

Understanding death as the cessation of intentional action: A cross-cultural developmental study¹

Clark Barrett² and Tanya Behne
Max Planck Institute for Human Development

Abstract. Determining whether or not an entity is capable of acting intentionally is a fundamental cognitive skill that emerges in the first year of infancy, and the inability to act is a key aspect distinguishing dead from living things. Though young children's understanding of death is generally thought to be poor, an understanding of death as the permanent cessation of agency might develop early in childhood. This study tested the cessation-of-agency hypothesis cross-culturally, by examining the differences between children's judgments about sleeping and dead animals. The results showed that children understand that death entails the permanent cessation of the ability to act by age 4 in two different cultures. This is consistent with a view that those distinctions that are most crucial for adaptive decision-making are the ones that develop earliest.

The cessation-of-agency hypothesis

One of the earliest-developing cognitive skills in humans is an understanding of agency: the ability of animate entities to act in a goal-directed fashion (Gergely, Nádasdy, Csibra, & Biró, 1995; Leslie, 1994). This capacity enables children to predict the behavior of others, which is important for making decisions in many kinds of interactions. While agency is a property of animate things that ceases permanently in death, young children are widely held to misunderstand death. For example, they are said to think of death as reversible, confusing it with sleep (Slaughter, Jaakkola, & Carey, 1999). If so, children might fail to understand that while sleeping things can wake up and act (e.g., help or cause harm), dead things cannot. This would be surprising from an adaptationist perspective, because one of the most important things to know about an object, for the purposes of decision-making, is whether it is capable of acting in an intentional fashion. These considerations lead to the cessation-of-agency hypothesis: that children's earliest understanding of death should be rooted in their understanding of agency, and that they should construe death as the cessation of the capacity to act. The present study, expanding on earlier work (Barrett, 1999; Barrett, Cosmides, and Tooby, forthcoming), tested this hypothesis experimentally in two populations, by examining children's understanding of the sleep-death distinction.

Methods

Subjects

Germany. Participants were 20 3-year-olds (13 m, 7 f), 29 4-year-olds (16 m, 13 f), and 20 5-year-olds (12 m, 8 f) from 13 inner city preschools in Berlin, Germany. Subjects were interviewed individually at school.

¹ Poster presented at the 2001 Meeting of the Cognitive Science Society, Edinburgh.

² barrett@mpib-berlin.mpg.de. Max Planck Institute for Human Development, Lentzeallee 94, 14195 Berlin, Germany. New address: Department of Anthropology, UCLA, Los Angeles, CA, 90095, USA.

Shuar. The Shuar are hunter-horticulturalists in the Amazon region of Ecuador. Children from 7 Shuar villages participated in the study. Participants were 12 3-year-olds (4 m, 8 f), 13 4-year-olds (7 m, 6 f), and 28 5-year-olds (15 m, 13 f). Interviews were conducted individually in Spanish or Shuar, depending on the language skills of the child.

Procedures

Children participated in structured interviews using realistic models of animals (human, lion or jaguar, chicken). All S saw one human condition and one non-human condition, either lion / jaguar or chicken, order balanced. The animal was presented and a series of warm-up questions were asked, followed by two experimental conditions (order balanced): in the “sleep” condition the animal was shown going to sleep, and in the “death” condition the animal was shown being killed by a person or other animal. After this manipulation, a series of questions was asked about the animal’s capacity to act (agency questions) and / or have mental states (non-agency questions; see Fig. 1). Individual S’s responses in the sleep and death conditions could then be compared. In both populations, parents were also surveyed regarding their children’s personal experiences that might be relevant to death, including television viewing (or access to TV in the Shuar case), time spent outdoors, experience with animals, experience with death, and so on.

Hypotheses

Hypothesis 1: Death understanding. Understanding of death as the cessation of agency, as evidenced by differences in responses in the sleep and death conditions, will be present at an early age in both populations.

Hypothesis 2: Question content. The more closely related to agency (i.e., the capacity to act) a question is, the better performance on that question.

Hypothesis 3: Between-population effects. Understanding of death will develop at the same age in both populations.

Hypothesis 4: Within-population effects. There should be no effect of individual experience on the developmental trajectory.

