See it, say it? How receptive and expressive vocabulary predict picture comprehension over time in typically developing and late talking children

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BACKGROUND: SYMBOLIC UNDERSTANDING

- Symbol = "something someone intends to represent something else" (DeLoache, 2004)
- Pictures as symbols: how do children understand pictures?
  - Need to understand dual representation

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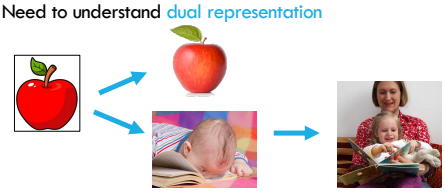

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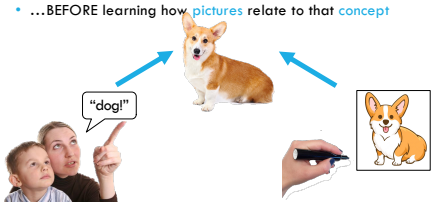
BACKGROUND: PICTURE COMPREHENSION

- Children use linguistic scaffolding:
  - Labelling helps distinguish between symbols and real objects (Ganea, et al. 2009; Preissler & Bloom, 2007)
  - Children may learn verbal labels for concepts…
  - …BEFORE learning how pictures relate to that concept



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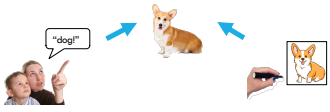
BACKGROUND: TALKING + LINGUISTIC SCAFFOLDING OF PICTURES

- Symbolic play relates to receptive vocab < 3-years-old, and expressive vocab > 3-years-old (Quinn et al., 2018)
- In children with ASD, picture comprehension is predicted by expressive + receptive vocab, but in TD children, picture comprehension was only predicted by receptive (Hartley et al., 2019)
- How does expressive + receptive vocabulary interact with picture comprehension?



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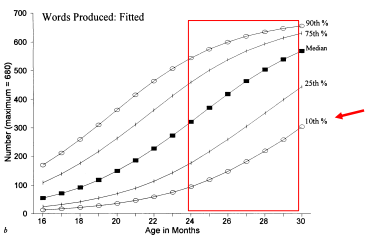
BACKGROUND: LATE TALKING CHILDREN

- Late talkers: children who say much less than their peers at ~ 24-months-old (10th percentile)



Expressive vocabulary in 16–30 month olds (Fenson et al., 1994)

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BACKGROUND: SYMBOLS ARE SOCIAL

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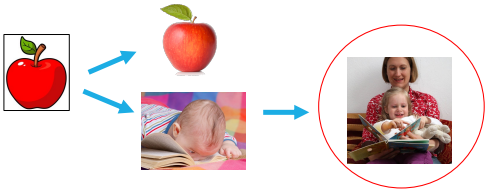
BACKGROUND: SOCIAL SCAFFOLDING



- Children use social scaffolding to understand pictures

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BACKGROUND: SOCIAL SCAFFOLDING

- LT children:
  - May have more socioemotional difficulties (Horwitz et al., 2003)
  - May have ?less input (Vigil et al., 2005; Paul & Elwood, 1991) ?less opportunities for social scaffolding
  - …but how does language skill interact with social ability and picture comprehension?

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EXPERIMENT & RESEARCH QUESTIONS

1. Do expressive + receptive vocabulary differentially affect picture comprehension?
2. Does early language delay affect picture comprehension?
3. Does social ability affect picture comprehension?
   - Can increased social ability compensate for language delay?

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HYPOTHESES

- LTs will respond less accurately than TDs when labels are available, but on par with TDs when labels aren't available
- Expressive vocabulary will predict picture comprehension accuracy (and be correlated with receptive vocabulary)
- Exploratory: children with lower social ability will have lower picture comprehension scores

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METHODS: PARTICIPANTS

- Monolingual English-speaking children, no sensory/developmental disorders
- TDs > 25th percentile + LTs < 10th percentile on expressive CDI
- T1: N = 59 (38 TDs + 21 LTs) 2.0 – 2.4-years-old
- T2: N = 29 (20 TDs + 9 LTs) 3.5 – 3.9-years-old (data collection interrupted by COVID-19 pandemic)

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METHODS: MEASURES

	T1: 2.0 – 2.4-years-old	T2: 3.5 – 3.9-years-old
Vocabulary	Oxford-CDI *(Hamilton et al. 2000)*	Expressive / Receptive One Word Picture Vocabulary Tests *(Brownell et al., 2011)*
Social ability	Preschool Social Responsiveness Scale *(Constantino et al. 2002)*	
Non-verbal IQ		Leiter-3 *(Roid et al., 2013)*
Task	Picture comprehension *(adapted from Callaghan, 2000)*	Picture comprehension *(adapted from Callaghan, 2000)*

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METHODS: PICTURE COMPREHENSION TASK*

Matched Labels Condition (language scaffolding not possible)

"Look!"

