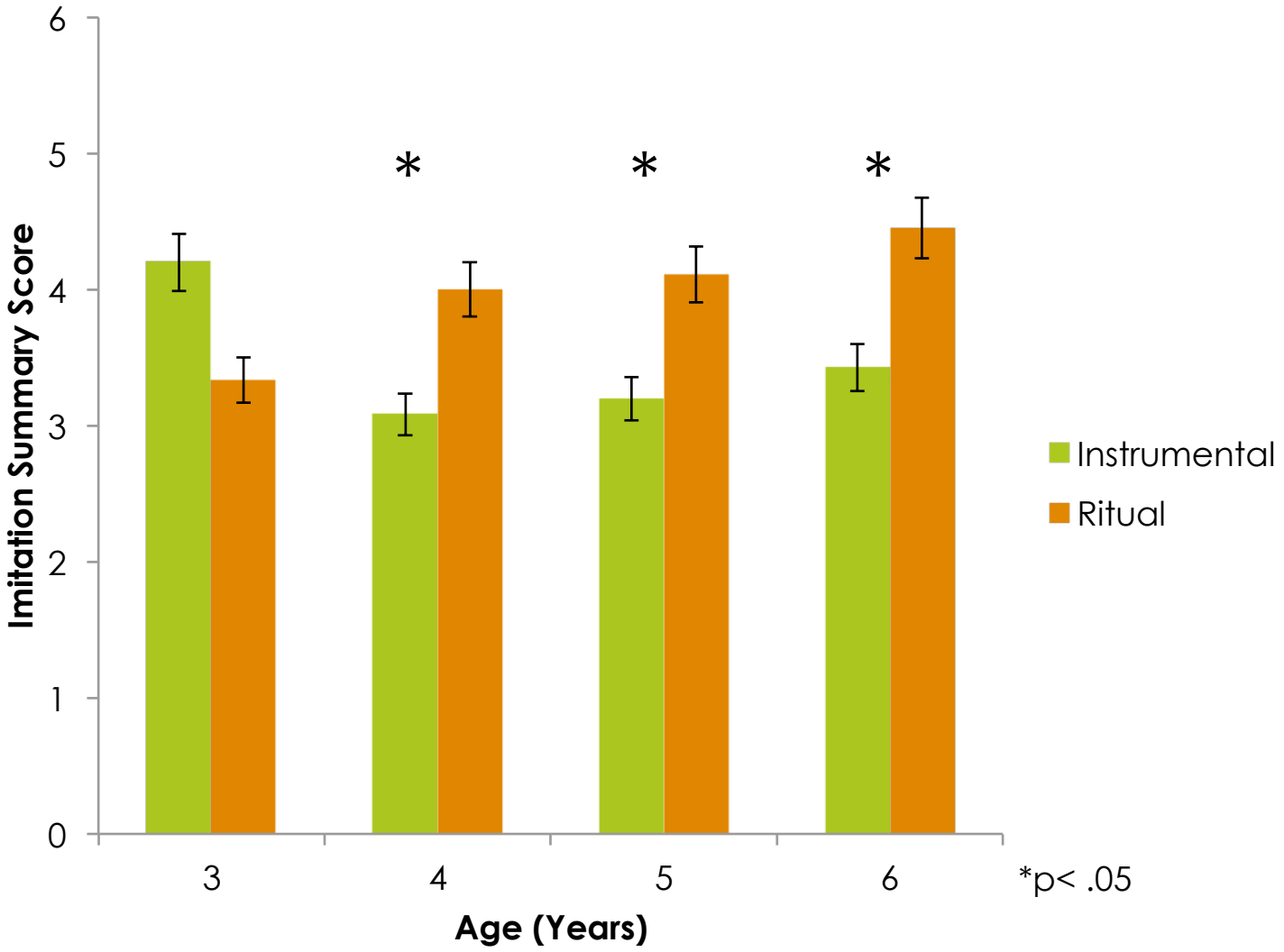
Ritual Condition



Conventional language

Higher imitative fidelity

Results


6
5
4
3
2
1
0
Imitation Summary Score
*
*
*
3
4
5
6
Age (Years)
Instrumental
Ritual
*p< .05

