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Children Understand Death as Biology: Pre-Schoolers' "Life" Theories of Body Organs

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RUNNING HEAD CHILDREN'S UNDERSTANDING OF DEATH AS BIOLOGY

KEYWORDS Naive theory of biology, vitalistic causality, "life force", location, function.

ABSTRACT South African children encounter death-related experiences as a result of various social factors. The aim of the reported study was to discover whether young children were able to conceptualise the human body as a biological entity and to relate their conceptualisations to understanding death as a biological phenomenon. Literature has shown that children between the ages of four and six years of age can reason about biological phenomena by ascribing a "life force" to certain body organs and that such knowledge can lead to a more mature understanding of death. A qualitative study was conducted within the framework of a naïve theory of biology. The data collection consisted of observations, semi-structured interviews, a model, photos and a projective technique. The findings from this research study reveal that children between the ages of five and six can draw on naive biological causal notions for body organ functioning and do rely on these causal devices to understand and describe biological phenomena such as death. This study can provide guidance to teachers on how to talk to children about death from a biological theoretical perspective.

INTRODUCTION

The quotation “O death, where is thy sting?” from the New Testament provides the impetus for the questions explored in this article. The aim of the reported study was to discover whether young children were able to conceptualise the human body as a biological entity and to relate their conceptualisations to understanding death as a biological phenomenon. The study was conducted within the framework of children’s naive biological theories, and findings reveal new and informed perspectives on the way in which children understand life and death phenomena. Research done within this framework claims that all human beings are able to design abstract, hierarchical, structured and accurate representations of the world that allow them to formulate wide-ranging and accurate representations of phenomena that they encounter through concrete, particular and probable combinations of experiences (Carey 1985). This is also true of young children.

Recent researchers from the cognitive developmental perspective are claiming that children as young as five can conceptualise death as a biological event once they are able to construct a naive theory of biology of the human body. Such an understanding of the human body results in a change in children’s conceptualisation of death, from misunderstanding it as behaviour (e.g. sleep or going away) to an initial understanding of death as a biological event (e.g. the heart stopped beating, the person stopped breathing) (Slaughter 2005). Furthermore, data from previous research indicates that when educators frame their talk about death in terms of children’s naive biological notions, children can develop a more mature understanding of death. This may ameliorate some of the fear, misunderstanding and pain that children experience when they fail to conceptualise death as part of the cycle of life (Jaakkola & Slaughter 2002; Slaughter 2005; Slaughter, Jaakkola & Carey 1999).

Working as a youth worker and counsellor in an urban early childhood educational centre, I observed how pre-schoolers search for meaning in the life and death events that they experience. Young children in South Africa often encounter death-related experiences as a result of the Aids epidemic, road accident fatalities or armed robberies. Children are no longer unaware of death experiences, and teachers need to know how to talk to young children about their experiences. Discussions with teachers supported my intuition that teachers need guidance on how to talk to young children about the concept of death. This gives impetus to the idea that young children need proper death education. It thus became imperative to conduct a study to find out what young children understand about the human body and how they explain the causality of death. I argue that teachers will be able to alleviate the “sting of death” for young children when they have a better understanding of the way in which young children conceptualise the workings of their bodies. They will then be

able to latch on to what young children know, and use children's naive biological notions to talk to them about death. Knowledge of children's reasoning about the function of body organs and causality of death can inform parents, educators and other professionals who work with young children.

Most studies about young children's conceptualisation of a naive biological theory in relation to their understanding of death have been done in first-world countries (North America, Australia and Japan) (Slaughter et al 1999; Inagaki & Hatano 2002). I decided to conduct this study in a South African context, as death experiences are very real to many young South African children. My study began with a literature investigation, which showed that over time researchers have explored children's understanding of death from psycho-analytical, Piagetian and more recently biological perspectives (Carey 1985; Kenyon, 2001; Slaughter 2005). Various perspectives of understanding children's perceptions of death warrant further discussion.

