Cognitive Science 32 (2008) 713–740

ISSN: 0364-0213 print / 1551-6709 online
DOI: 10.1080/03640210802066907

Understanding Mortality and the Life of the Ancestors in Rural Madagascar

Rita Astuti[a], Paul L. Harris[b]

[a]*Department of Anthropology, London School of Economics and Political Science*
[b]*Graduate School of Education, Harvard University*

Received 28 March 2006; received in revised form 28 November 2006; accepted 23 March 2007

Abstract

Across two studies, a wide age range of participants was interviewed about the nature of death. All participants were living in rural Madagascar in a community where ancestral beliefs and practices are widespread. In Study 1, children (8–17 years) and adults (19–71 years) were asked whether bodily and mental processes continue after death. The death in question was presented in the context of a narrative that focused either on the corpse or on the ancestral practices associated with the afterlife. Participants aged 8 years and older claimed that death brings an end to most bodily and mental processes. Nevertheless, particularly in the context of the religious narrative, they claimed that certain mental processes continue even after death. This assertion of an afterlife was more evident among adults than children, especially with respect to cognitive processes, such as knowing and remembering. In Study 2, 5- and 7-year-olds were asked similar questions in connection with the death of a bird and a person. Seven-year-olds consistently claimed that bodily and mental processes cease at death, whereas 5-year-olds were unsystematic in their replies. Together, the two studies replicate and extend findings obtained with Western children showing that, in the course of development, different conceptions of death are elaborated—a biological conception in which death terminates living processes and a religious conception in which death marks the beginning of a new form of spiritual existence.

Keywords: Supernatural concepts; Cognitive development; Madagascar; Cross-cultural research

1. Introduction

There is currently considerable debate about whether cognitive science can offer a satisfactory explanation of the origins, spread and resilience of religious beliefs and practices (e.g., see Atran, 2002; J. L. Barrett, 2004; Boyer, 2001; Whitehouse & McCauley, 2005).

Correspondence should be sent to Rita Astuti, Department of Anthropology, London School of Economics and Political Science, Houghton Street, London, WC2A 2AE, United Kingdom. E-mail: r.astuti@lse.ac.uk

Some contributions to this debate are distinctively polemical in that they pit religion against a scientific or materialist view of the world (Dawkins, 2006; Dennett, 2006). However, the debate within cognitive science is best served when competing psychological proposals can be carefully examined in the light of empirical data.

In this article, we examine the understanding of death among the Vezo, a group of people who live on the western coast of Madagascar. We aim to show that Vezo hold and act upon two different conceptions of death—one that can be regarded as grounded in everyday, biological thinking; and the other that is intimately linked to Vezo conceptions of an afterlife. In arguing that Vezo subscribe to both conceptions, we seek to draw together two hitherto separate and apparently antithetical lines of enquiry. Research by social anthropologists has documented the widespread existence of beliefs in the afterlife. One particularly elaborate and well-studied example is that of the beliefs in the existence and power of the ancestors that are widespread in Madagascar, and well-documented among the Vezo. By contrast, developmental psychologists have offered convincing evidence that children increasingly acknowledge biological constraints on the life cycle. On this view, a mature concept of death implies the recognition that death is a terminal point that brings all living processes to an end. We seek to show that an adequate understanding of how Vezo approach death calls for an analysis that simultaneously honors both of these research traditions. More specifically, we seek to show that Vezo subscribe to the continued existence of the ancestors but also acknowledge the biological constraints on the life cycle. Below, we discuss in more detail the research in each tradition, and we spell out the research implications of bringing them together.

1.1. Anthropology and beliefs in the ancestors

Anthropologists have long been interested in representations of the afterlife and, in particular, in the beliefs and ritual practices surrounding the ancestors. In the evolutionary schema of Victorian anthropologists—Spencer, Tylor, and Frazer—"ancestor worship" was considered as the most primitive form of religion, which afforded the simplest conception of a supernatural being (for an overview, see Morris 1987). When such evolutionary models were abandoned, ancestor worship remained a central preoccupation of structural–functionalist anthropologists, who saw it as a central force in the reproduction of the moral, jural, and economic order (e.g., Fortes, 1945; Kopytoff, 1971). More recently, anthropologists have focused on the pervasiveness of the ancestors in their descendants' everyday lives and on how their existence is experienced in different ways and at different times through features of the landscape, objects, illnesses, and particular emotions (e.g., see Hardman, 2000; McCall, 1995).

The anthropological literature on Madagascar has been dominated by scholarly concerns with the ancestors (for a review, see Middleton, 1999). In addition to analytical concerns about their role in shaping people's historical memory (e.g., Cole, 2001; Feeley-Harnik, 1991; Graeber, 1999; Lambek, 2002), in legitimating political authority (e.g., Bloch, 1986), or in mediating conversion to Christianity (e.g., Keller, 2005), ethnographers of this region have given a rich account of the pervasive presence of the ancestors in people's everyday comings and goings. To illustrate, like other people in Madagascar, Vezo have to follow a great variety

of taboos (on certain foods, words, localities, body postures, etc.) that have been laid down by their dead relatives in the distant past; if they breach a taboo, they expect to fall ill as a result of ancestral wrath; if they go on a journey or undertake a substantial new project (e.g., build a new house), they inform the ancestors in order to pre-empt their inquisitive questions; when they sleep, they may encounter a dead relative in their dreams who offers to hold their hand, or asks for food, or complains that her "house" (i.e., her tomb) is dirty and asks why nobody has cleaned it. Most interactions with the ancestors are aimed at keeping them at a safe distance from the living. Tombs are built, announcements are made, taboos are observed in order to keep the ancestors happy so that they will not enter one's dreams and bring misfortune. But if there are signs that the ancestors are angry or unhappy, offerings of food and rum are made to try to appease them (see Astuti, 1994, 1995a).

On this and similar anthropological accounts, many people around the world, including the Vezo of Madagascar, subscribe to the idea that dead people maintain a significant presence among the living; that they continue to influence the health and success of their descendants; and that they preserve a significant capacity for feelings, emotions, desires, likes, and dislikes. However, in view of Evans-Pritchard's (1937) famous findings regarding the co-existence of "natural" and "mystical" causal reasoning among his Azande informants, we might want to consider the possibility that many people around the world, including the Vezo, also fully comprehend the biological consequences of death.

1.2. Developmental psychology and the biology of death

A great deal of psychological research has been devoted to different aspects of children's biological knowledge, ranging from the understanding of illness and contagion (Kalish, 1999) to the understanding of birth and biological inheritance (Solomon, Johnson, Zaitchik, & Carey, 1996; Springer, 1996), from the understanding of life (Inagaki & Hatano, 2002) to the understanding of death. This latter body of literature has focused on the extent to which children construe death in terms of a larger, biological theory of the life cycle. Thus, it is argued that children come to grasp not just the universality and irreversibility of death (Speece & Brent, 1992); they also realize that the body consists of an integrated set of organs whose functioning is essential for life (Jaakola & Slaughter, 2002; Slaughter, Jaakola, & Carey, 1999; Slaughter & Lyons, 2003). On this biological conception, death implies a breakdown of the bodily "machine" and the comprehensive cessation of all processes.

Despite this impressive and relatively early emerging knowledge of the biological constraints on the life cycle, it has also been found that adults tend to be less likely than children to insist on the irreversibility of death, with some referring explicitly to the possibility of special transformations such as reincarnation or resurrection (Brent & Speece, 1993). Moreover, studies that have included both children and young adolescents document a progressive increase in references to the afterlife (Brent, Speece, Lin, Dong, & Yang, 1996; Wenestram & Wass, 1987).

These findings raise the possibility that, although children come to understand the biological constraints of the life cycle and to represent death as the cessation of all life processes, they might also come to expect that some of the properties of life continue after death.

1.3. Two conceptions of death

If we bring together these anthropological and psychological lines of research, one conclusion suggests itself: That children and adults around the world might hold two relatively distinct conceptions of death. On the one hand, they come to understand death in biological terms, and conceive of it as the endpoint of life. On the other hand, they also come to understand death in supernatural terms as the beginning of an afterlife.

A recent study by Harris and Giménez (2005) sought to demonstrate that children raised in a Catholic environment do indeed hold both of these conceptions. Following a standard test procedure used to assess children's understanding of death, they asked Spanish 7- and 11-year-olds who were attending secular, public schools in Madrid to judge whether certain properties of a deceased person remain viable after death. In order to reveal the existence of two different conceptions of death, Harris and Giménez introduced two different types of probes. First, children were told about the death of a grandparent in either a secular, medical context (involving a conversation between a doctor and a child about what had happened to the grandparent); or alternatively, in a nonsecular, religious context (involving a conversation between a priest and a child about what had happened to the grandparent). Second, children were asked to make judgments about the continued functioning of both bodily and mental processes.

Both the narrative context and the type of process influenced children's judgments. In the secular medical context, children claimed that most processes cease after death; whereas in the religious context, they claimed that some processes continue. In addition, children were more likely to claim that mental processes continue after death than bodily processes. Thus, given the secular narrative and asked about bodily processes, children generally insisted on their cessation at death. Given the religious narrative and asked about mental processes, they often insisted on their continuation beyond death. This dual conception of death as a biological endpoint and a spiritual continuation was more evident among 11-year-olds than 7-year-olds.

Although significant, Harris and Giménez's (2005) study has two obvious limitations. First, it only looks at children; second, all participants came from a Catholic community. The goal of the present study is to extend the scope of Harris and Giménez's findings by exploring conceptions of death from early childhood into adulthood and to do so in a non-Western setting. More generally, we aim to remedy a general limitation of existing research on the ontogeny of religious belief, which has typically examined only a relatively narrow age span and included only Western participants.

2. The ethnographic context of the study

Given the unusual setting for the studies reported in this article, we give a short description of the cultural context in which they were carried out. The studies were conducted in the Vezo coastal rural community of Betania in western Madagascar where Rita Astuti conducted extensive periods of anthropological fieldwork between 1987 and 2004. The village has, at present, a population of about 1,000 people. The livelihood of the village depends on a variety of small-scale fishing activities and on the daily trading of fish at the market of the nearby town (for more details, see Astuti, 1995a, 1995b).

