

**AN INVESTIGATION OF PRESCHOOLERS' NAIVE BIOLOGICAL THEORY OF  
THE HUMAN BODY IN UNDERSTANDING THE CAUSE OF DEATH FROM A  
PSYCHOLOGY OF EDUCATION PERSPECTIVE**

**by**

**MILANDRE VLOK**

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**SUPERVISOR: PROF. M.W. DE WITT**

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Student number: 529-769-9

I declare that **AN INVESTIGATION OF PRESCHOOLERS' NAIVE BIOLOGICAL THEORY OF THE HUMAN BODY IN UNDERSTANDING THE CAUSE OF DEATH FROM A PSYCHOLOGY OF EDUCATION PERSPECTIVE** my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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SIGNATURE  
(MRS. M VLOK)

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DATE

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## **ABSTRACT**

This research study investigated preschoolers' naive theory of the human body in understanding the cause of death. The empirical investigation showed that urban and suburban preschoolers (ages 5 and 6) have an understanding of a naive theory of the human body and that some do make reference to a 'vitalistic causality' in explaining organ function. Furthermore, most of the participants gave an external explanation for the cause of death (e.g. gunshots, poison, sticks), but those participants who gave an internal (biological) explanation for the cause of death were well-informed about the biological teleology of body organs. These findings conclude that education, socio-economic factors and culture influence the acquisition of a naive theory of biology. The need for guidance to educators, in explaining the concept of death to preschoolers, was further emphasised.

**Key words: Death, early childhood, cognitive development, causality, a naïve theory of biology, vitalistic causality and biological teleology.**

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## CHAPTER 1

### INTRODUCTION TO THE STUDY

#### 1.1 INTRODUCTION

Speaking about death, loss and grief was once, about three decades ago, a taboo subject. As Grollman (1995: 1) states, "if a conference on death was held in the 1960's we could all meet in a telephone booth". He goes on to say that much has taken place in the years to follow to bring death *in your face (my italics)*. New experiences with death - the HIV/AIDS epidemic, upsurge of violent crime, terrorist attacks, moral issues of assisted suicide, euthanasia and the growth of the hospice movement have contributed to death being openly discussed. Grollman (1995: 4) further states that, "even at a very young age, children are confronted with death: a pet is 'put to sleep', a grandparent dies, a space shuttle explodes, Bambi's mother is killed, a murder is reported on the evening news". It is thus no longer debated whether children are concerned about the topic of death. The questions have shifted to what children feel and understand about death. Death is a subject that is emotionally and cognitively complex. Non-bereaved and bereaved children want to make sense of their world, and ask questions that need to be answered.

Slaughter (2005: 179) mentions that in the last decade or so, cognitive developmental researchers have begun to focus on a new approach to understanding how children learn about concepts in their world. Researchers have become interested in children's developing naive theory of biology. Furthermore, they are interested to investigate how children first begin to conceptualise death as a biological event. Recent research has found that around age 5 or 6 years children begin to understand that certain organs have a 'life agency' that maintains life and that the cessation of these organs ultimately lead to death. The body is seen as a "life-machine" that structures and organises children's knowledge about the human body and other biological phenomena (Slaughter 2005: 185 and Jaakkola and Slaughter 2002: 325). Researching young children's conceptualisation of **naive** theoretical frameworks have become one of the most exciting directions in the recent study of cognitive development (Siegler 1999: 49).

## 1.2. THE INVESTIGATION OF THE PROBLEM

### 1.2.1 Awareness and rationale for the study

The youth of South Africa is our future. Yet millions of children face bereavement through the death of a parent, relative or friend as a result of HIV/AIDS (Brown, 2007: 69). It would be naïve to think that children are unaware of death or have no death related experiences, especially as the HIV/AIDS epidemic is creating devastation in the lives of millions of African families. Children are left orphaned and parents bury their children. Furthermore, the high statistics on violent crime (e.g. hijackings and armed robberies), on road accident fatalities, on suicide, presume that many children encounter some sort of sadness, loss or personal death experience in their lives (Statistics South Africa 2005; South African Crime Statistics 2009; HIV/AIDS statistics for South Africa 2009). The death of a loved one, especially a parent, traumatically impacts the entire family support network as well as the individual.