Summary

- Converging evidence differences in imitative fidelity based on verbal cues to instrumental vs ritual learning
  - Higher imitative fidelity in ritual condition
  - Increase in distinct behavioral profiles with age

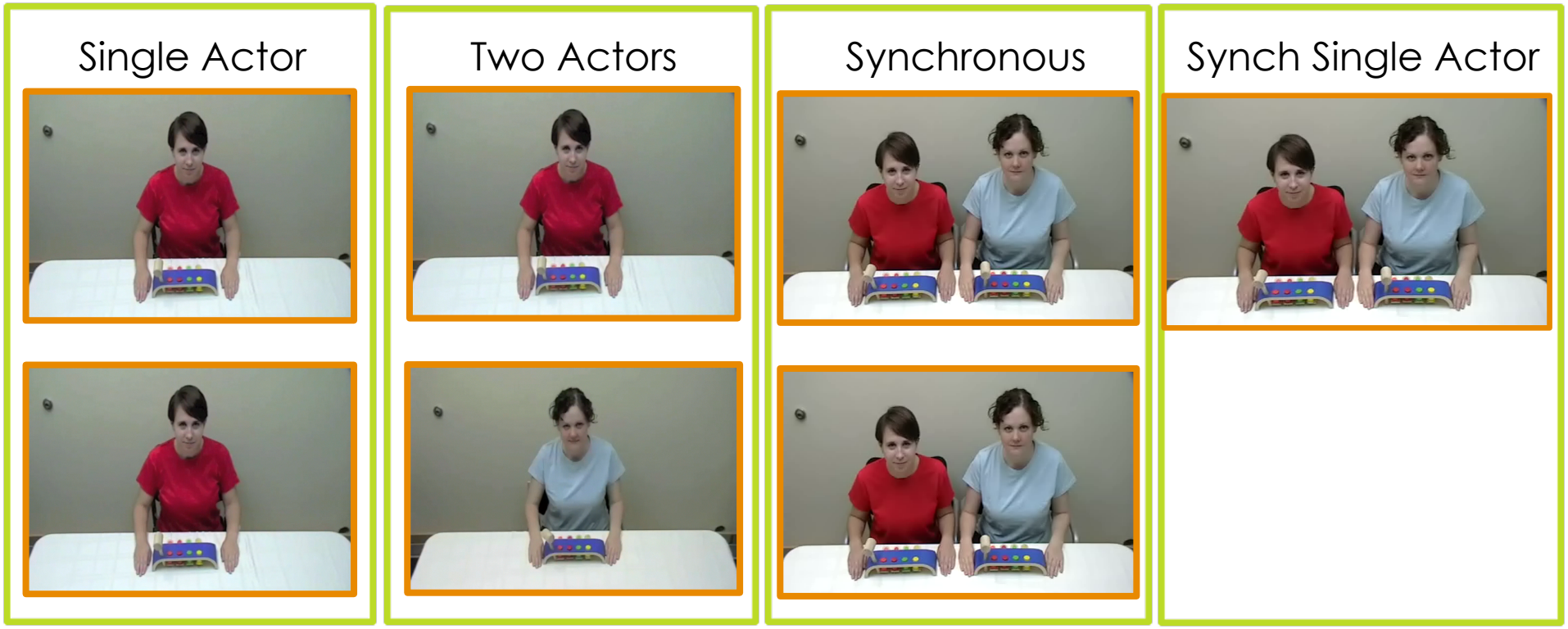
Study 2: Consensus and synchrony

- What are the effects of multiple actors on imitative fidelity?
  - Consensus
  - Behavioral synchrony
- Developmental trajectory