For the purpose of this article, we describe two aspects of the experience of the Vezo children and adults who participated in our studies. First, the very direct first-hand encounters that Vezo have with animal and human death; second, the pervasiveness of Vezo ancestral practices aimed at appeasing and ingratiating dead relatives. In addition, in order to provide more information about the indigenous conceptualization of body and mind among the Vezo, we also compare and contrast three terms that may be tentatively translated into English as "body," "mind," and "spirit." These three terms were used in the final section of the death interview used in Study 1 as a probe of participants' understanding of the consequences of death.

2.1. Exposure to animal and human death

In the village of Betania, adults kill a variety of animals—fish of all sizes, turtles, cattle, pigs, chickens, and occasionally tenrecs—in the course of their daily subsistence activities. Animal death is also part of children's daily experience from the earliest age. For example, it is common for both girls and boys to wait expectantly for the canoes' return from the daily fishing expeditions. When a canoe arrives, children squat around the catch, hoping to receive (or steal) the intestines and other internal organs, which they cook on miniature fires. These gatherings often turn into something of an anatomy lesson, as children prod the fish, open its mouth, inspect its gills, poke its eyes, and so on. Older children sometimes scare the younger ones by suddenly moving the fish forward as if it were still alive; if the youngsters cry, they are immediately reassured that the fish is actually dead; and they are shown that, in fact, it cannot move by itself. Children may be given small live fish to play with in the pools along the shore. Vezo toddlers play with these fish in the same way that their Western counterparts play with wind-up toys; but after much squeezing, throwing, and guided swimming, their fish eventually stop moving. Frustrated toddlers are told by their older siblings that the fish does not move because it is dead and can now be eaten. A similar pattern—play followed by death, followed by eating—characterizes children's interaction with small wildlife, such as birds (Astuti, 2000).

Children are present in large numbers when an ox is slaughtered. Children's fascination with these larger kills is partly motivated by the hope that they might receive a few shreds of meat; but children also appear to be intensely interested in the process of dying itself—they comment on the raucous noise that erupts from the cut throat, on the last expulsion of excrements, on the glassy eyes of the dead animal, and so on. In sum, like adults', Vezo children's experience of animal death is at very close range.

Sadly, the same can be said for human death. In Betania, funerals are frequent (during her most recent 6-month period of fieldwork, Rita Astuti participated in 8 funerals). Adults are expected to participate by attending the wake and two communal meals daily. Indeed, in the case of senior and elderly people, the corpse may be kept as long as 3 or 4 days in the village, requiring people to give up their sleep and normal food for as many nights and days (Astuti, 1995a). Children are taken along to funerals and wakes where they spend most of their time playing in large voluble groups as they wait to be fed, and eventually fall asleep huddled together in small groups. Mindful of the decomposing body, children choose to gather far away from the stench. At times, they might accompany their parents when they first enter the house where the corpse is laid out, and they often cry in fear—in unison with the sudden loud

wailing that is triggered by the arrival of each new visitor. When a child's parent dies, just before the coffin is finally nailed down before being carried to the cemetery, the children, no matter how young they might be, are made to stand in front of the coffin and ordered to look at their father or mother and to register that she or he is dead: "Do you see, that's your mother, she is dead. You shall never call her name again." As the nails are hammered in, the children are ushered outside. They are not allowed to accompany the coffin to the cemetery, as it is thought that the dead parent would never let them come back.

2.2. Interaction with the ancestors

As noted above, the presence of the ancestors is part of people's everyday life. Decisions about what food to avoid, when to hold a ritual, where to build a new house, whom to marry, when to leave and when to come back, and so on, must take the ancestors into account—the ancestors' desires have to be met, their orders have to be obeyed, their curiosity about what goes on among the living has to be satisfied.

Adults are responsible for keeping the ancestors happy so that they do not interfere with their descendants' lives. They are also responsible for staging rituals that appease the ancestors and seek their forgiveness when they show anger and dissatisfaction. By contrast, children have no duties or responsibilities toward the ancestors. Nonetheless, they are present whenever a ritual interaction with the ancestors takes place. Indeed, children are obliged to be present because the ancestors delight in seeing the expanding crowd of their descendants. However, no attempt is made to explain to children what the purpose of the offerings is, who the recipients are, how the offerings are consumed by the ancestors, and so on. Adults think that children are unable to understand such "difficult" things as the dangerous requests of the ancestors. They also believe that children are particularly vulnerable to the anger of the ancestors, and hope that keeping children's minds free from ancestral knowledge is the best way to protect them. Parents are consequently pleased to point out that when a ritual offering takes place, their children are only interested in the food that is being cooked.

In sum, although Vezo children have direct encounters with animal and human death, it would be difficult for them to ignore the existence of the ancestors. Yet, children receive little explicit commentary on what kind of entity the ancestors are. By the time they are teenagers, they might occasionally be asked to take a more direct role in ancestral rituals (e.g., by cooking the rice offered to an angry ancestor). When they move into full adulthood, when they "take up house"—the literal meaning of marriage—and have children of their own, the ancestors will begin to impinge on their daily lives as never before, as they are now in a position to take important decisions that might upset the ancestors and bring illness to their children. As Vezo adults would have it, it is only when people have become full persons—by having children of their own—that they are wise enough to understand about ancestral matters.

2.3. Body, mind, and spirit

Vezo use three words to refer to different components of a living person: *vata*, *say*, and *fanahy*. The term *vata* is the most straightforward, as it refers to the material and visible component of the person. A person's *vata* can be healthy or sick, beautiful or ugly, strong or

weak, big or small. It corresponds quite closely to the English term *body.* The terms *say* and *fanahy* are more problematic. Vezo adults are far from clear about the exact referents of these terms and about the exact location of the entities they refer to. They agree that neither *say* nor *fanahy* are visible, but that the nature of a person's *say* and *fanahy* is revealed in that person's behavior. In the case of the *say*, people who behave oddly are said to have a sick *say* or to have lost their *say*; people who are wise are said to have *say*; people who are mentally handicapped are said not to have enough of it; and children are credited with very little *say* because this grows as they get older. Children, for their part, use the term to tell their mates that their *say* is insufficient (i.e., that they are stupid). Because say involves a graded capacity for intelligent and socially appropriate behavior, it can be tentatively translated as *mind.* As for the *fanahy*, people who are generous are said to have a beautiful or a good *fanahy*, and those who are easily angered or are stingy are said to have a bad *fanahy*. Once again, children routinely use the term to assert that their best friends have a good *fanahy* and that their enemies have a bad one. The same person's say and *fanahy* can have different connotations; for example, someone who has little say, can have a beautiful *fanahy*. Most adults assert that when people are asleep, the *fanahy* wanders around, detached from the body; and that when people die, the *fanahy* departs permanently from the body. Insofar as the term *fanahy* denotes the moral characteristics of the person and her personal identity, it can be tentatively translated as *spirit.* Accordingly, below, for the sake of convenience, we use the terms body, mind, and sprit.

3. Study 1

Study 1 was designed to answer two questions. First, we asked if the dual conception of death identified among Spanish children by Harris and Giménez (2005) would re-emerge in a very different cultural context. In the light of the ethnographic observations presented earlier, we anticipated that Vezo children would exhibit a robust understanding of the biological consequences of death for the human body (due to their close encounters with animal and human death). Nevertheless, we predicted that they would also endorse the view that some of the person's mental properties survive after death. This latter prediction was based on the expectation that children's repeated, albeit untutored, participation in ancestral rituals would afford them the idea that ancestors have desires; that they often feel angry, lonely, and hungry; that they can see and judge the behavior of their living descendants and remember promises that have been broken; and so on—in short, that dead people's minds survive the death of their bodies.

We further predicted that this dual conception of death would also be found among Vezo adults. Thus, we anticipated that Vezo adults would continue to acknowledge the biological consequences of death while simultaneously endorsing the view that some processes, notably mental or spiritual processes, continue into the ancestral afterlife. On the one hand, the ethnographic observations show that Vezo adults are prepared to devote huge efforts to appeasing their ancestors, clearly suggesting that they believe in the survival of some mental properties after death. On the other hand, given their continued first-hand experience and understanding of both animal and human death, we doubted that Vezo adults would abandon a biological conception of death, notwithstanding their pervasive commitment to and engagement with the ancestors. To probe the existence of these two conceptions, we employed, with important

modifications, the question format adopted by Harris and Giménez (2005) with Spanish children. Participants were questioned about the functioning of bodily and mental processes in two narrative contexts that focused on either the corpse or the ancestral tomb. As described in more detail below, whereas these two narratives were tailored to the cultural practices of the Vezo, they were also designed to capture an analogous distinction to that between secular and religious contexts, which was used in the study with Spanish children.

Our second question was whether there would be any changes to this dual conception in the course of development. On the strength of recent findings by Bering and his colleagues (Bering, 2007; Bering & Bjorklund, 2004; Bering, Hernández-Blasi & Bjorklund, 2005), one could argue that the idea that dead agents preserve their mental faculties is not acquired through enculturation at all, but is the natural output of a default cognitive stance. On this account, younger children should be more likely than adults to endorse the survival of dead agents' minds because their natural intuition is still unconstrained by the understanding of death as a biological phenomenon. Hence, the dual conception of death should become less apparent in the course of development as the biological conception of death increases its grip. By contrast, the findings of Harris and Giménez (2005) showed that older children are *more* likely than younger children to expect certain processes to continue after death. Harris and Giménez concluded that alongside their biological understanding of death, older children increasingly endorse the religious testimony to an afterlife that often surrounds an encounter with human death. On this account, therefore, one would expect a similar age change among the Vezo. More specifically, even if both children and adults adopt a dual conception of death, this should be more evident among adults. Given their active and informed participation in rituals devoted to the ancestors, adults should be especially likely to expect mental processes to continue into the afterlife.

To address these two questions about how Vezo participants reason about the consequences of death, a wide age range of children and adolescents (8 years–17 years) and adults (19 years–71 years) were interviewed about the death of a fictional character. The age groups were defined, *a priori,* to capture the qualitative change in Vezo relations with the ancestors that occurs when people marry and have children of their own (see above). Thus, the 8 to 17 age group includes the local category of children (*zaza*) and of unmarried but sexually active adolescents (*kidabo, somonjara*). For ease of exposition, participants in this younger group are referred to as children. One half of the participants in each age group were interviewed following a narrative that presented the character's death in a secular context that included a corpse, and one half following a narrative that presented the character's death in a ritual context that included an ancestral tomb. After listening to the narrative, all participants answered a series of question concerning whether various processes cease or continue at death.

