# When Half is a Whole: Infants' Developing Perception of Occlusion Events

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## INTRODUCTION

How do infants come to perceive the three-dimensionality of the world around them? Do young infants, who have had very little opportunity to move on their own, understand the lawful relationships that exist among objects which pass "behind" other objects? For example, do infants know that a person standing behind a tree is not, in fact, two half people?

**How much do infants understand about the process of occlusion?**

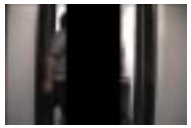
**Do they realize that a person continues even as they "disappear" behind an occluder?**

## STUDY 1

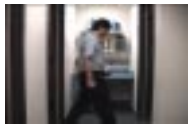
Following the inspiration of Kellman & Spelke (1983), this study examines whether 5- and 9-month-old infants correctly perceived occluded objects (in this case, a man) as having continued existence, behind an occluder.

1) Familiarized infants with 6 displays depicting a man walking back and forth behind a large black screen.
2) Test on possible or impossible events. The impossible event was visually consistent, while the possible event was conceptually consistent.

Familiarization



Possible



Impossible

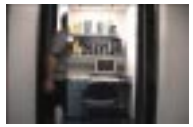


Figure 1. Study 1 design. Six familiarization and six possible and impossible displays (24 sec each).

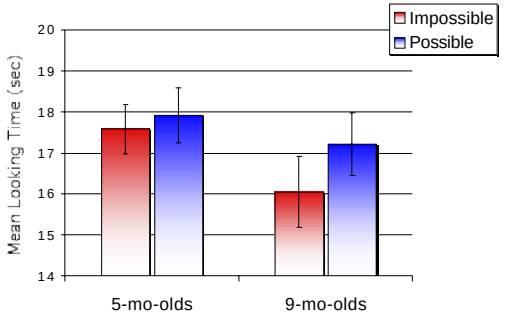



Figure 2. Mean looking times to the impossible and possible events for each of the groups. Bars indicate standard error. (N=36)

Results

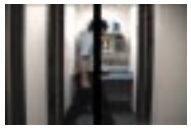
- Neither 5-month-old nor 9-month-old infants showed a consistent preference.
- However, the 9-month-olds showed a trend toward looking at the possible event.
- This suggest that infants may simply have preferred the stimulus with greater motion. Or perhaps they were not able to integrate trajectory information across such a large occluder.

## STUDY 2

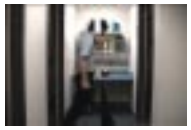
**What if the occluder was smaller?**

In study 2, the occluder was reduced by 1/3rd. This also had the effect of keeping some portion of the man visible at all times.

Familiarization



Impossible



Possible

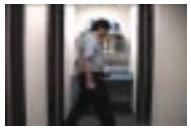


Figure 3. Study 2 design. Six familiarization and six possible and impossible displays (24 sec each).

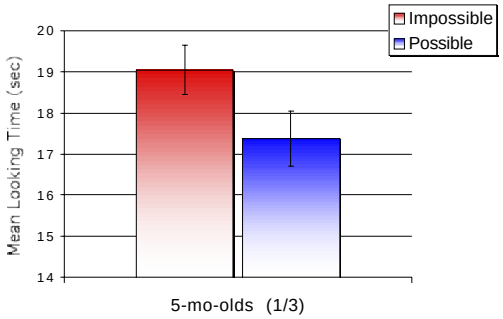



Figure 4. Mean looking times to the impossible and possible events. Bars indicate standard error. (N=18)

Results

- In direct contrast to the previous study, infants now looked significantly longer at the impossible event ($p$ = .002).

## CONCLUSIONS

- Even 5-month-old infants are able to extract 3-D information from a 2-D display, showing surprise at a conceptually incongruent outcome, if the task is simplified.
- This sensitivity is related to factors like degree of occlusion and time of occlusion, as indicated by differential performance depending on the size of the occluder.
- Thus, infant knowledge of occlusion appears to be graded and develops gradually over time.

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