Herrmann, Legare, Harris, & Whitehouse (2013). *Cognition.*

Methods

Video presentation



Imitation task

N = 259 3-6-year-olds

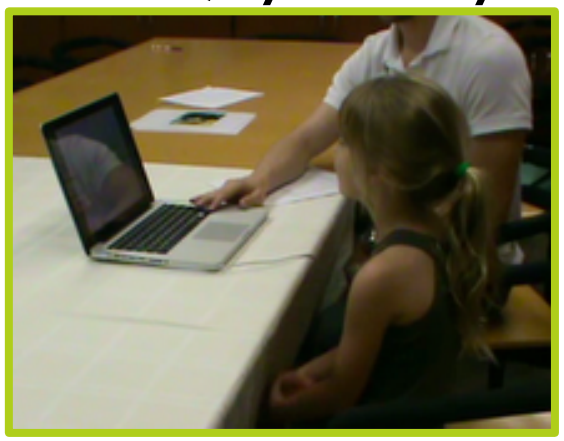
Predictions

Instrumental, single actor

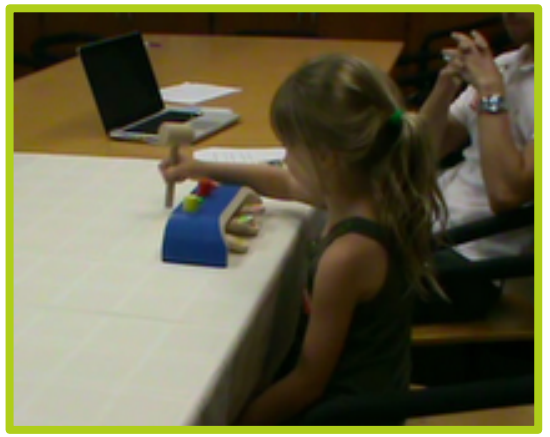
Instrumental language