3.1. Method

3.1.1. Participants

A total of 56 children (31 boys and 25 girls: mean age = 12 years, 8 months; range = 8 years, 11 months–17 years, 3 months) and 46 adults (21 men and 25 women: mean age = 35 years; range = 19 years–71 years) were interviewed.

For the purpose of preliminary analysis, each of these two groups was further divided into three subgroups. Thus, children were divided into a young child subgroup (mean age = 10

years, 0 months; range = 8 years, 11 months–11 years, 3 months), an intermediate child subgroup (mean age = 12 years 8, months; range = 11 years, 6 months–13 years, 10 months), and an adolescent group (mean age = 16 years, 7 months; range—16 years, 3 months–17 years, 3 months). Adults were divided into a young adult subgroup (mean age = 22 years; range = 19 years–25 years), an intermediate adult subgroup (mean age = 30 years; range = 26 years–34 years), and a senior subgroup (mean age = 52 years; range = 40 years–71 years).

Children in the young and intermediate age groups were typically in either Grade 1 or Grade 2, having repeated the same curriculum for one or more years. Almost all were functionally illiterate. A small number of adolescents had progressed beyond Grade 7, but the majority had either dropped out or was in intermediate grades. All the adults were engaged in fishing and trading in the nearby market town. Some were literate, but virtually no one needed to make regular use of their literacy skills in the course of everyday life. All participants were from the Vezo village of Betania. The interviews were all conducted in Malagasy by Rita Astuti and were tape recorded. At the end of each interview, all participants were offered a small sum of money to thank them for their participation. Monetary compensation of this kind is customary when someone seeks information from more knowledgeable people; we are, therefore, confident that the monetary reward did not influence the way adults answered the test questions (e.g., by biasing them to give the kind of answers they might have thought the interviewer wanted to hear). In the case of children, the prospect of the reward encouraged them to participate and pay close attention to the story and questions.

The recruitment of adult participants posed no difficulties because villagers were familiar with Rita Astuti and with her habit of asking somewhat peculiar questions. The recruitment of children was facilitated by the presence of her 10-year-old son. For about 1 month prior to testing, children of all ages were encouraged to come to the researcher's house to play with her son and to draw. By the time the children were asked to participate in the study, they were familiar with the researcher and her tape recorder.

3.1.2. Procedure

Before testing began, participants were told that they were going to hear a story and be asked some questions about it. They were also told that the experimenter's questions could be answered in more than one way and that the experimenter was interested in the different opinions that people might have.

All participants received a story about the death of an adult. One of the stories—the "corpse" story—described the death of Rampy; it focused on his illness and subsequent death. The other story—the "tomb" story—described the death of Rapeto; it described him as an elder with many descendants and focused on the construction of the ancestral tomb by his family following his death. One half of the participants in each subgroup were given the corpse story, and one half were given the tomb story.

The narratives were designed to evoke two different conceptions of death. The corpse narrative—akin to the secular narrative of Harris and Giménez (2005)—was designed to draw attention to the biological dimensions of the dying process; the tomb narrative—akin to the religious narrative of Harris and Giménez—was designed to evoke the deceased's continuing existence after death. To appreciate the latter point, note that, although Vezo tombs are undoubtedly places for the disposal of decomposing human bodies, they are also the most prominent places where living people attend to their ancestors by building them a comfortable

Table 1
English translation of questions about bodily and mental processes for Study 1 (person) and Study 2 (person + bird)

Process	Person	Bird
Bodily	Do his eyes work or not?	Do its eyes work or not?
	Do his ears work or not?	Do its ears work or not?
	Do his legs move or not?	Do its wings move or not?
	Does his heart beat or not?	Does its heart beat or not?
	Does his stomach need food or not?	Does its stomach need food or not?
	Does a cut on his hand heal or not?	Does a cut on its neck heal or not?
	Does he get old or not?	Does it get old or not?
	Does his body work or not?	Does its body work or not?
Mental	Does he see things around or not?	Does it see things around or not?
	Does he hear when people talk or not?	Does it hear when birds make sounds or not?
	Does he feel hungry or not?	Does it feel hungry or not?
	Does he feel cold or not?	Does it feel cold or not?
	Does he remember where his house is or not?	Does it remember where its island is or not?
	Does he know his wife's name or not?	Does it know where there is fish or not?
	Does he miss his children or not?	Does it feel afraid or not?
	Does his mind work or not?	Does its mind work or not?
	Does his spirit work or not?	Does its spirit work or not?

"house." Indeed, one common reason why ancestors intrude in people's dreams is to complain that their tomb needs repairing. Tombs, in other words, are more than places of burial; they are crucial in mediating the relations between life and the afterlife. The English translation of the text of each story is provided in the Appendix.

After hearing the story, participants were asked a total of 14 questions about the viability of various processes after death; 7 questions concerned body processes, and 7 questions concerned mind processes. The left-hand panel of Table 1 lists these questions. In the case of the corpse story, the questions were introduced by this statement: "Now that Rampy is dead." In the case of the tomb story, the questions were introduced by this statement: "Now that Rapeto is over there at the tombs." Note that because Rapeto's body is indeed buried in his tomb, this introductory statement does not in any way imply, or endorse, Rapeto's survival as a spiritual entity. In other words, the prompts in both stories ultimately leave participants free to represent the deceased as either a rotting corpse or as an immaterial, ancestral spirit.

Within the set of seven body and seven mind questions, there were three "matched" questions. These three questions focused on the same underlying process but the exact form of the question varied depending on whether it concerned body parts or their associated sensations and psycho-biological processes. Thus, with respect to seeing, participants were asked, "Do his eyes work or not?," and "Can he see or not?" With respect to hearing, participants were asked, "Do his ears work or not?," and "Can he hear when people talk or not?" Finally, with respect to eating, participants were asked, "Does his stomach need food or not?," and "Does he feel hungry or not?" These matched questions offered a more finely tuned probe of the extent to which participants conceive of the fate of the body and mind at death as being different.

In addition, within the set of seven mind questions, there were three questions that focused specifically on cognitive as distinct from psycho-biological processes. These were the following: "Does he know the name of his wife or not?," "Does he remember where his house is or not?," and "Does he miss his children or not?" Answers to these three questions could be compared with answers to the question about the three psycho-biological processes just mentioned; namely, seeing, hearing, and feeling hungry.

It should be noted that children were asked one further body question ("Does he need to shit or not?"). However, during the piloting stage with adult participants, this question was regarded as too absurd to be worth an answer, and made people doubt the seriousness of the interviewer's intentions. Hence, it was not included in the adults' interviews. In addition, both children and adults were asked a question about dreaming ("Does he dream or not?"). Children found this question confusing because of the close association between dreaming and ancestral visitations. Instead of interpreting the question as being about the dreaming faculties of the deceased, children often understood it as being about the possibility of seeing the deceased in one's dreams. Accordingly, replies to these two questions were not included in the analyses reported below.

After participants had answered the seven questions about body processes, they were asked about the functioning of the body considered as a unified entity—"Does his body work or not?"—and were invited to justify their reply. After participants had answered the seven questions about mind processes, they were asked about the functioning of the mind and also the spirit—"Does his mind work or not?," followed by "Does his spirit work or not?"—and in each case were invited to justify their reply. A full analysis of these justifications is presented elsewhere (Astuti, 2008).

Each set of 7 questions was asked in one of two random orders. One half of the participants in each age group received the body questions followed by the mind questions, and one half received the reverse order. Several additional precautions were taken with the young and intermediate child groups. First, to forestall the likelihood that they might focus on the final negative option, they were asked 7 of the 14 questions in a positive–negative order (e.g., "Do his eyes work or not") and 7 in a negative–positive order (e.g., "His eyes don't work . . . or do they?"; the negative–positive order does not sound awkward or unnatural in Malagasy). This precaution was not taken with older participants because it was assumed that they would not be prone to echoic responding.

Second, the stories were accompanied by visual aids. Children were first shown a colored drawing of the protagonist—Rampy or Rapeto—in a standing position. Toward the end of each story, they were shown either a colored drawing of Rampy stretched out on a bed, with his eyes closed, and a white cloth tied around his jaw; or a colored drawing of Rapeto's tomb, with the traditional cement cross bearing his name clearly visible.

3.2. Results

Participants were scored for the frequency with which they gave a "does not work" reply to the process questions. We first examine replies to the set of 14 process questions. Second, we analyze replies to the three matched bodily and psycho-biological questions. Third, we consider replies to these three psycho-biological questions versus the three cognitive questions. Finally, we analyze responses to questions about the body, mind, and spirit.

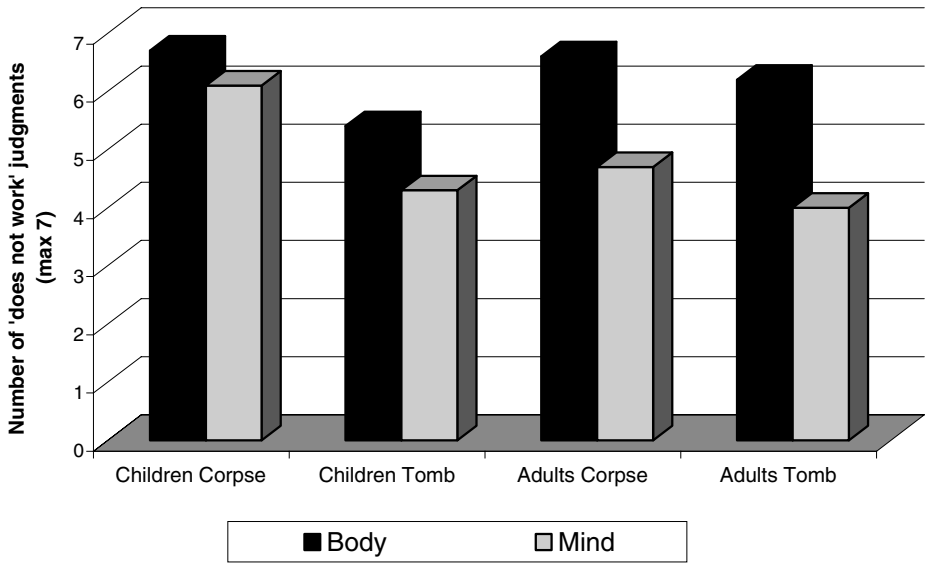

Fig. 1. Mean number of "does not work" judgments (maximum = 7) as a function of age, narrative, and process type (body vs. mind).

