Babies Use Others' Surprise to Reason about Hidden Objects

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Introduction

- **Emotion-as-information:** Emotional expressions serve as an important source of **information** for infants and children to **learn** about the physical and social **world** (Wu et al., 2021)
- **Unlike** the other basic emotions, which are elicited by a **particular type** of content, **surprise** is elicited by **abstract** content, "**new information"**
- Prior studies show that infants know some causes of surprise:
  the appearance of a **novel** toy (Tomasello & Haberl, 2003), a statistically **improbable** outcome (Wu et al., 2024), or a **false** belief (Scott, 2016)

Yet, it remains unknown whether infants understand the **change** in **epistemic state** implied by a person's expression of **surprise**

Research Question

Do infants **understand** that a person will **not** be surprised by the **same** information **multiple times**?

Methods & Results

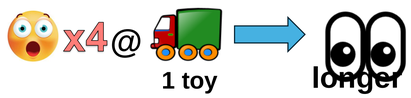
Participants: Infants between **17-** to **24- months** old (N = 36)

Each baby watched two different video stimuli, one from each emotion condition, displaying the following events:

1. Experimenter presents the box to baby. She specifically points out the **four** small **doors** on the **sides** of the box.
2. Experimenter expresses their assigned emotion (either **surprise** or **happiness**) while opening **each** of the small **doors** on the box.
3. Experimenter opens the large door in the front of the box to reveal either **one** large **toy** or **four** small **toys** placed in front of each of the small doors.

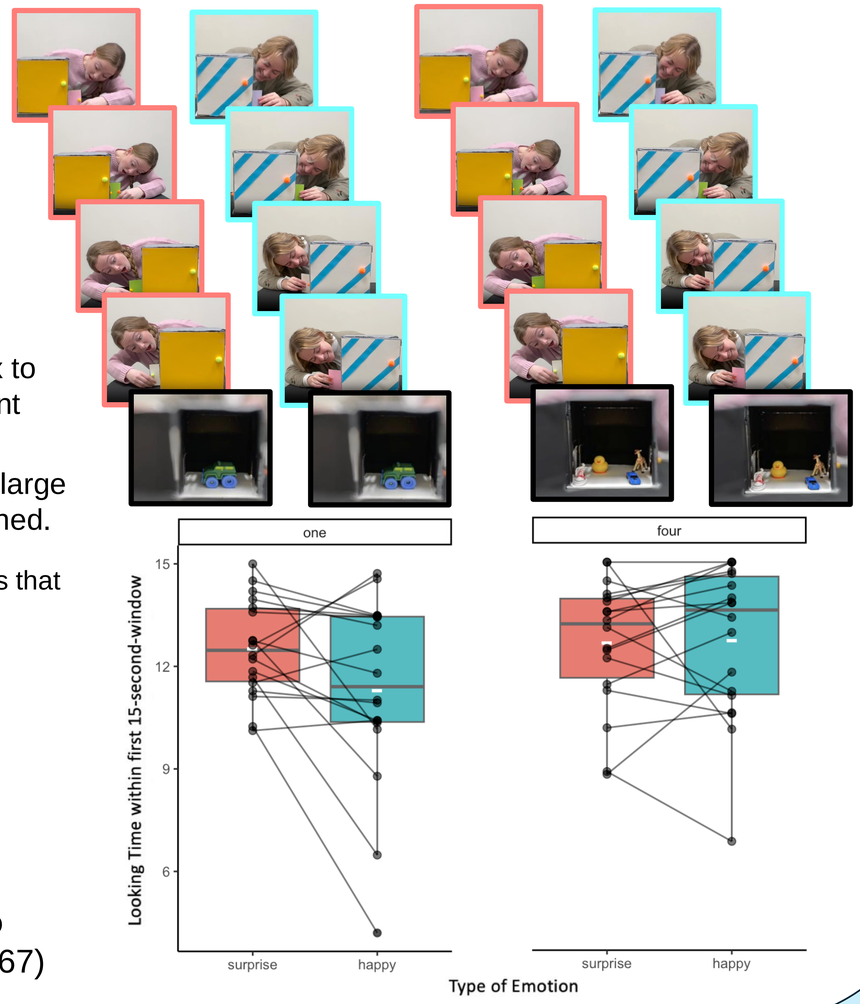
The infant's **total looking time** in the **15s** window after the large door was opened was measured for each video they watched.

Violation-of-Expectation Paradigm: infants **look longer** at events that violate their expectations



We found that:

- Infants who saw the **one toy** outcome **looked significantly longer** at the **surprised** trials vs. the **happy** trials ($F(1,14) = 5.881$, $p = .0294$)
- Infants who saw the **four toy** outcome exhibited **no difference** in **looking time** ($F(1,14) = .050$, $p = .8267$)

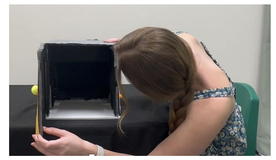


Conclusions

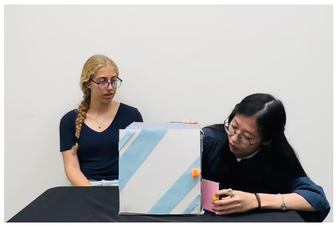
Infants **know** that a person should **not** be surprised by the **same** information **multiple times**

- Infants understand the way in which a person's **epistemic state changes** after they **express surprise**:
  - Once a person expresses surprise, she then becomes **aware** of that information and thus should not be surprised by the **same** information **again**

Future Directions



We have just begun a follow-up experiment to test whether infants understand that, unlike other emotions, surprise can also be triggered by the **absence** of objects.



We are in the process of developing visual stimuli to test whether infants truly comprehend the connection between an **individual's belief** and their **surprise** by examining their expectations when **multiple people** express surprise.

References

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