Lowest imitative fidelity

Ritual, synchrony

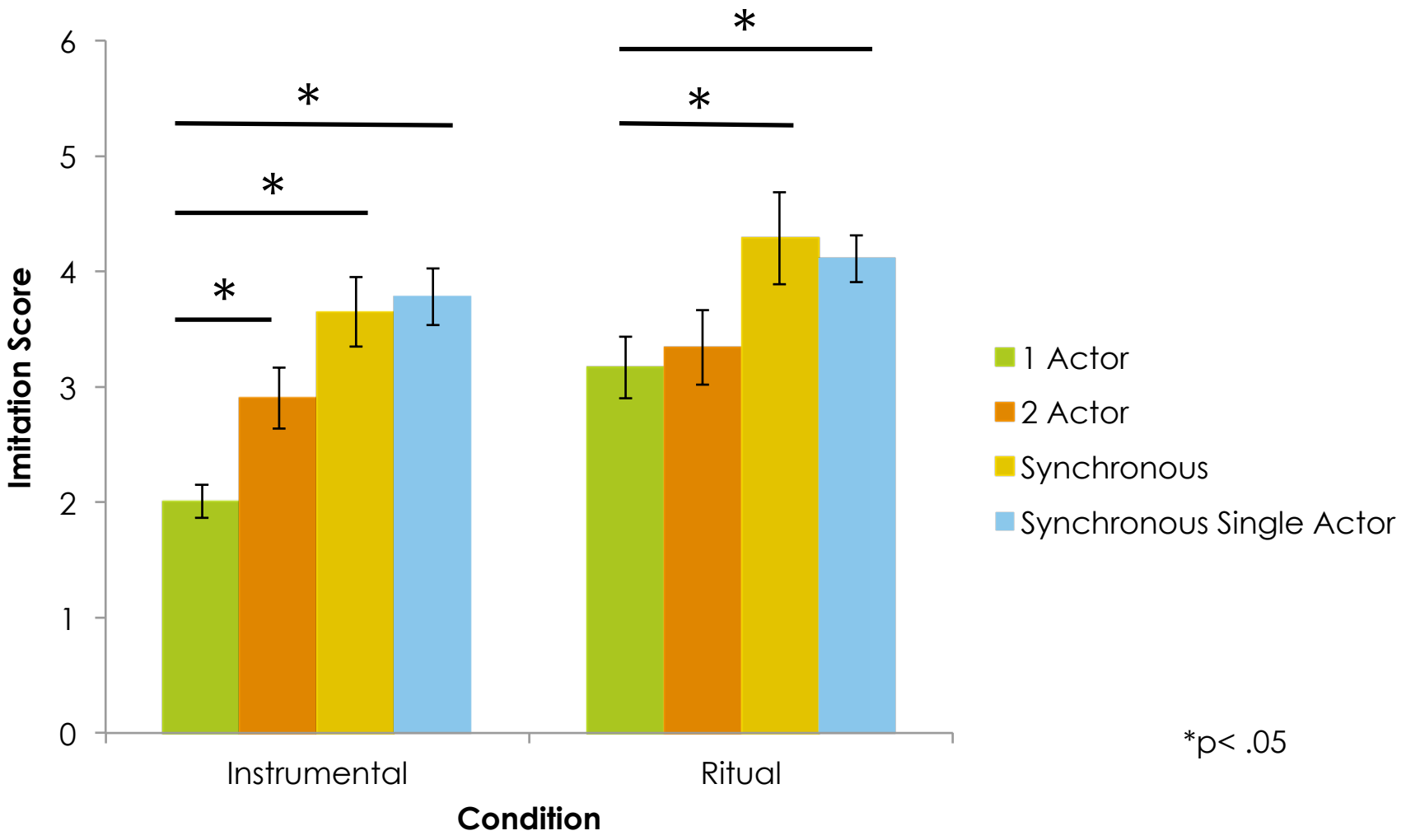


Conventional language



Highest imitative fidelity

Results


Imitation Score
6
5
4
3
2
1
0
*
*
*
*
*
Instrumental
Ritual
Condition
1 Actor
2 Actor
Synchronous
Synchronous Single Actor
*p< .05