3.2.1. Responses to entire set of process questions

Inspection of the data indicated that there were no systematic effects of gender or of receiving the body or mind questions first. Accordingly, an initial analysis was carried out in which the mean number of "does not work" judgments (maximum = 7) was analyzed as a function of the six age-based subgroups described in the section on participants. However, given the small number of participants in each combination of subgroup and narrative context, this analysis obscured the clear differentiation that emerged when the children and the adults were combined to form two separate groups.

Figure 1 shows the mean number of "does not work" judgments as a function of age (children vs. adults), narrative (corpse vs. tomb), and process type (body vs. mind). Although participants said that most processes cease at death, more "does not work" judgments were produced in the context of the corpse narrative than the tomb narrative, and for bodily processes rather than for mental processes. In addition, children gave more "does not work" judgments than adults did, but only for mental processes.

A three-way analysis of variance (ANOVA) of Age × Narrative × Process Type confirmed that "does not work" judgments were produced more often by participants receiving the corpse ($M = 12.12$, $SD = 2.38$) as compared to the tomb narrative ($M = 9.92$, $SD = 2.92$), narrative—$F(1, 98) = 16.25$, $p < .001$—more often for bodily ($M = 6.22$, $SD = 1.22$) than for mental processes ($M = 4.80$, $SD = 2.12$), and process type—$F(1, 98) = 66.62$, $p < .001$.

The only other significant finding was the interaction of Age × Process Type: $F(1, 98) = 11.69$, $p < .001$). Further analysis of this interaction using tests of simple effects showed that for bodily processes, "does not work" judgments were given as often by children ($M = 6.10$, $SD = 1.29$) as by adults ($M = 6.36$, $SD = 1.10$): age, $F(1, 196) = 0.66$, *ns*). For mental

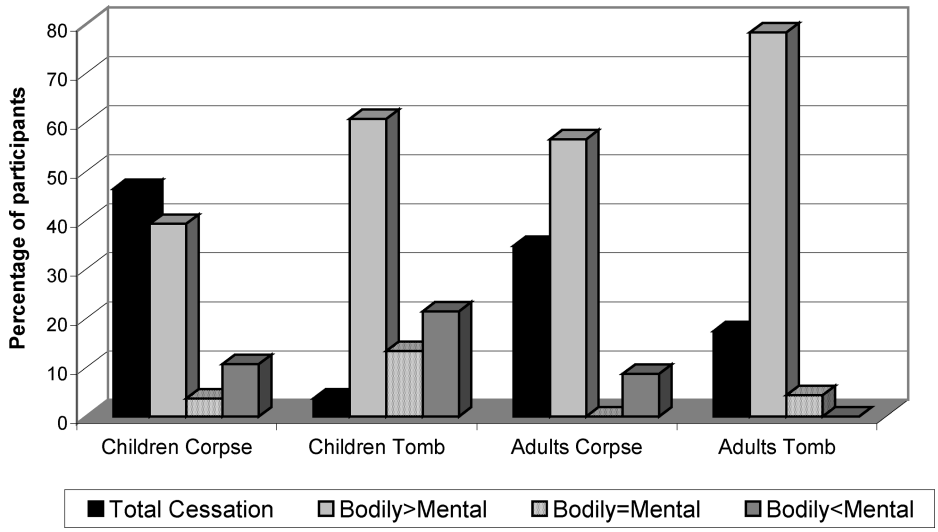

Fig. 2. Percentage of participants allocated to four different categories as a function of age and narrative.

processes, however, they were given more often by children ($M = 5.22$, $SD = 1.94$) than adults ($M = 4.25$, $SD = 2.24$): age, $F(1, 196) = 9.24$, $p < .01$.

To better understand individual patterns of judgment, participants were allocated to four categories: those who produced a "total cessation" pattern by giving "does not work" judgments for all seven body questions and all seven mind questions, those who gave more "does not work" judgments for the body than the mind, those who gave an equal number of "does not work" judgments for the body and the mind (but less than 7 in each case), and those who gave more "does not work" judgments for the mind than the body. Fig. 2 shows the percentage of children and adults in each of these four categories as a function of age and narrative.

As expected, many participants gave more "does not work" judgments for the body than the mind (*bodily* > *mental*), whereas the reverse pattern of judgment (*mental* > *bodily*) was rare. Sign tests confirmed that this asymmetry was marginally significant for children who heard the corpse narrative ($p < .058$) and significant for those who heard the tomb narrative ($p < .034$). The asymmetry was significant both for adults who heard the corpse narrative ($p < .008$) and for adults who heard the tomb narrative ($p < .002$).

Fig. 2 also throws light on the effect of narrative. In the context of the corpse narrative, almost one half of the children (46%) and more than one third of the adults (35%) gave a total cessation pattern of judgment. In the context of the tomb narrative, this total cessation pattern was less frequent among both children (4%) and adults (17%). In this latter context, the majority of participants (61% of children; 78% of adults) made fewer "does not work" judgments for the mind as compared to the body.

Summarizing, children and adults often claimed that processes cease at death, but such claims were more frequent for bodily than mental processes and for the corpse narrative than the tomb narrative. A substantial minority of participants who heard the corpse narrative claimed that all processes cease at death, but few who heard the tomb narrative did so.

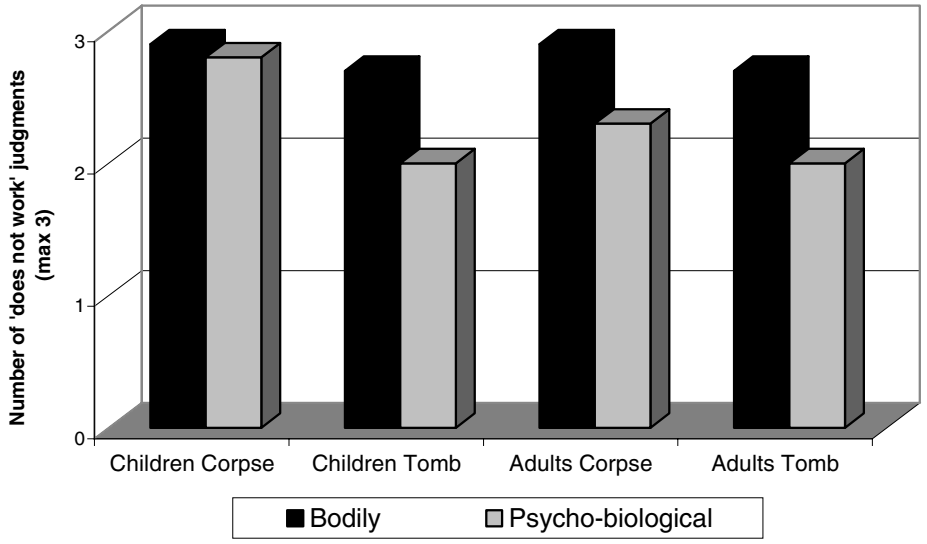

Fig. 3. Mean number of "does not work" judgments for matched questions (maximum = 3) as a function of age, narrative, and process type (bodily vs. psycho-biological).

3.2.2. Responses to three matched body and mind questions

To compare participants' pattern of judgment with respect to the body and the mind in more detail, we focused on three questions that targeted the functioning of a body part and its associated psycho-biological sensation (the eyes and seeing, the ears and hearing, the stomach and feeling hungry).

Figure 3 shows the mean number of "does not work" judgments (maximum = 3) as a function of age, narrative, and process type. A three-way ANOVA of Age × Narrative × Process Type confirmed that "does not work" judgments were given more often for the corpse narrative ($M = 5.47$, $SD = 1.07$) than for the tomb narrative ($M = 4.67$, $SD = 1.49$), narrative—$F(1, 98) = 9.35$, $p < .003$—more often for bodily parts ($M = 2.78$, $SD = 0.59$) than for psycho-biological processes ($M = 2.28$, $SD = 0.96$), and process type—$F(1, 98) = 38.40$, $p < .001$. There were no significant interactions.

3.2.3. Responses to psycho-biological and cognitive questions

To assess participants' differentiation within the realm of mental processes, we compared their judgments concerning three psycho-biological processes (seeing, hearing, and feeling hungry) with three cognitive processes (knowing, remembering, and missing one's children). Fig. 4 shows the mean number of "does not work" judgments (maximum = 3) that participants made as a function of age, narrative, and process type. A three-way ANOVA of Age × Narrative × Process Type confirmed that "does not work" judgments were given more often in the context of the corpse narrative ($M = 4.57$, $SD = 1.87$) than the tomb narrative ($M = 3.29$, $SD = 1.91$), narrative—$F(1, 98) = 12.12, p < .001$—more often for psycho-biological processes ($M = 2.28$, $SD = 0.96$) than for cognitive processes ($M = 1.65$, $SD = 1.26$), and process type—$F(1, 98) = 42.44$, $p < .001$.

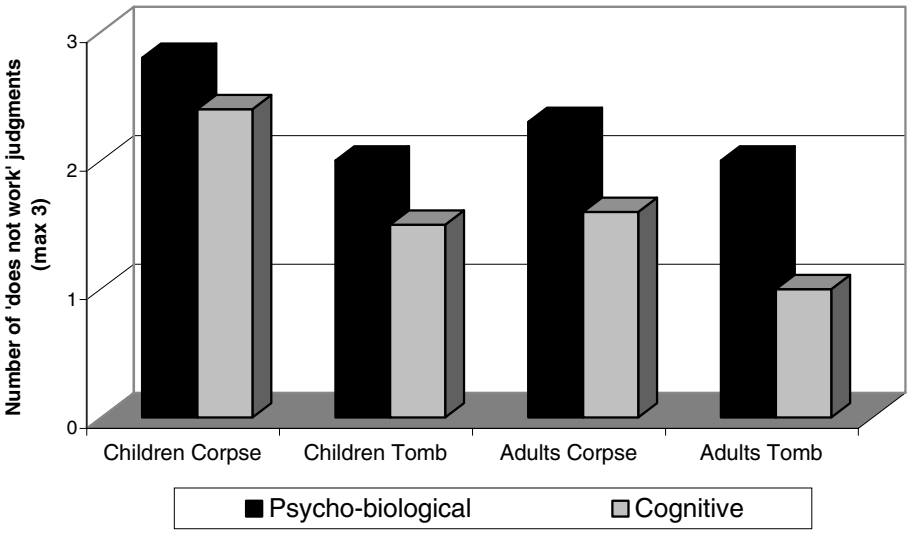

Fig. 4. Mean number of "does not work" judgments (maximum = 3) as a function of age, narrative, and process type (psycho-biological vs. cognitive).