Results

Did children understand the sleep / death distinction? Yes, by age 4. Fig. 1 shows that death understanding increases with age, as reflected by the divergence between the blue (sleep) and pink (death) lines. An ANOVA with question type, population, and age group as factors showed a main effect of age group ($F_{2,87} = 19.7, p < .001, \eta^2 = .31$; other factors, see below)³. By age 4, children answer “yes” more often for questions about sleeping humans (e.g., “Can it move?”), than for dead humans (Paired Wilcoxon test, one-tailed: Shuar 4-yr-olds, $Z = 2.4, p < .01$; German 4-yr-olds, $Z = 3.8, p < .001$).

³ All statistics reported here are for human questions only. Lion and chicken results were similar, but samples smaller. Responses for human and chicken questions ($r = .74, p < .001$) and human and lion questions ($r = .53, p < .001$) were highly correlated within subjects.

Was performance best on questions most related to agency? Yes. In Fig. 1, the questions are arranged by the degree to which they concern agency, in decreasing order from left to right. ANOVA showed a significant but small main effect of question type ($F_{4,348} = 6.2$, $p < .001$, $\eta^2 = .07$)⁴. Post-hoc analysis showed the number of correct responses on the agency questions “Can it move?” and “Can it move if touched?” was higher than for non-agency questions “Can it detect you?” and “Can it be afraid?” (Paired Wilcoxon test, all S pooled, $Z = 2.9$, $p = .002$, one-tailed).⁵

Were there population effects? No. ANOVA showed no significant main effect of population, nor an interaction between population and age. There was, however, an interaction between question type and population ($F_{4,348} = 3.8$, $p = .005$, $\eta^2 = .04$). Post-hoc analysis revealed slight but consistent population differences in performance on particular questions (see Fig. 1).

Were there within-population effects of individual experience? No. There were no effects on performance of individual death-related experience, such as exposure to television, experience with animals, etc., though the sample may have been too small to detect effects.

Summary of results. Hypothesis 1 was confirmed: understanding of death as cessation of agency was present by age 4 in both populations. Hypothesis 2 was confirmed: performance was best on agency-related questions. Hypothesis 3 was not rejected: no population differences were found. Hypothesis 4 was not rejected: no effects of experience were found.

Conclusion

From an adaptationist standpoint, it is important to know whether or not an object is capable of action. The present study shows that children distinguish between sleeping and dead things in this regard at an early age. This finding supports a general view that those distinctions that are most crucial for adaptive decision-making are the ones that develop earliest. While other aspects of death may not be understood until much later in childhood, understanding of death as the cessation of agency is present at least by age 4. We suspect that such an understanding of death could be found at an even earlier age if methods relying less on language, pretense and explicit knowledge were employed.

Thanks: to J. Hutchinson and U. Czienskowski for useful comments, and to the Max Planck Gesellschaft for financial support.