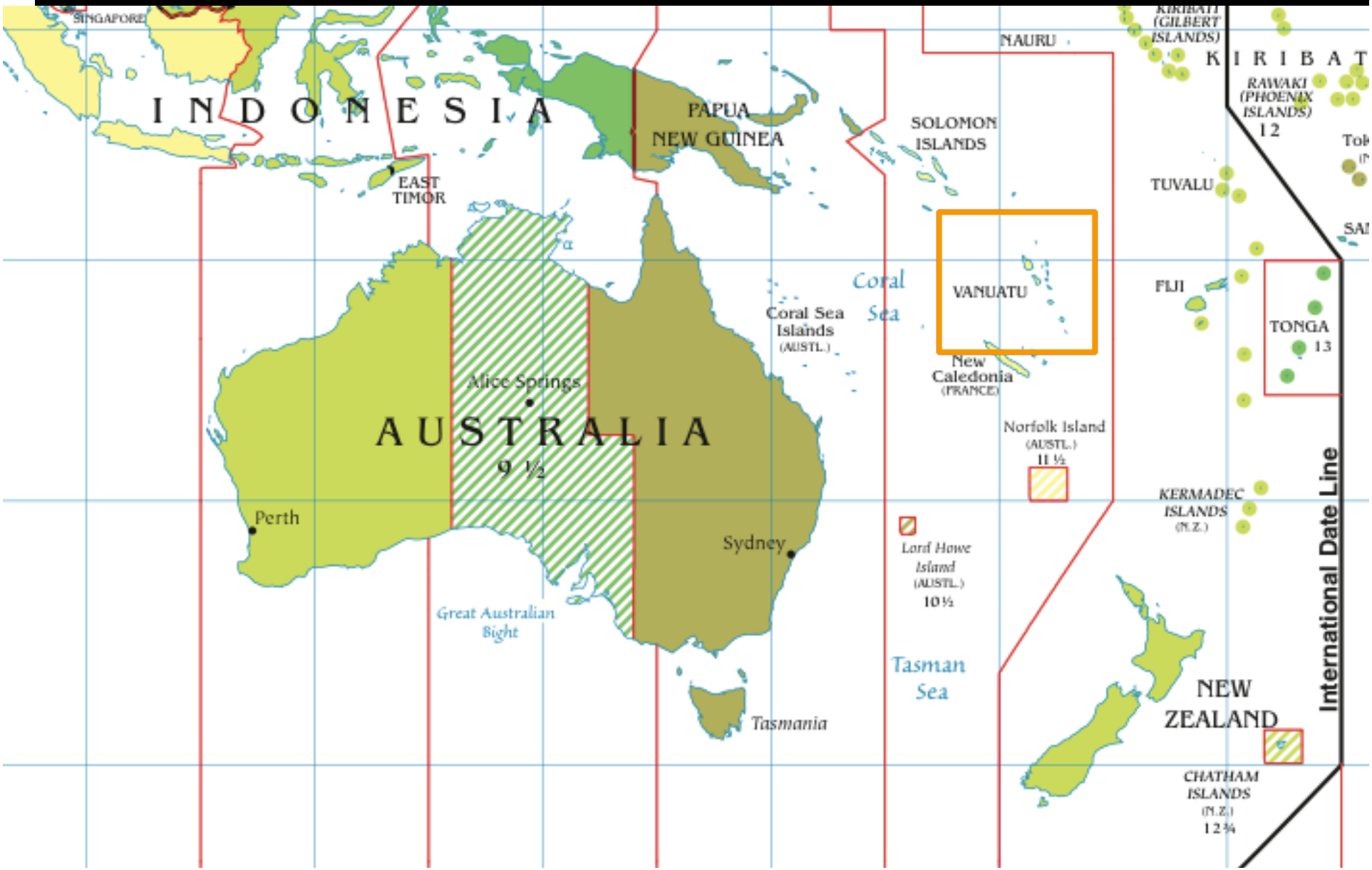
Summary

- Witnessing multiple actors and synchronous action increase imitative fidelity
- Increase in imitative fidelity with age

Aim 2

Examine cross-cultural differences in learning instrumental skills and cultural conventions across social contexts

Cross-cultural perspectives: Tanna, Vanuatu



Cross-cultural perspectives: Tanna, Vanuatu

Study 3: Single child

- Are there cross-cultural differences in expectations for conformity?
- Cross-cultural comparisons of imitative fidelity
  - Austin, Texas, USA
    - *N* = 85 6-8 year-olds
  - Tanna, Vanuatu
    - *N* = 57 6-8 year-olds

Clegg & Legare (under review)

Methods

Live model presentation

Instrumental condition:
Instrumental language
"I'm going to make a necklace"

Ritual condition:
Conventional language
"Everyone always does it this way"