The interaction of Age × Process Type also reached significance: $F(1, 98) = 4.69$, $p < .033$. Further analysis of this interaction confirmed that "does not work" judgments were given for psycho-biological processes as often by children ($M = 2.40$, $SD = 0.92$) as by adults ($M = 2.14$, $SD = 1.00$); age,$F(1, 196) = 1.52$, *ns*. For cognitive processes, however, such judgments were given more often by children ($M = 1.95$, $SD = 1.15$) than by adults ($M = 1.25$, $SD = 1.31$); age, $F(1, 196) = 10.99$, $p < .01$.

3.2.4. Responses to body, mind, and spirit considered as unitary entities

Recall that after the set of process questions, participants made judgments about the continued working of the body, the mind, and the spirit. We analyzed these data in two steps. First, we examined the effect of narrative. As expected, when judgments were summed across the three entities, participants gave more "does not work" judgments in the context of the corpse narrative ($M = 2.33$, $SD = 0.82$) than the tomb narrative ($M = 1.98$, $SD = 0.97$), $t(100) = 1.99$, $p < .05$.

Next, we examined the percentage of participants (collapsing across narrative type) who gave "does not work" judgments as a function of age and entity type as shown in Fig. 5. Participants were more likely to make a "does not work" judgment for the body as compared to the mind, and for the mind as compared to the spirit, with this differentiation being more marked among adults. McNemar tests were calculated to check these conclusions. Ten children gave a "does not work" judgment for the body but not the mind; none did the reverse: $\chi^2 = 8.1$, $p < .01$. Seventeen adults gave a "does not work" judgment for the body but not for the mind; none did the reverse: $\chi^2 = 15.06$, $p < .001$. In addition, 10 children gave "does not work" judgments for the mind but not for the spirit, whereas 2 did the reverse: $\chi^2 = 4.08$,

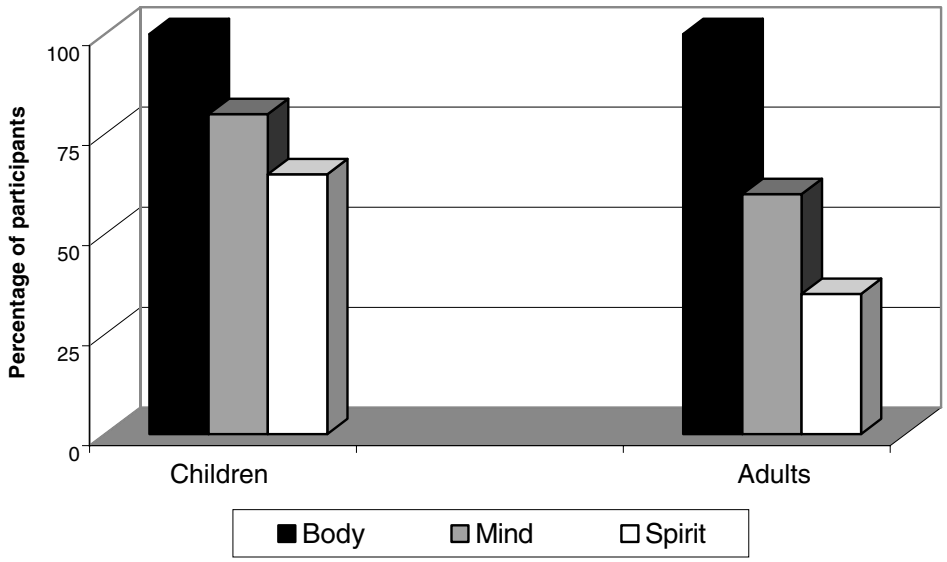

Fig. 5. Percentage of participants giving a "does not work" judgment as a function of age and type of entity.

$p < .05$. Twelve adults gave "does not work" judgments for the mind but not for the spirit, whereas 3 did the reverse: $\chi^2 = 4.27$, $p < .05$.

3.3. Discussion

Vezo participants often gave "does not work" judgments when asked about the consequences of death, but articulated different conceptions of death depending on the narrative context. Whether all questions or various subsets were included, they offered more "does not work" judgments when the narrative focused on the corpse as opposed to the ancestral tomb. This manipulation revealed that both adults and children can articulate a conception of death that appears to be antithetical to Vezo ancestral beliefs, claiming that when a person dies and his or her body stops functioning, all his or her mental processes also cease.

Both age groups made more "does not work" judgments for bodily as compared to mental processes. Such judgments were made more often for particular body parts (e.g., the eyes) than for associated mental process (e.g., seeing), and for psycho-biological processes as compared to cognitive processes. Finally, participants offered more "does not work" judgments for the body than the mind, and more for the mind than the spirit. Overall, these data suggest that Vezo differentiate between the death of the material body and the continuation of the spirit. This differentiation sharpens with age: Children and adults made similar claims about bodily processes, but adults gave fewer "does not work" judgments for mental processes than children did, especially with respect to cognitive processes such as knowing and remembering.

In the introduction, we asked if Vezo participants would conceive of death as both a biological terminus and a metaphysical transformation. The impact of narrative, as well as the differentiation between bodily and mental processes, provide strong evidence for these two conceptions. We also asked if there are changes in this dual conception during the

course of development. Contrary to the proposal of Bering and his colleagues (Bering & Bjorklund, 2004; Bering et al., 2005), we found no evidence of any developmental increase in the frequency of "does not work" judgments. Instead, for mental processes, a developmental decline in the frequency of such judgments was observed. Thus, as compared to children, Vezo adults were more, not less, likely to endorse the afterlife. In the general discussion section of this article, we consider this inconsistent pattern of results in more detail. Next, however, we describe the rationale for Study 2.

The first goal of Study 2 was to explore whether an understanding of the biological consequences of death is present even among younger children. In part, this question was motivated by the finding of Astuti, Solomon, and Carey (2004), who found that Vezo children passed a standard "adoption task" that probed their understanding of biological inheritance many years later than middle class North American children. Thus, it was only at around age 14 as opposed to age 7 that Vezo children judged that an adopted child would share bodily traits with the birth parents and beliefs, customs, and skills with the adoptive parents. Unlike their North-American counterparts, Vezo children are routinely exposed to comments and narratives that claim that babies do *not* resemble their birth parents in their physiognomy. To the extent that their delayed understanding of biological inheritance is attributable to this distinctive and relatively focused piece of testimony, we should not expect all aspects of their biological reasoning to be delayed. In line with that expectation, Astuti et al. found that by age 6 (like children in North America, Brazil, and Mexico), Vezo children understand the biological fixation of species kind. They predict that a baby bird hatched from a duck's egg would be a duck even if raised by a hen.

Thus, because of their early first-hand experience with death, we expected that Vezo children as young as 6 years old would understand its biological consequences. Accordingly, we asked Vezo children aged between 5 and 7 years to judge whether bodily and mental processes stop working at death. To maximize the likelihood that children would display their understanding, we asked them about the death of a bird as well as a person. The particular bird is one that children often hunt and kill. Previous research suggests that the context of predation is particularly likely to prime children's biological understanding of death (H. C. Barrett & Behne, 2005).

The second goal of Study 2 was to further examine Bering's proposal (Bering & Bjorklund, 2004; Bering et al., 2005) that young children frequently anticipate the continued functioning of mental processes after death, even in a context that does not explicitly prime children to think about the afterlife (as in the puppet show involving a mouse and an alligator that he and his collaborators have used). From Bering's perspective, children's emerging biological understanding is slow to trump their intuitive afterlife beliefs. Hence, children between 5 and 7 years should often expect mental processes to continue functioning after death even if they acknowledge that bodily processes cease to operate. By contrast, if children come to differentiate between the fate of bodily and mental processes at death as a result of their emerging understanding of relevant ritual practices, younger children with fewer insights into those rituals would be unlikely to differentiate between bodily and mental processes.

In sum, Study 2 was designed to examine young children's understanding of the biology of death and their differentiation between bodily and mental processes. Children aged 5 to 7 years were given two tasks—one about the death of a man and one about the death of a bird. In each case, they were given a set of 14 questions, similar to those employed in Study 1.

4. Study 2

4.1. Method

4.1.1. Participants

A total of 34 children (15 boys and 19 girls) divided into two age groups was included in the final study: eighteen 5-year-olds (mean age = 5 years 9, months; range = 5 years, 6 months–6 years, 6 months) and sixteen 7-year-olds (mean age = 7 years, 1 month; range = 6 years, 9 months–7 years, 7 months). A further 5 children (all younger children) were excluded because they failed the control questions (described below). Two older children were excluded because, despite completing the first task, they could not be interviewed for the second task. Children were again recruited from the Vezo village of Betania.

4.1.2. Procedure

All participants were administered two tasks. In the "person" task, children were shown a colored drawing of a man named Rapeto in a standing position. In the "bird" task, children were shown a colored drawing of a bird diving into the sea. In each case, children were asked several warm-up questions such as, "Is Rapeto sitting or not?," or "Is this bird flying or not?"; calling for a mix of negative and positive answers. When the researcher was satisfied that the child was at ease, she introduced a new drawing, announcing that either Rapeto or the bird had died the previous day. The drawing of the dead Rapeto was the same as the one used in Study 1; the drawing of the dead bird depicted a bird flat on the sand with limp neck and wings. Children were asked whether they could tell that the man or the bird was indeed dead; and when they agreed, they were given the test questions.