Psycho-analytical research

The first research into children's understanding of death was conducted from a psycho-analytical perspective. Researchers claimed that young children are not able to understand that death occurs as a result of biological processes (Carey 1985:15; Wellman and Gelman 2000: 267). Researchers focused on how children responded to death emotionally, but also determined their conceptualisations of death (Slaughter 2005). Emotional responses to death (fear of separation, anxiety and sadness) were noted. Early investigators claimed that children personified death and were not able to recognise death as a biological concept, as a result of their cognitive and emotional immaturity (Nagy 1948). This study investigated whether this is still the case and whether young children are only able to explain the cause of death as intentional (i.e. "my mother died because I said bad things to her" or "my dog died because I did not let it sleep on my bed"). Children who reason about death in this way have much more anxiety and fear about death (Nagy 1948).

Piagetian research

Piaget (1976) claims that children develop according to certain developmental stages and these stages further influence the way in which they understand the world. Piaget states that children's understanding of the specific subcomponent of death is strongly determined by their cognitive maturity. According to Piaget, these fixed stages make it impossible for young children to understand death in a relatively mature way if they have not yet developed to a

cognitive level that complements a specific subcomponent of death understanding. Piagetian researchers demarcated seven subcomponents of death and used them in structured interviews to evaluate how children at different cognitive developmental levels understood the concept of death. The sub concepts were:

- irreversibility or finality: the dead cannot come back to life
- universality or applicability: all living things (and only living things) die
- personal mortality: that “you” will die
- inevitability: all living things will eventually die
- cessation or non-functionality: the body ceases to work when vital organs break down
- unpredictability: knowing when natural death will occur is not possible

(Speece & Brent 1985)

Piagetian researchers claim that children between five and six years old understand that death happens to every living entity and that the dead cannot come back to life (Kastenbaum 1967; Koocher 1973; Speece & Brent 1992). Research findings show that before the age of seven children are not able to grasp all the subcomponents (especially the abstract subcomponents) of death (Speece & Brent 1985). These findings imply that pre-operational children cannot understand that if a vital organ that contains “life” shuts down, the person will die, as such thinking was seen to be too abstract for young children to grasp.

However, modern researchers have questioned the usefulness of assimilating developmental changes in death understanding to Piagetian stages. Carey (1985) re-opened questions about how young children distinguish living entities (animals and plants) from non-living things, and biological phenomena (e.g. internal bodily processes, illness) from physical and mental ones. Questions were asked about whether children could make predictions and give biological causal explanations for biological phenomena. Carey claims that young children’s reasoning about the human body is based on their notion of animism and personification; this is because they lack domain-specific knowledge of biology, not as a result of domain-general intellectual immaturity, as Piaget claims. Carey asserts that before about the age of 10 children reason that human intentional control causes bodily processes, and that certain phenomena were determined by human intentional control (Slaughter 2005).

Furthermore, studies that were conducted in recent decades have shown that children as young as five do possess a naive theory of biology that they use to predict and explain causes of biological phenomena (Inagaki & Hatano 2006). Keeping in mind Piaget’s cognitive

stages of development, I was curious to explore how children in the pre-operational stage explained the function of body organs in relation to their understanding of the causality of death, and if they made claims that certain body organs maintain life. I looked at my research through the lens of a naive biological framework that highlights domain-specific conceptual acquisition

Domain-specific conceptual acquisition

Young children's understanding of death from a biological perspective has captured the attention of more recent researchers (Jaakkola & Slaughter 2002; Inagaki & Hatano 2002). Findings from their studies suggest that young children can construct a naive biological framework for understanding the body and death. Children can understand that the human body is a biological entity with vital and non-vital organs. The researchers use the concept of "vitalistic causality" or a "life force" to reason about various biological entities. Young children can construct an autonomous domain of biology, a vitalistic biology with the concept of "life" as a central-explanatory mechanism (Inagaki & Hatano (1996; 2002). Studies show that children between the ages of four and six are already beginning to understand that the body has vital organs whose main goal is to maintain life. Such knowledge enables them to understand that the breakdown or cessation of these vital organs ultimately leads to death. When children construct a naive biological framework, they begin to move from a fundamental misunderstanding of death as a psychological event to an understanding of death as a biological phenomenon that occurs when vital organs cease to work (Jaakkola & Slaughter 2002; Slaughter et al 1999).

