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Year in School:	Senior
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Funding Sources:	College of Arts and Science Undergraduate Research Mentorship Program, Psychological Sciences Undergraduate Research Funds

Do infants really understand object impermeability?

Baillargeon et al. (1990) conducted an experiment in which infants viewed two events: a) a possible event (a bear appeared beside a clear cover, the display was hidden by a screen, and an adult hand reached behind the screen and emerged holding the bear); and b) an impossible event (a bear displayed beneath a cover such that a single reaching action would be insufficient to retrieve the bear was retrieved with a single reach). Reported longer looking times to the impossible event were interpreted as evidence that infants understand barrier impermeability. An alternative possibility is that infants may have perceived the bear under the clear cover as a single object. Longer looking to the impossible event may have indicated surprise at object decomposition rather than violation of barrier impermeability. The present experiment was designed to test this possibility. Forty 5 month-old infants (range 5.0 to 5.8 months) were randomly assigned to one of two conditions. The Barrier Impermeability condition was an exact replication of Baillargeon et al.'s (1990) experimental design; infants viewed two familiarization and two pretest displays, followed by the possible and impossible test events described above. Infants in the Object Decomposition condition viewed the same familiarization, pretest, and test events. In the test events, however, the hand emerged from behind the screen holding the cover instead of the bear. Neither of these events violates the principle of barrier impermeability, but in the bear-under-cover event, retrieval of the cover by itself is an instance of composite object decomposition. If infants in the Object Decomposition condition perceive the bear under the cover as a single object, they should expect to see the hand retrieve both bear and cover and look longer when only part of the object appears. Looking times should be longer than those to the bear-beside-cover event and similar to those of Barrier Impermeability infants for the impossible event. Preliminary results are consistent with this prediction. Baillargeon et al.'s (1990) results for the Barrier Impermeability condition were replicated; infants looked longer at the impossible ($M = 59.41$ sec; $SD = 20.84$) than the possible event ($M = 51.57$; $SD = 14.85$). However, Object Decomposition infants looked longer at the bear-under-cover ($M = 51.77$; $SD = 8.98$) than at the bear-beside-cover event ($M = 46.39$; $SD = 14.18$). Results are interpreted as suggesting an alternative (if not mutually exclusive) explanation for the Baillargeon et al. (1990) results.