The processes probed in the two tasks were the same, as shown in the left- and right-hand panels of Table 1. For one of the seven mental questions used in the person task ("Does it miss his children?") a close match was difficult to find for use in the bird task. Accordingly, a more plausible question ("Does it feel afraid?") was devised.

In all other respects, the design of the person and bird tasks was identical to that used in Study 1, except that one additional precaution was included. In addition to the 14 process questions and three questions about the body, mind, and spirit, children were asked a total of five control questions. Each control question was phrased such that a correct answer called for a positive reply—in contrast to the test questions where a biologically informed answer called for a negative reply. The control questions were introduced to check for perseverative responding. A total of 5 children (all in the younger group) failed more than one control question and were excluded.

One half of the children were first presented with the person task followed by the bird task, and the other half were first presented with the bird task followed by the person task. The two tasks were administered at a week's interval from one another.

4.2. Results

Figure 6 shows the mean number of "does not work" judgments (maximum = 7) that children made as a function of age (5 years vs. 7 years), target (bird vs. person), and process

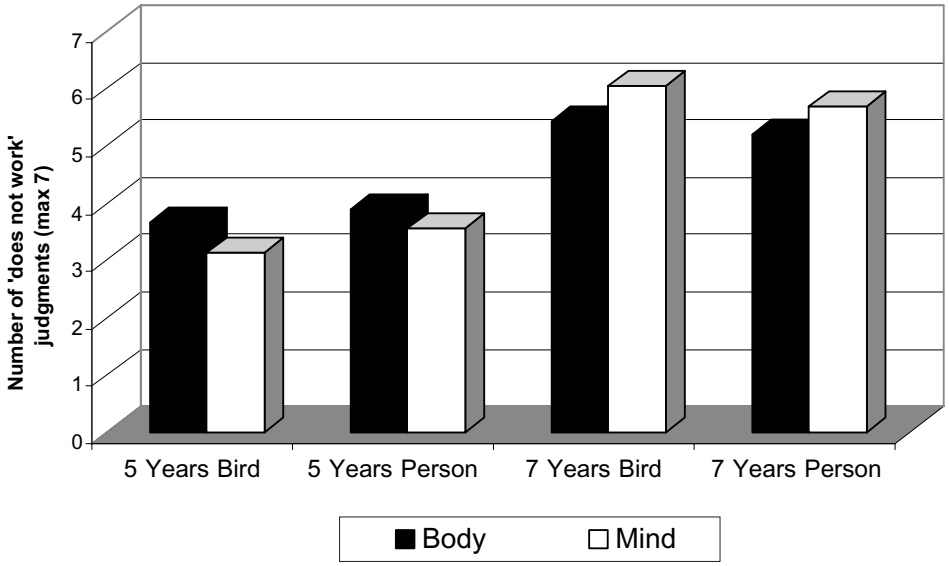

Fig. 6. Mean number of "does not work" judgments (maximum = 7) as a function of age, target (bird vs. person), and process type (body vs. mind).

type (body vs. mind). Fig. 6 shows that "does not work" judgments were the dominant mode of response among older children but not among younger children. This age change is apparent, irrespective of whether children were questioned about a bird or a person and about body or mind processes. A four-way ANOVA of Age × Target Order × Target × Process Type produced a single main effect and no interactions. The main effect of age, $F(1, 30) = 17.32$, $p < .001$, confirmed that when the entire set of 28 questions was examined, "does not work" judgments were made more often by older children ($M = 22.38$, $SD = 2.58$) than by younger children ($M = 14.23$, $SD = 7.04$).

To assess whether children's replies deviated from chance, t tests were calculated comparing their total score across all 28 questions (combining replies for bird and person) to the chance expectation of 14. These tests confirmed that older children gave more "does not work" judgments than would be expected by chance, $t(15) = 12.99$, $p < .001$; whereas younger children were at chance, $t(17) = 0.14$, *ns*.

The above analysis was followed by a more focused analysis of the three closely matched body and mind questions. A four-way ANOVA of Age × Target Order × Target × Process Type also produced only a single main effect and no interactions. The main effect of age, $F(1, 30) = 20.22$, $p < .001$, confirmed that "does not work" judgments were made more often by older children ($M = 10.88$, $SD = 1.15$) than by younger children ($M = 6.78$, $SD = 3.30$). Two t tests again confirmed that older children gave more "does not work" judgments than would be expected by chance (i.e., 6), $t(15) = 16.99$, $p < .001$; whereas younger children were at chance, $t(17) = 1.00$, *ns*.

We also compared children's replies concerning three psycho-biological processes (seeing, hearing, and feeling hungry) and two cognitive processes (knowing and remembering). (The

data for replies to the 2 questions about cognitive processes were multiplied by 1.5 to compare them to replies to the 3 questions concerning psycho-biological processes.) A four-way ANOVA of Age × Target Order × Target × Process Type produced a main effect of age, $F(1, 30) = 13.93$, $p < .001$, confirming that, irrespective of process type, "does not work" judgments were produced more often by older children ($M = 10.53$, $SD = 1.78$) than by younger children ($M = 6.25$, $SD = 4.13$). The only other significant result was an uninterpretable three-way interaction of Age × Target Order × Process Type: $F(1, 30) = 5.34$, $p < .028$. Two t tests confirmed that, overall, older children gave more "does not work" judgments than would be expected by chance (i.e., 6), $t(15) = 10.16$, $p < .001$; whereas younger children were at chance, $t(17) = 0.26$, *ns*.

Finally, we examined the frequency with which participants gave "does not work" judgments for each of the three entities—body, mind, and spirit. Preliminary inspection confirmed that (in contrast to the older children and adults interviewed in Study 1) children gave a similar number of "does not work" replies for each of the three entities. Accordingly, their replies were summed across these three entities. Fig. 7 shows the mean number of "does not work" judgments (maximum = 3) as a function of age and target (bird vs. person). A three-way ANOVA of Age × Target Order × Target produced only a single main effect and no interactions. The main effect of age, $F(1, 30) = 11.60$, $p < .002$, confirmed that older children gave more "does not work" judgments ($M = 5.72$, $SD = 0.52$) than younger children ($M = 3.83$, $SD = 2.04$). Two t tests confirmed that, overall, older children gave more "does not work" judgments than would be expected by chance (i.e., 3), $t(15) = 21.10$, $p < .001$; whereas younger children were at chance, $t(17) = 1.74$, *ns*.

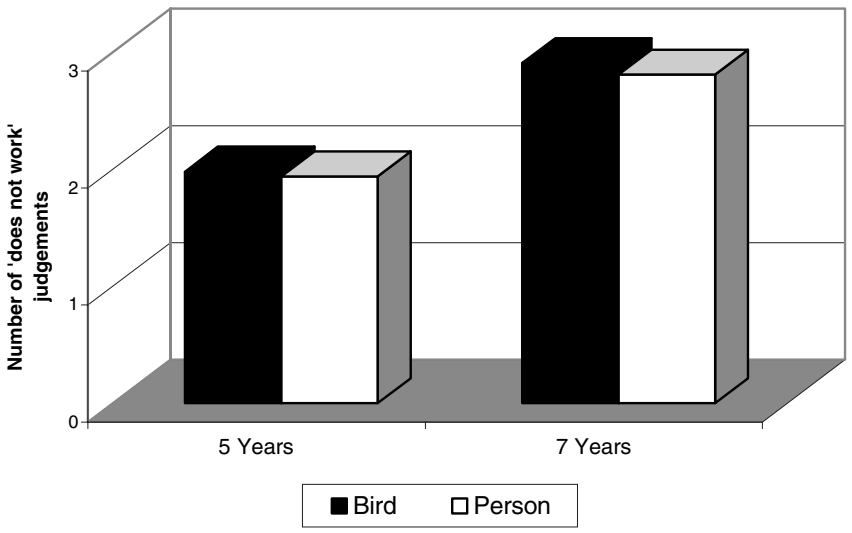

Fig. 7. Mean number of "does not work" judgments for body, mind, and spirit combined (maximum = 3) as a function of age and target.

4.3. Discussion

The results of Study 2 show that there is a marked age change between 5 and 7 years among Vezo children. Across four different analyses, 7-year-olds consistently gave more "does not work" answers than did 5-year-olds. In addition, 7-year-olds consistently gave more such answers than would be expected by chance. By contrast, 5-year-olds children were at chance. This age change held for bodily and mental processes alike. Moreover, despite their systematic performance, 7-year-olds made no differentiation between the two types of processes.

These findings show that 7-year-old Vezo children have a relatively coherent conception of both human and animal death. Children's performance is in line with the findings reported in Astuti et al. (2004), showing that by approximately 6 years of age, Vezo children understand the biological process of species fixation, even if they take several more years to understand the biological inheritance of individual traits. Thus, by age 7, Vezo children have mastered several key components of the biology of the life cycle. They claim that death brings virtually all processes—whether connected to the body or the mind—to a halt. We turn next to a more wide-ranging discussion of the two studies combined.

5. General discussion

We first consider the findings in relation to our two main goals: to study conceptions of death in a non-Western setting and to describe the development of those conceptions from early childhood through adulthood. We then examine our findings in relation to other recent reports of the development of afterlife beliefs. Finally, we indicate future directions for research.

Study 1 was designed to probe whether Vezo participants would modulate their inferences about the fate of the deceased depending on the narrative context. Both children and adults were less likely to judge that some processes continue after death when asked to listen to a corpse narrative that focused on the illness and subsequent death of a fictional character than when asked to listen to a tomb narrative that focused on the tomb and the rituals associated with the ancestors. Most strikingly, when presented with the corpse narrative, a substantial minority of children and adults claimed that *all* functions cease at death. Such a nihilist stance was much rarer in the context of the tomb narrative.

The most plausible interpretation of this highly regular effect of narrative is that Vezo have recourse to two different conceptions of death. Guided by their everyday observation of death across various species, they construe it in biological terms as the breakdown of vital functions. Guided by their involvement in ancestral rituals and practices, they construe death as the beginning of a different form of existence, one that is not obviously tied to bodily processes but includes at least some mental processes such as remembering; wanting; feeling displeased, angry, or placated.