Imitation task

Methods

Predictions

Instrumental Condition

Instrumental language

Lower imitative fidelity

Ritual Condition

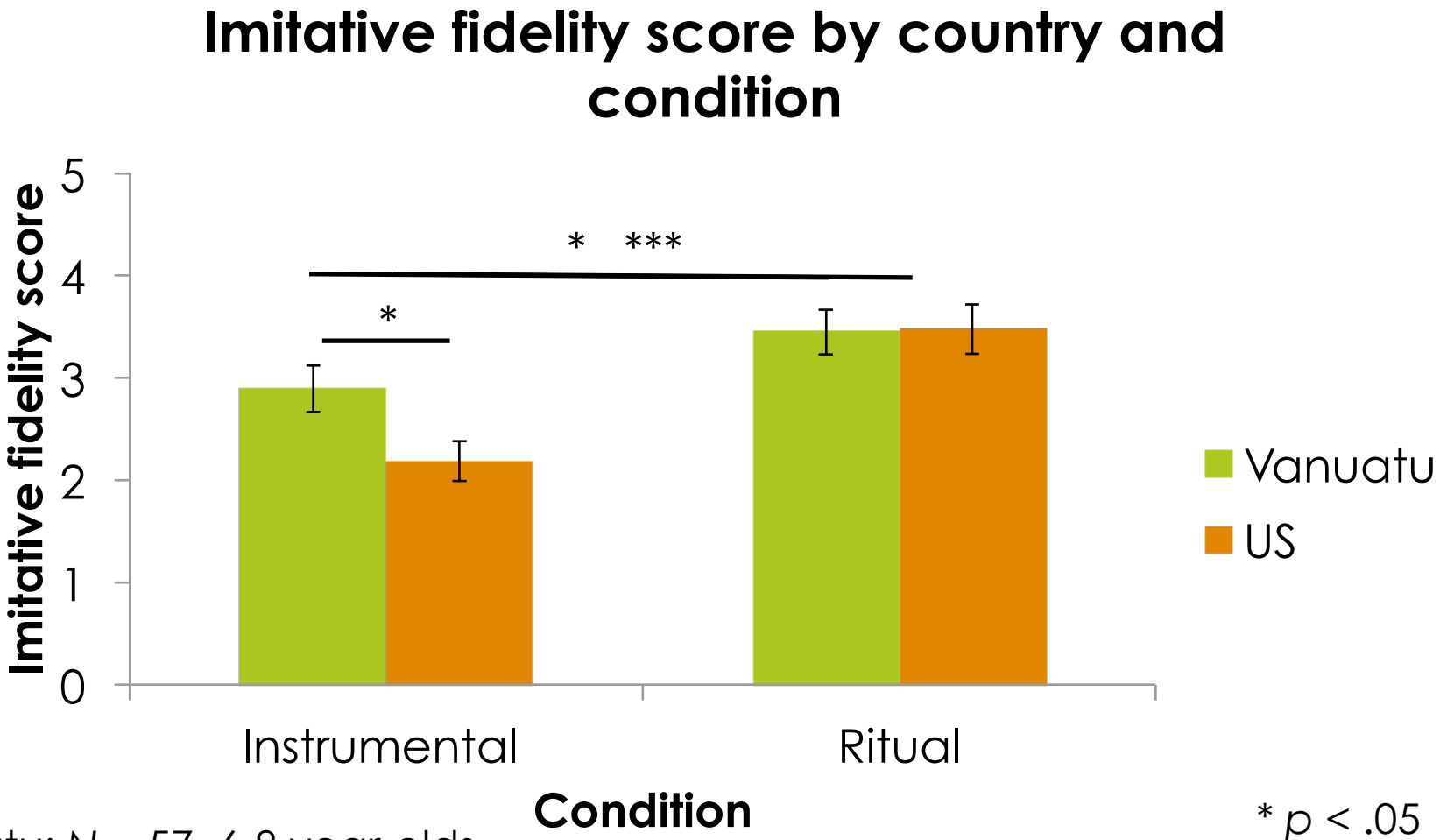
Conventional language

Higher imitative fidelity

Cross-cultural questions

- Is imitative fidelity higher in the ritual condition?
- Is there cultural variation in overall imitative fidelity?

Results – Imitative fidelity



Vanuatu: *N* = 57, 6-8 year-olds
US: *N* = 85, 6-8 year-olds

* $p < .05$
*** $p < .0001$

Conclusions

- Overall imitative fidelity comparable in both the U.S. and Vanuatu
- Children in both the U.S. and Vanuatu imitated with high levels of fidelity in the ritual condition

Study 4: Parent-child dyads

- How do parents scaffold children's imitation?

- Are parents sensitive to the same cues?

Clegg & Legare (in prep)