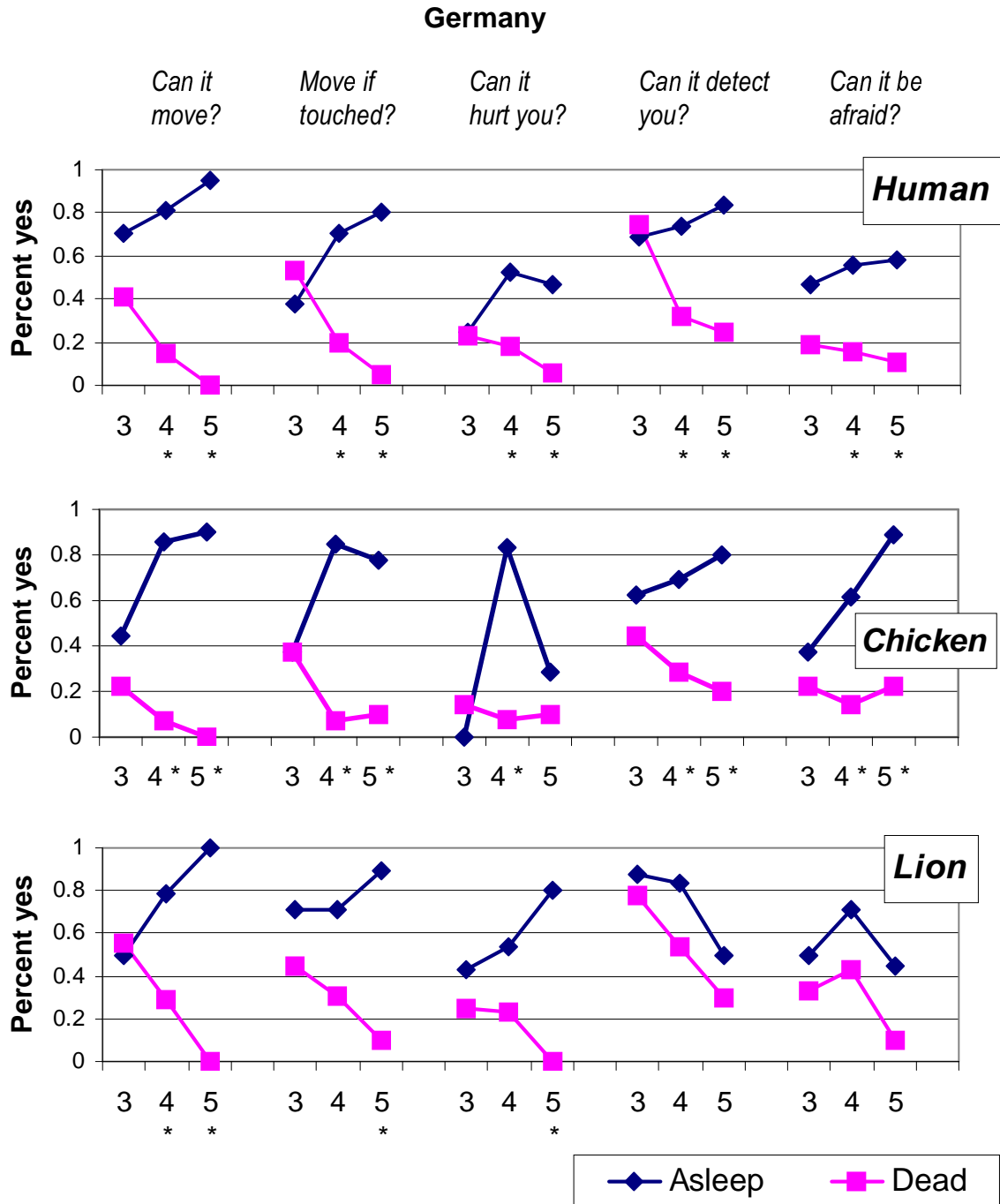
⁴ In the ANOVA results reported here, performance on individual questions was scored as follows. For sleep questions, a “yes” response received 1 point, and “no” or no response received 0. For death questions, a “no” response received 1 point, and “yes” or no response received 0. Thus, for each question, a score of 0, 1, or 2 was obtained, with 2 indicating correct responses in both sleep and death conditions for that question.

⁵ “Can it hurt you?” was not included in this analysis, because many children did not feel that even a living person could hurt them.