(drawn picture of object)

"Which one is the same as the picture?"

(real plastic objects)

*Simplified for conference (see Cheung et al., (in press) *JECP* or get in touch with me for details)
Task adapted from Callaghan (2000) *Cog Dev*

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METHODS: PICTURE COMPREHENSION TASK*

Distinct Labels Condition (language scaffolding possible)

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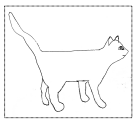

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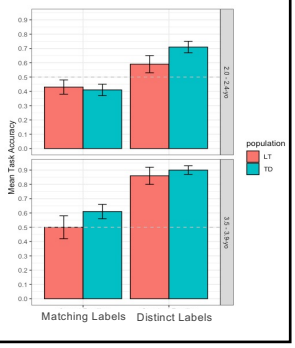
RESULTS: TASK GLMERS

- Children get better at task with time (p <.001)
- Effect of population overall:
  - TD children show more accurate performance than LT over time (p = .025)
- HOWEVER: both TDs + LTs…
  - Perform most accurately when language scaffolding is available (Distinct Labels; p <.001)
  - Least accurately when it isn't (Matched Labels; p <.001)
  - No interaction of condition * population



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RESULTS: PREDICTIVE EFFECTS OF VOCABULARY

- GLMERs: separate analyses at each timepoint
- In addition to effect of condition…
  - 2.0 – 2.4-years-old: task performance predicted by concurrent receptive vocab (p = 0.38), but not expressive vocab
  - 3.5 – 3.9-years-old: task performance predicted by concurrent expressive vocab (p <.001), but not receptive vocab
  - Added effect of social responsiveness at ~ 2.0-years-old → those with reduced social ability were less accurate (regardless of language ability; p = .023)

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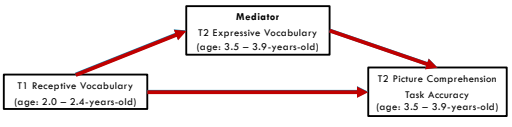
RESULTS: MEDIATION ANALYSES

- How does early receptive vocabulary affect later expressive vocabulary and picture comprehension?
  - Effect of early receptive vocab on later task performance is mediated through later expressive vocab (ACME; p = .016)



  - Total effect: 0.10; 0.03 through early receptive vocab, 0.07 through later expressive vocabulary

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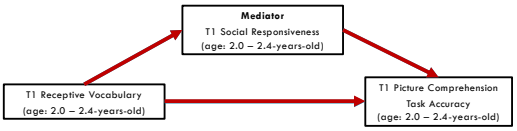
RESULTS: MEDIATION ANALYSES

- Exploratory:
  - Effect of receptive vocabulary on task performance at ~2-years-old is mediated through social ability (ACME; $p = .020$)



  - Total effect: 0.04; 0.02 through receptive vocab, 0.02 through social responsiveness

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LIMITATIONS + FUTURE DIRECTIONS

- Limitations:
  - COVID-19 limiting data collection at ~3.5-yos
  - Cultural differences in:
    - Vocab measures (UK v. US)
    - Populations that do not use pictures/social scaffolding
- Future directions:
  - Larger sample with face-to-face testing (when this resumes)
  - Interventions around use of social scaffolding for early language delay

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CONCLUSIONS AND TAKE HOMES

LT children show delayed, but not different picture comprehension to TD children, and can still use labels.

Receptive language skills predict picture comprehension at the earlier age of 2, mediated by individual social ability.

Expressive language skills predict picture comprehension at the later age of 3.5 (likely due to their ability to engage in social discourse).

Language skills, social ability, and symbolic understanding develop along interacting trajectories in the first five years of life.

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Our participants

Co-authors: Professor Padraic Monaghan & Dr Calum Hartley

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