Studies done in North America and Australia showed a strong correlation between children's acquisition of a naive "life" theory of the body and their understanding of death (Slaughter et al 1999). In their study, children of four to five years old were classified as "life theorists" or not, depending on whether they made reference to the biological goal of "life" when answering questions about the human body and how it functions. Children who were "life theorists" could state that the heart, lungs and other organs keep the body alive, which revealed their naive biological theory of the human body. Those children who were "life theorists" were more likely to understand the subcomponents of death (applicability, irreversibility, inevitability and cessation) than their peers, who had a relatively immature understanding of death, in line with the psycho-analytical and Piagetian research (Slaughter 2005).

A second longitudinal study done in Australia supported the American study (Slaughter & Lyons 2003). In this study children of three to five years old were explicitly given biological information about the human body to enable them to reason about the body with reference to the notion of “life”. Children who previously reasoned about the human body from a psychological perspective were taught that certain vital organs have certain life-giving functions. After the short training period, children were assessed on their understanding of death. The results showed that children who were taught that certain vital organs maintain life showed a correlational mature understanding of death. Further findings of a research study conducted with Japanese children showed that this developmental pattern between the acquisition of naive theories of biology and a relatively mature understanding of death could be generalised across cultures. Japanese children also acquired a “life” theory (“ki”) around four to six years of age (Inagaki & Hatano 2002).

Findings from these studies thus indicate that children can possess an autonomous biology before they reach formal schooling (Carey 1985; Hatano & Inagaki 1994). Such domain-specific pieces of knowledge are acquired innately, as the child has had some experience with the biological phenomena. These innate constraints are domain-specific learning mechanisms that guide the young child’s explanations and predictions of the natural world and operate with both acquired knowledge and sociocultural constraints as the child develops (Hatano & Inagaki 2000).

METHODOLOGY

This research study adopted a qualitative inquiry approach. The analytical framework of a naive theory of biology was used to discover and provisionally verify, through systematic data collection and data, in what ways young children could explain the location and functions of body organs in relation to explaining the cause of death (Vlok and de Witt 2011).

Sampling of participants

Eight children (between the ages of five and six) from two Early Childhood Education (ECD) centres in Pretoria where I had worked as a volunteer were purposively sampled. The inclusion criteria were based on the judgement of the teachers and the communication abilities of the children. In both ECD centres the children had been exposed to the curriculum theme of “My body”, and some death-related events (e.g. death of a family member or pet) had been talked about in the classrooms. I followed the ethical clearance procedures to make

sure that children were not harmed in any way throughout the study. No child who had experienced recent bereavement was selected. I informed the children sampled what the study was all about and told them a story prior to the research activities. Each child was debriefed after the research activities by asking the child how she felt about doing the activities. Creswell (2003) states that the researcher interacts with the child participants in a relaxed and informal way in order to observe what they are saying and doing during the research activity or process.

Data collection tools

I used different methods to collect data about the children's understanding of the location and function of body organs, and their understanding of the cause of death. The tools I used were observations, semi-structured interviews, a model, photos and a projective technique. I used the Smilansky Death Questionnaire (1987) and the Life Theorising Questionnaire (Jaakkola & Slaughter 2002) to design the questions for the semi-structured interviews and interpret the findings. De Vos, Strydom, Fouche & Delpont (2005) mention that qualitative studies can make use of a set of predetermined questions or an interview schedule, but the researcher must see it as a guide rather than be dictated to by it. I selected questions from the above-mentioned questionnaires to guide my interviews.