References

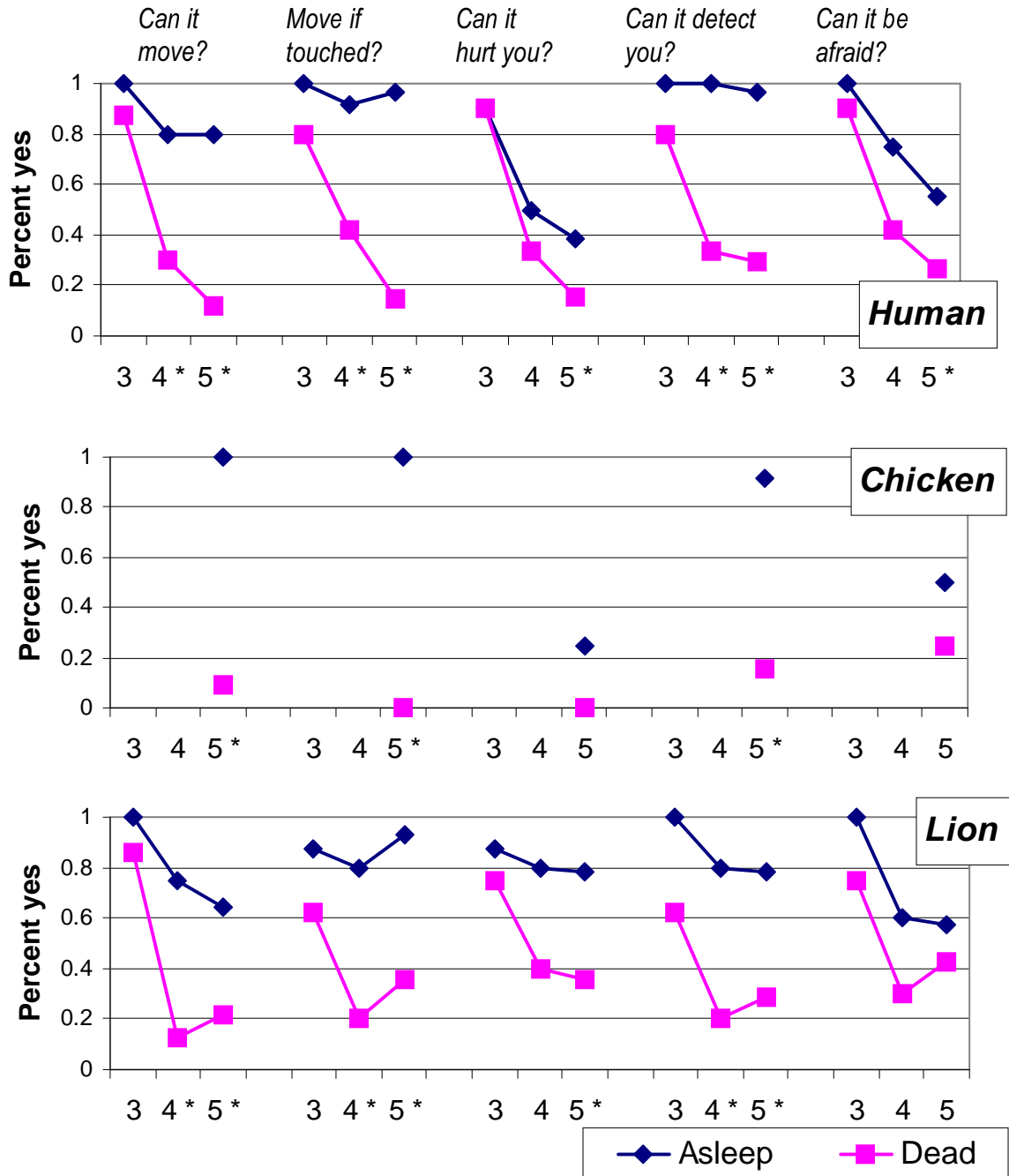
- Barrett, H.C. (1999). Human cognitive adaptations to predators and prey. PhD Dissertation, University of California, Santa Barbara. UMI Microform number 9986870.
- Barrett, H.C., Cosmides, L., and Tooby, J. (in prep). Children's understanding of predator-prey interactions and death.
- Gergely, G., Nádasdy, Z., Csibra, G., & Biró, S. (1995). Taking the intentional stance at 12 months of age. *Cognition*, 56, 165-193
- Leslie, A. M. (1994). ToMM, ToBy, and agency: Core architecture and domain specificity. In L. A. Hirschfeld & S. A. Gelman (Eds.), *Mapping the mind: Domain specificity in cognition and culture*. Cambridge: Cambridge University Press
- Slaughter, V., Jaakkola, R., & Carey, S. (1999). Constructing a coherent theory: Children's biological understanding of life and death. In M. Siegal & C. Peterson (Eds.), *Children's understanding of biology and health*. Cambridge: Cambridge University Press.

Fig 1. Responses to questions about sleeping and dead animals:



Note: Ages in years indicated on the horizontal axis. Degree to which questions concern agency declines from left to right across each axis. Significant differences between sleep and death conditions indicated by * ($p < .05$, McNemar test).

Fig 1. cont'd: Shuar



Note: Ages in years indicated on the horizontal axis. Degree to which questions concern agency declines from left to right across each axis. Significant differences between sleep and death conditions indicated by * ($p < .05$, McNemar test). Due to small sample, only 5 year olds were tested on the “chicken” condition among the Shuar.