Although such different conceptions might be regarded as objectively incompatible with one another, it is unlikely that Vezo experience tension or inconsistency. Each conception is likely to be activated in different, non-overlapping circumstances. For example, when people are confronted with a dead person, they will consider it at one moment as a corpse and at another moment as an ancestor, behaving accordingly toward it. When they wash and prepare

the corpse, Vezo treat it as a non-sentient entity. The body is washed with cold water because "it can't feel anything," and the entangled hair is pulled and yanked because "she no longer feels any pain." But when the children are shown the face of their dead parent for the last time and told never to call his or her name again, the dead person is treated as a sentient being capable of returning to, and interfering with, the everyday life of the community (for further ethnographic details, see Astuti, 2007).

The finding that such different conceptions of death coexist in people's minds raises important questions about the study of belief. Anthropologists routinely attribute a range of beliefs (in ancestors, witches, gods, etc.) on the basis of their informants' statements and actions. For example, considering the large amount of time and resources that Vezo spend to honor and appease the ancestors, or the anxiety that is generated by ancestral dreams, an anthropologist might reasonably infer that Vezo believe in the existence and power of ancestral spirits. But how do they exactly?

The findings of the present study—as did the findings of Harris and Giménez (2005)—provide us with a more complicated answer than is normally available to anthropologists. Vezo do not believe in the existence and power of the ancestors in the abstract, but they believe in them when their attention is on tombs that have to be built, on dreams that have to be interpreted, and on illnesses that have to be explained and resolved. In other contexts, death is represented as a total annihilation, and in these contexts it would be misleading to insist that Vezo believe in the existence of ancestral spirits. This does not make their belief in the power of the ancestors any less compelling. Instead, it shows that the belief in the power of the ancestors needs to be studied in terms of when a given conception of death is activated, rather than in terms of whether a belief in the ancestors is or is not held.

Our second goal was to set out a relatively comprehensive description of the development of Vezo ideas about death from childhood through adulthood. Combining the findings from Studies 1 and 2, it is possible to discern three periods or stages. First, very young children display no systematic pattern of judgment about what processes continue to function after death. Subsequently, at around 7 years of age, children claim that most processes cease to function. They make no distinction, in this regard, between bodily and mental processes. This conception of death as a general cessation of functioning replicates a pattern of development that is well established among Western children (Slaughter et al., 1999), as noted in the introduction. Finally, older Vezo children and adults differentiate between bodily and mental processes. Irrespective of narrative context, they are more likely to claim that mental processes continue after death. At the same time, they are less likely to claim that processing comes to a halt if they are presented with an ancestral as opposed to a biological narrative. Taken together, the impact of both process type and narrative suggest that older children and adults adopt a dual conception of death. They either emphasize the cessation of processing—consistent with a biological conception—or the continuation of processing—consistent with a belief in the afterlife. This dual conception is found among older children but is more sharply evident among adults. These findings replicate and extend earlier research with Spanish children growing up in a predominantly Catholic environment (Harris & Giménez, 2005).

We first consider two caveats to this developmental narrative before discussing its broader implications. First, despite their unsystematic replies during the interview of Study 2, Vezo 5-year-olds might possess more biological understanding of death than they revealed. At this

age, Vezo children have little experience of entering into a sustained dialogue with adults, and they are generally very shy in answering any kind of questions even when they are quizzed by their own parents. Yet, as described in the introduction, they have typically had frequent, direct encounters with death. Thus, particularly in light of the recent report by H. C. Barrett and Behne (2005) showing that Shuar and German 4- and 5-year-olds distinguish the effects of being killed versus sleeping when provided with very explicit predation cues, our findings for Vezo 5-year-olds should be treated with caution. Admittedly, when Rita Astuti attempted a replication of H. C. Barrett and Behne's protocol with Vezo 4-year-olds (using wooden figures to enact a cat preying on a mouse), she failed to elicit replies, irrespective of who did the questioning (herself, a young Vezo man, the children's own parent). Nonetheless, these negative results may conceal an early understanding of the consequences of death.

Second, the 7-year-olds in Study 2 made no distinction between mental and bodily processes, consistent with a biological conception of death as the cessation of all processes. However, it is possible that they might claim that some processes, particularly mental processes, continue after death, if they were prompted to conceptualize a human death in terms of the ancestral rituals that normally surround it. Pending further investigation, the exact point at which children adopt two different conceptions of death remains to be established.

Turning to the wider implications of our developmental findings, we consider the finding that the differentiation between the two conceptions of death is more evident among adults than children. One possibility is that the two different conceptions follow separate and autonomous trajectories. In particular, it could be maintained that children do not need to understand that death brings to an end the organism's vital functions in order to learn that dead people continue to miss their children, that they are angry if they are forgotten, and happy if a new tomb is built for them. Indeed, one could argue that ignorance of the biological consequences of death actually facilitates children's assimilation of their elders' representations of the afterlife. As suggested by J. L. Barrett (Barrett, Richert, & Driesenga, 2001) in the context of a study of Western children's understanding of the omniscience of God, children who do not understand the limitations of mortal human beings find it easy to accept the extraordinary qualities of supernatural entities. However, we may also consider an alternative line of argument, compatible with Boyer's (2001) characterization of religious concepts as "counterintuitive." Children may be in a better position to learn about the afterlife after they have consolidated their biological understanding of death. More specifically, ideas about the afterlife may be more cognitively salient when they constitute an apparent violation of children's consolidated, biological intuitions.

The data from our studies fit this latter line of argument. Consistent with a biological conception of death, the 7-year-olds in Study 2 reasoned that both in the case of a bird and a person, most processes, whether bodily or mental, cease at death. By contrast, the older children who participated in Study 1, with an average age of 12 years, claimed that some processes, especially mental processes, continue after death. This claim regarding the continued functioning of mental processes was even more evident among adults. Thus, we conclude that a belief in the afterlife is especially likely to emerge against the backdrop of a consolidated understanding of death as a biological terminus.

How far are our conclusions and interpretations consistent with other recent research on afterlife beliefs and their development? A robust finding, both in Study 1 and in the earlier

report of Harris and Giménez (2005), was that participants are more likely to acknowledge the continued functioning of mental as compared to bodily processes after death. Bering and his colleagues (Bering, 2002; Bering & Bjorklund, 2004; Bering et al., 2005) reported a similar differentiation between mind and body. Across several experiments, participants were more likely to assert the continued functioning of mental (e.g., feeling desires or emotions) as compared to biological (e.g., brain functioning) or psychobiological processes (e.g., feeling sick).

Nevertheless, Bering and his colleagues (Bering, 2007; Bering & Bjorklund, 2004) interpreted these results differently. They proposed that children's expectation that mental processes continue to function after death is the natural output of a default cognitive stance; it is not initially acquired through enculturation. Moreover, they predicted a developmental inhibition of this default stance: "As children develop, they tend to acquire biological knowledge, and they likely apply this knowledge when reasoning about the psychological status of dead agents" (Bering & Bjorklund, 2004, p. 218). Thus, children should increasingly acknowledge that mental as well bodily processes cease at death. This account effectively predicts, therefore, that the gap between judgments about mental as compared to biological processes will wane or completely disappear, as the biological concept of death is increasingly applied not just to biological processes but also to mental processes. Our findings indicate, by contrast, that the gap between body and mind becomes more evident in the course of development, as the biological fate of the body is increasingly differentiated from that of the mind or spirit. Recall that no differentiation between body and mind was made by 5- or 7-year-olds in Study 2. Note also that, although 5-year-olds made fewer "does not work" judgments than 7-year-olds, this may be plausibly attributed to their unsystematic pattern of replies and not to any early belief in the afterlife.

Indeed, close scrutiny of the findings of Bering and his colleagues also suggests that the differentiation between mind and body either persists (Bering et al., 2005) or increases from 5 to 12 years (Bering & Bjorklund, 2004; Experiment 2) and is strongly evident among adults (Bering, 2002). Moreover, consistent with our emphasis on the role of religious testimony, Spanish children attending Catholic schools were more likely than those attending secular schools to eschew a consistently biological stance, with this effect of schooling being especially marked among the oldest children (Bering et al., 2005). Finally, adult judgments about the cessation or continuation of mental processes at death are significantly correlated with their self-reported beliefs in an afterlife (Bering, 2002). Thus, whatever the exact explanation for the origin of children's belief in the continued functioning of mental processes at death, we conclude that there is little support for the prediction that such beliefs disappear as the biological conception of death extends its grip. To the contrary, there is considerable support for the proposal that exposure to religious practices and teaching, whether Christian or non-Christian, enhances the expectation that mental processes continue after death.

The finding of Bering and his colleagues (Bering & Bjorklund, 2004) that young children differentiate between the fate of bodily as compared to mental processes has been used by Bloom (2004) to support his claim that humans are natural dualists. On Bloom's account, the early emerging "belief in the afterlife is a natural consequence of our [*Homo Sapiens*] intuitive Cartesian perspective" (p. 207). Thus, Bloom suggested that as soon as children learn about the inevitable destruction of their body, the notion of an afterlife will come to them naturally.

Our data do not bear on the hypothesis that humans are natural dualists, but they do suggest that any conversion of early dualism into a belief in the afterlife is not automatic. Given participants' sensitivity to the ancestral narrative, it appears to be sustained by an awareness of ritual practices.

Our proposals indicate two important directions for future research. We have argued for the existence of two conceptions of death, but is one of them more basic or automatic? The design of Study 1 was based on a simple narrative manipulation that was likely to equate the cognitive demand of retrieving and using either conception. However, following J. L. Barrett's (1999) distinction between basic as compared to "theologically correct" concepts, and Sperber's (1997) distinction between intuitive and reflective beliefs, one could test whether, in a cognitively demanding task that forces participants to reason quickly and on-the-fly, Vezo might preferentially access one of the two conceptions, perhaps irrespective of any narrative priming they receive. If so, this would indicate that the other conception requires more effort, a certain amount of conscious reflection, and the mobilization of theologically correct and explicitly held reflective beliefs. We are inclined to predict that, if there is a difference at all, the less cognitively demanding, more basic, or intuitive conception will be that of death as annihilation.