I cut out a one-metre high human body from Styrofoam and six cardboard body organs (heart, lungs, veins, brain, stomach and a bone) for my observations of body organ location and my talk about body organ functions. I used a small frozen dead frog in a sealed plastic bag as a projective technique to ascertain children's understanding about the cause of death.

I observed each child as he or she placed the cut-out body parts on the Styrofoam human body to discover the child's understanding of the location of body organs. A photograph of each child's construction was taken to assure overlap for the purpose of dependability of the study. Semi-structured interviews, which I recorded, were used to discover each child's conceptualisation of the function of the body organs. The following three questions were asked during the research activities:

- Where on the body do the heart, lungs, veins, brain, stomach and bones go?
- What do the heart, lungs, veins, brain, stomach and bones do?

- Why do you think the frog died?

RESULTS

I began my data analysis by transcribing the data; Kvale (1996) remarks that the transcript can become meaningful considering the big picture of children's conception of life and death. I began to list themes that I found in the literature review and in the data collection. I specifically looked for key words that emerged that expressed the concept of "life" or a "life force" in the children's explanations.

Recorded data was transcribed and labelled according to the following three themes:

- correct and incorrect knowledge of body organ location
- mention of a "life force" of vital body organs
- biological, external or psychological explanations for the cause of death

If the child mentioned concepts that substantiated a "life force" (words such as "life", "oxygen", "breathing", "alive", "blowing") for vital organs (heart, veins, brain, lungs), it was concluded that the child was able to construct a naive vitalistic biology theory of the body organ, by conceptualising "life" as a central causal-explanatory mechanism about organ functioning. If the child mentioned concepts that substantiated non-vital organ function (words such as "to eat" (stomach) or "for walking" (the bones) for non-vital organs), it was concluded that the child had correctly grasped the functioning of non-vital organs. If the child mentioned that the frog died because "its heart stopped beating", or its "lungs stopped breathing", or its "brain was dead", it was concluded that the child was able to give a biological causal explanation of death. This is contrasted with explaining that the frog had died because, for example, someone "stepped on it", "threw a stone at it" or "hit it with a stick" (external causality) or because someone was angry with the frog, or said something bad to the frog (psychological causality) (Vlok and de Witt 2011).

DISCUSSION

Findings from the research indicate that children between the ages of five and six can give biological explanations for vital body organs. The responses of preschool children regarding "life" theorising of vital organs were captured in words such as "break", "not alive", "stops

working”, “dies”, “death”, “burst”, “down-down (meaning dead) “live”, “life”. These words show that the children can explain that vital organs (heart, brain, blood, stomach and lungs) have a “life” force. They indicate that the child understands that the body is a “life machine” and can recognise that any major malfunction of some vital organ will result in the failure of that organ, and ultimately death (Slaughter 2005). These findings support the findings of Slaughter et al (1999), Jaakkola and Slaughter (2002) and Hatano and Inagaki (1994) in studies of American, Australian and Japanese preschool children, which indicate that young children are able to acquire a “life” theory of the human body around the ages of four to six. Furthermore, the children showed that their experiences of real-life phenomena and prior education about the human body influenced the way in which they understood body organ location and function. They described the stomach as “to eat food” or “having a baby”, the bones as being “cold”, the lungs as “smoke” or “blowing” and the blood as “flowing out of the body”. This could mean that they used their own mental “pictures” of eating food, a pregnant woman, a skeleton, someone smoking a cigarette or blowing bubbles or bubble-gum, or seeing blood run out of a wound, to inform the way they reason about body organs. Inagaki and Hatano (2002) state that children draw analogies from their knowledge about human experiences by giving properties to less-familiar or abstract organs. This was found to be true in the current study being reported.