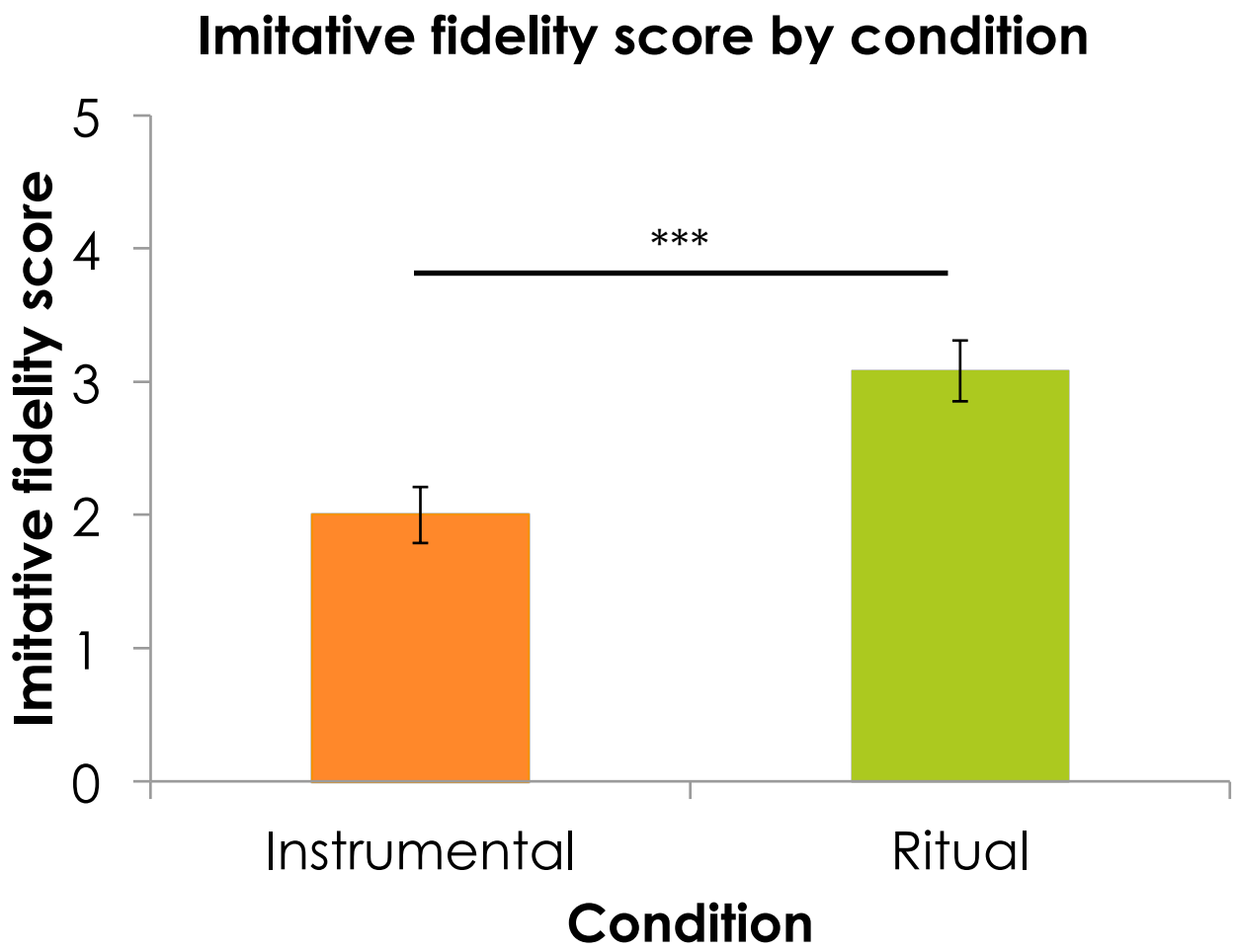
Methods

- Live model, familiar activity (necklace-making task)
- Parent-child dyads

Ritual condition

Instrumental condition

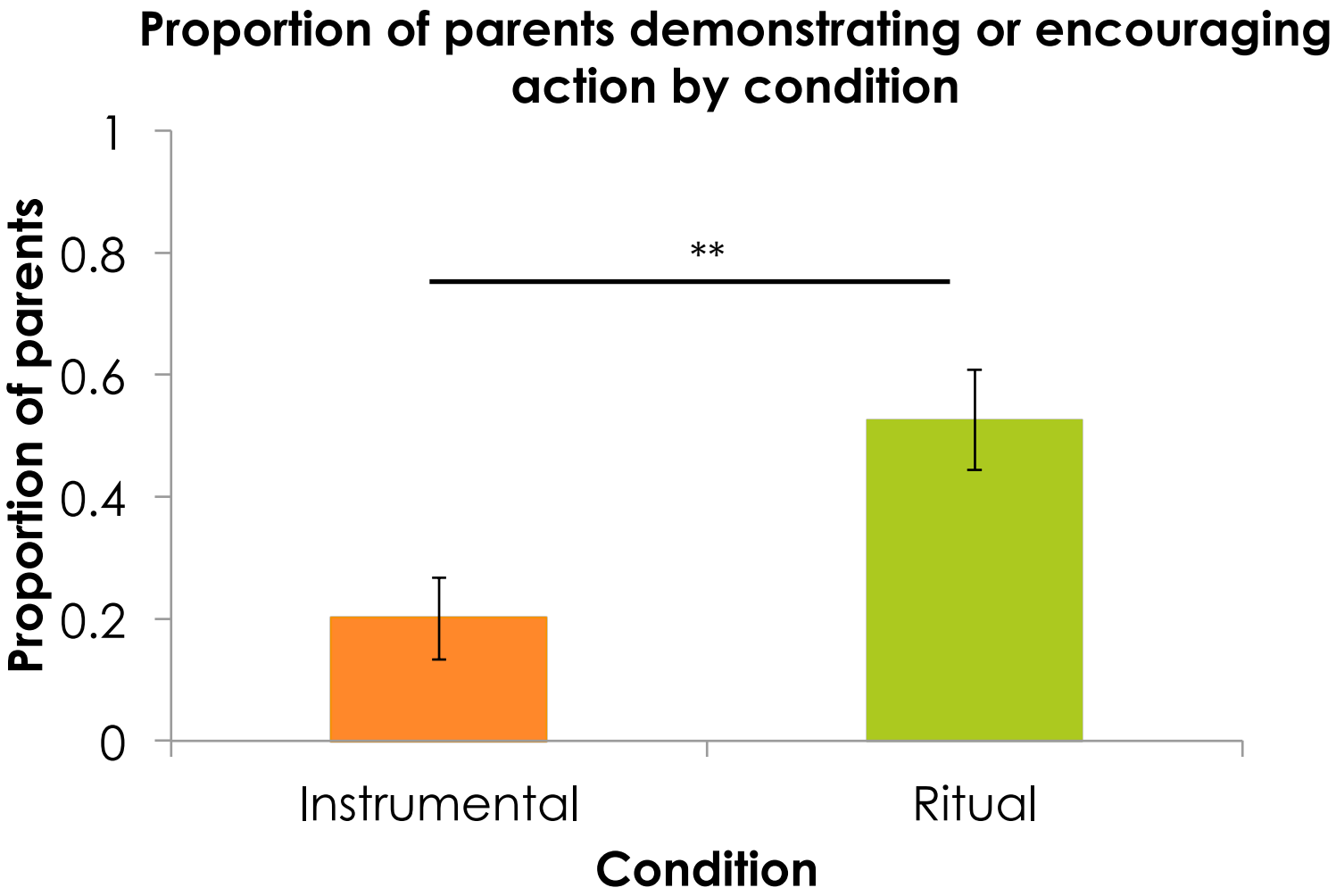
Results



N = 73 3-6-year-olds (+ parent)

*** $p < .001$

Results



N = 73 3-6-year-olds (+ parent)

** $p < .01$

Summary

- Parallel and distinct behavioral profiles for instrumental versus ritual learning
- Cross-cultural similarities and differences
- Parents and children are sensitive to cues to imitative fidelity

Conclusions

Conclusions

- **Efficient social learning requires using imitation and innovation flexibly**
- **Cues to adjudicate between instrumental and ritual learning**
  - Verbal and non-verbal cues
- **Cross-cultural continuity and variation**
- **Parent scaffolding of instrumental and conventional learning**

Child (social) scientists

Cognition, Culture, & Development Lab

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Andre Souza, Ph. D.

Jennifer Clegg, M.A.

Justin Busch

Nicole Wen

Funders and investigative team

- **CCD Lab website: www.cristinelegare.com**
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  - Harvey Whitehouse, Paul Harris, and Susan Gelman
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  - Rachel Watson-Jones, Patricia Herrmann, & Andre Souza
- Graduate students
  - Jennifer Clegg, Justin Busch, Nicole Wen
- Lab staff
  - Katherine Cullum