We have speculated that Vezo children learn that a person's spirit survives the death of his or her body against the backdrop of their understanding of death as the biological breakdown of the living organism. It should be feasible to test this developmental claim more directly. Recent research shows that children's biological knowledge can be consolidated following a brief intervention in which they are offered explicit information about the critical role played by internal body parts (Slaughter & Lyons, 2003). If our speculation is correct, children who benefit from such an intervention should subsequently be more receptive to claims about the continuity of mental processes in the afterlife as compared to control children who receive no such intervention. Thus, an appreciation of the biological finality of death may prime children's sensitivity to claims of a spiritual afterlife.

In conclusion, we note that our findings are relevant to a broader debate about the nature of cognitive development. Particularly in the context of research on the acceptance and understanding of evolutionary theory, it has been argued that early emerging assumptions about teleological design may impede a full understanding of the evidence in favor of natural selection (Mayr, 2001; Shtulman, 2006). More generally, it is often assumed that children's early theorizing stands in the way of a comprehensive acceptance of scientific theories and their implications (Gardner, 1991; Harris & Koenig, 2006). However, the relationship between earlier and later concepts may be more varied and complicated. If our analysis is correct, children's biological conception of death, even if it is not a fully scientific theory, is grounded in a coherent, empirically based concept of the life cycle that informs their understanding of species fixation and developmental growth, as well as the biological constraints that make death inevitable. Despite its early emergence and gradual consolidation, that conception does not prevent, and may offer a backdrop to, an alternative conception of death in which, ultimately, those biological constraints are denied in certain contexts. In short, although it is often proposed that early emerging conceptions may stand in the way of a more comprehensive and empirically based understanding, our findings indicate that well-grounded empirical conceptions may sometimes be followed, and even overridden, by religious assumptions.

Acknowledgments

This research was funded by the Economic and Social Research Council, England (Research Fellowship R000271254, 2002–05). We thank the adults and children who participated in these studies for their time and trust.

References

Astuti, R. (1994). Invisible objects: Funerary rituals among the Vezo of western Madagascar. *Res: Anthropology and Aesthetics, 25,* 111–122.

Astuti, R. (1995a). *People of the sea: Identity and descent among the Vezo of Madagascar*. Cambridge, England: Cambridge University Press.

Astuti, R. (1995b). "The Vezo are not a kind of people": Identity, difference and "ethnicity" among a fishing people of western Madagascar. *American Ethnologist, 22*, 464–482.

Astuti, R. (2000). Les gens ressemblent-ils aux poulets? Penser la frontière homme/animal à Madagascar [Are people like chickens? Thinking about the boundary between people and animals in Madagascar.]. *Terrain, 34,* 89–105.

Astuti, R. (2007). What happens after death? In R. Astuti, J. P. Parry, & C. Stafford (Eds.), *Questions of anthropology* (pp. 163–180). New York: Berg.

Astuti, R. (2008). *Concepts of body, mind and spirit among the Vezo of Madagascar.* London School of Economics and Political Science, Department of Anthropology. Manuscript in preparation.

Astuti, R., Solomon, G. E. A., & Carey, S. (2004). Constraints on conceptual development: A case study of the acquisition of folkbiological and folksociological knowledge in Madagascar. *Monographs of the Society for Research in Child Development, 69*(3, Serial No. 277).

Atran, S. (2002). *In Gods we trust: The evolutionary landscape of religion*. Oxford, England: Oxford University Press.

Barrett, H. C., & Behne, T. (2005). Children's understanding of death as the cessation of agency. *Cognition, 96,* 93–108.

Barrett, J. L. (1999). Theological correctness: Cognitive constraint and the study of religion. *Method and Theory in the Study of Religion, 11,* 325–339.

Barrett, J. L. (2004). *Why would anyone believe in God?* Walnut Creek, CA: Altamira.

Barrett, J. L., Richert, R., & Driesenga, A. (2001). God's beliefs versus mother's: The development of nonhuman agent concepts. *Child Development, 72,* 50–65.

Bering, J. M. (2002). Intuitive conceptions of dead agents' minds: The natural foundations of afterlife beliefs as phenomenological boundary. *Journal of Cognition and Culture, 2,* 263–308.

Bering, J. M. (2007). The folk psychology of souls. *Behavioral and Brain Sciences, 29,* 453–462.

Bering, J. M., & Bjorklund, D. F. (2004). The natural emergence of reasoning about the afterlife as a developmental regularity. *Developmental Psychology, 40,* 217–233.

Bering, J. M., Hernández-Blasi, C., & Bjorklund, D. F. (2005). The development of "afterlife" beliefs in secularly and religiously schooled children. *British Journal of Developmental Psychology, 23,* 587–607.

Bloch, M. (1986). *From blessing to violence: History and ideology in the circumcision ritual of the Merina of Madagascar.* Cambridge, England: Cambridge University Press.

Bloom, P. (2004). *Descartes' baby: How the science of child development explains what makes us human*. New York: Basic Books.

Boyer, P. (2001). *Religion explained: The evolutionary origins of religious thought*. New York: Basic Books.

Brent, S. B., & Speece, M. W. (1993). "Adult" conceptualization of irreversibility: Implications for the development of the concept of death. *Death Studies, 17,* 203–224.

Brent, S. B., Speece, M. W., Lin, C., Dong, Q., & Yang, C. (1996). The development of the concept of death among Chinese and U.S. children 3–17 years of age: From binary to "fuzzy" concepts? *Omega, 33,* 67–83.

Cole, J. (2001). *Forget colonialism? Sacrifice and the art of memory in Madagascar*. Berkeley: University of California Press.

Dawkins, R. (2006). *The God delusion*. London: Bantam.

Dennett, D. (2006). *Breaking the spell: Religion as a natural phenomenon*. London: Penguin.

Evans-Pritchard, E. P. (1937). *Witchcraft, oracles and magic among the Azande*. Oxford, England: Claredon.

Feeley-Harnik, G. (1991). *A green estate: Restoring independence in Madagascar*. Washington, DC: Smithsonian Institution Press.

Fortes, M. (1945). *The dynamics of clanship among the Tallensi*. Oxford, England: Oxford University Press.

Gardner, H. (1991). *The unschooled mind*. New York: Basic Books.

Graeber, D. (1999). Painful memories. In K. Middleton (Ed.), *Ancestors, power and history in Madagascar* (pp. 319–348). Leiden: Brill.

Hardman, C. E. (2000). *Other worlds: notions of self and emotion among the Lohorung Rai*. New York: Berg.

Harris, P. L., & Giménez, M. (2005). Children's acceptance of conflicting testimony: The case of death. *Journal of Cognition and Culture, 5,* 143–164.

Harris, P. L., & Koenig, M. (2006). Trust in testimony: How children learn about science and religion. *Child Development, 77,* 505–524.

Inagaki, K., & Hatano, G. (2002). *Young children's naïve thinking about the biological world*. New York and Brighton: Psychology Press.

Jaakola, R. O., & Slaughter, V. (2002). Children's body knowledge: Understanding "life" as a biological goal. *British Journal of Developmental Psychology, 20,* 325–342.

Kalish, C. (1999). What young children's understanding of contamination and contagion tells us about their conception of illness. In M. Siegal & C. C. Peterson (Eds), *Children's understanding of biology and health* (pp. 99–130). Cambridge, England: Cambridge University Press.

Keller, E. (2005). *The road to clarity. Seventh-Day Adventism in Madagascar.* New York: Palgrave Macmillan.

Kopytoff, I. (1971). Ancestors as elders in Africa. *Africa, 41,* 129–142.

Lambek, (2002). *The weight of the past: Living with history in Mahajanga, Madagascar*. New York: Palgrave.

Mayr, E. (2001). *What evolution is*. New York: Basic Books.

McCall, J. (1995). Rethinking ancestors in Africa. *Africa, 65,* 256–270.

Middleton, K. (1999). Introduction. In K. Middleton (Ed.), *Ancestors, power and history in Madagascar* (pp. 1–36). Leiden: Brill.

Morris, B. (1987). *Anthropological studies of religion: An introductory text*. Cambridge, England: Cambridge University Press.

Shtulman, A. (2006). Qualitative differences between naïve and scientific theories of evolution. *Cognitive Psychology, 52,* 170–194.

Slaughter, V., Jaakola, 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, health, and ethics* (pp. 71–98). Cambridge, England: Cambridge University Press.

Slaughter, V., & Lyons, M. (2003). Learning about life and death in early childhood. *Cognitive Psychology, 46,* 1–30.

Solomon, G. E. A., Johnson, S. C., Zaitchik, D., & Carey, S. (1996). Like father, like son: Children's understanding of how and why offspring resemble their parents. *Child Development, 67,* 151–171.

Speece, M. W., & Brent, S. B. (1992). The acquisition of a mature understanding of three components of the concept of death. *Death Studies, 16,* 211–229.

Sperber, D. (1997). Intuitive and reflective beliefs. *Mind and Language, 12,* 67–83.

Springer, K. (1996). Young children's understanding of a biological basis for parent–offspring relations. *Child Development, 67,* 2841–2856.

Wenestram, C. G., & Wass, H. (1987). Swedish and U.S. children's thinking about death: A qualitative study and cross-cultural comparison. *Death Studies, 11,* 99–121.

Whitehouse, H., & McCauley, R. N. (2005). *Mind and religion: Psychological and cognitive foundations of religiosity*. Walnut Creek, CA: Altamira.

Appendix: English translation from Malagasy original of the corpse and tomb narratives, Study 1

The corpse story

This is the picture of a man called Rampy. He worked very hard all the time. And one day when it was very hot, he had a serious malaria attack, and his body and head ached a lot. His children and wife took him to the hospital, where he was given four injections. Nonetheless, after three days from the time he arrived at the hospital, he died.

This is the picture of Rampy once he died. And the questions that I am going to ask you are about him, now that he is dead.

Now that Rampy is dead . . .

The tomb story

This is the picture of a man called Rapeto. He had many children and grandchildren. On the day when he died, many of his grandchildren were with him in his house. And now that he is dead, he is often dreamt by his grandchildren. Rapeto's family has built the cross for him, and his children and grandchildren are happy because his work (i.e., the work for his tomb) has been completed well.

This is the picture of the tomb where Rapeto is, and this is his cross. And the questions I am going to ask you are about Rapeto, now that he is over there at the tomb.

Now that Rapeto is over there at the tomb . . .