Some children were able to place most body organs in their correct positions on the Styrofoam model, but some were unsure where to place the brain, the lungs and the veins. Some children placed the lungs in the position of the throat and the brain on the torso, which may indicate that it is difficult for children to place abstract objects in their correct positions. These findings again support claims that children may be influenced by their visual pictures or experiences of their bodies and find it difficult to understand abstract concepts such as veins or the brain (Hatano & Inagaki 1994). In this study, reference was made to the heart as being “for love”, “for God” for “giving you power” and for “singing”, which supports research from a psycho-analytical perspective that animism and egocentrism influence young children’s reasoning about the human body, as claimed by Piaget (Speece & Brent 1996).

External and internal reasons were provided for the cause of the frog’s death. Some children mentioned that the frog had died because “the heart stopped”, its lungs “could not blow” and “the brain was dead”. These findings give evidence that young children can give a naive biological explanation for the cause of death, as was found in previous research (Slaughter et al 1999; Jaakkola & Slaughter 2002; Hatano & Inagaki 1994). Children also referred to external causes for the death of the frog (i.e. “[someone] stepped on it”, “a stone”, “hit with a

stick”, “the sun got in the eyes”), which could imply that children formulate reasons for phenomena from their own real-life experiences, or that they have received no prior information on the function of body organs. It is interesting to note that no psycho-analytical explanations were given for the cause of death of the frog (i.e. it died because someone said bad things to it or because someone did not like it), as suggested by previous research done from a psycho-analytical perspective (Nagy 1948; Carey 1985). This may be the result of some children’s immature understanding of the cause of death (Speece & Brent 1985; 1992; 1996).

CONCLUSIONS

The findings from this research study reveal that children between the ages of five and six can draw on naive biological causal notions for body organ functioning and do rely on these causal devices to understand and describe biological phenomena such as death. Children can understand that certain body organs have a vital force or “life” power that keeps the body alive (Inagaki & Hatano 2002). They can also explain that death can be caused by internal bodily processes. These findings support previous research done within the framework of a naive theory of biology (Vlok and de Witt 2011).

Children’s pre-operational cognitive developmental level hinders them from reaching a mature understanding of death, but this does not mean that they reason about the cause of death only from a psycho-analytical perspective. I thus claim that children can develop a mature biological understanding of death, provided that they have or are given biological facts that inform them about how the human body functions to maintain life. This notion of constructing a naive theory of biology has positive implications for parents and teachers working with young children. Death education done from a biological perspective can alleviate some of the emotional impact of losing a loved one, as previous research has indicated (Slaughter 2005:184). Inagaki and Hatano (2006:179) emphasise that studies of naive biology provide educators, especially science educators, with empirical bases for formulating instruction about the human body.

RECOMMENDATIONS

Findings from this study led to the following recommendations for teaching practice and future research. The concept of death can be explained in terms of biology, alongside

religion/spirituality and incorporated into the life skills curriculum. A series of children's books can be written on the topic of organ function and organ location in relation to the phenomenon of death. The theme of "My body" can include information on the inner workings of the body. Knowledge of children's naïve theories of biology can be incorporated into workshop content on bereavement support of young children. Future studies can be conducted on the way in which naïve theories of biology emerge, develop and change as a result of various cultural and socio-economic environments or how terminal children understand their illness from a naïve theory of biology perspective. Further questions can be asked to explore whether a combination of biological and spiritual/religious explanations alleviate young children's misunderstandings and anxieties about death.

The aim of the reported study was to discover whether young children were able to conceptualise the human body as a biological entity and to relate their conceptualisations to understanding death as a biological phenomenon. Findings from the literature review and the empirical research give evidence that young children can think and talk about the human body as an entity that sustains life and that, albeit less mature than adults, can reason about the cause of death from a naïve biological perspective. In a study by Schleifer and Talwar (2013) mention is made that biological communication coupled with spiritual/religious communication does not encompass the subcomponents of death required for children to reach a mature understanding of death, but it may proverbially take the "sting out of death's tail" for young children. Death talk, packaged within the framework of biology and spirituality/religion, may be a buffer helping to alleviate children's fears, anxieties and misunderstandings of death.

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