The researcher in her work as youth worker has supported children who have lost a loved one through an illness, a car accident, suicide or an armed robbery. She has observed children expressing their hurt through play, drawings and stories. She has found that children give various reasons why a person has died and that children show misunderstandings about the concept of death. Some children believe that the death of their loved one was caused as a result of the child "thinking bad thoughts" or "saying bad things" to the deceased (psychological reasons). Others explain that death was caused as a result of internal organ failure ("his heart stopped" or "his brain died") or external causes (e.g. poison, gunshot or a stick).

Furthermore, the researcher has become aware that parents and teachers need to be equipped to answer children's questions about death in a way that compliments a child's age, cognitive functioning, experience with death and affective disposition. Brown (2007: 69) mentions that the way grieving children are supported may have a profound effect on how they are able to adapt to loss and bereavement, and its impact throughout their lives.

The researcher believes that children should be encouraged to talk about their feelings, ask questions about death and mourn the loss of a loved one in such a way that they will eventually integrate their loss and move towards closure. Researcher

Dunning (2006: 501) emphasises that explaining the concept of death to children should be done as a three-part intervention: cognitive, affective and behavioural. Dunning cautions that without such frames around the experience of death, "affect can overwhelm thinking, thinking itself becomes disturbed, and without cognitive strategies in place, more primitive adaptations takes place".

The researcher is also interested to investigate the viewpoint of educators about a death education curriculum. Wass (1995: 301) mentions that death education can put the portrayal of violent death in the entertainment media into perspective for young children and adolescents. Wass further mentions that media literacy, actual crime statistics and discussion of dying by natural causes may correct distorted images that glorify or trivialize death. Wass (1995: 303) cites Herman Feifel's (1977) vision that the field of death, dying and bereavement is both science and humanity and that "death education needs to attend to both its scientific and humanistic goals".

#### *1.2.1.1 Current views of children's understanding of organ function and organ location in relation to the agency "life" and causality of death*

During the last decade there has been an upsurge of interest among developmental cognitive psychologists regarding the nature of children's early knowledge of people's insides, bodily function and what "being alive" means. These studies have further been done in relation to children's understanding of the concept of death ( Binnie & Williams 2002: 334; Hatano & Inagaki 1994:172 and Jaakkola & Slaughter 2002: 325). Slaughter (2005: 184) mentions that a child can reach a more mature understanding of death when he understands that a vital body organ has a 'life agency' that keeps the body alive and that the body ceases to work when that 'life agency' breaks down.

Studies done by Jaakkola and Slaughter (2002: 332) and Hatano and Inagaki (1994: 178) found that children's factual knowledge about the body increased between four and eight years. Children's knowledge of organ function and organ location seemed to increase at approximately the same rate across this age range. These studies further indicate that older preschoolers and school-aged children assert that the body and its vital organs function to maintain life. This implies that children predict and interpret biological phenomena, especially human body functioning, on the basis of a 'vitalistic causality'. Children understand that humans are kept active through food

and water which contain a vital power or life force. They further reason that certain organs have a life force that maintains life and when this life force ceases, the plant, animal or human dies.

Such biological knowledge leads to a mature understanding of the subconcept of causality of death. Causality of death is the final subconcept to be mastered as a mature understanding of death (Speece and Brent 1996: 43). Inagaki and Hatano (2004: 356) reviewed evidence that children predict and interpret biological phenomena, especially human bodily processes, on the basis of 'vitalistic causality' and found that a majority of preschoolers prefer to choose vitalistic explanations over psychological explanations in explaining the cause of death. The researcher will investigate whether these research findings can be found in her empirical investigation.

### **1.3 PRELIMINARY LITERATURE STUDY**

#### **1.3.1 General perspectives on young children's thinking**

The study of cognitive development is dominated by the theories of Piaget and Vygotsky. Oakley (2003: 13) mentions that Piaget (1929) first noted that children think differently to adults in the way they interpret the world. Oakley (2003: 14) mentions that Piaget divided the child's cognitive development into fixed sequential stages. Piaget held the view that as the brain matures thinking matures and understanding increases. Papalia, Olds and Feldman (2004: 237) mention that although Piaget recognised that preschoolers have some understanding of a connection between actions and reactions, he believed that pre-operational children cannot reason logically about cause and effect until they develop to the formal operational level.

Neo-Piagetian researcher-theorists generally shared Piaget's view of development, but saw limitations. Recent data on cognitive development does not suggest domain-general cognitive development, but rather domain-specific conceptual acquisition. Slaughter (2005: 182) cites research done by Gopnik and Meltzoff (1997) and Inagaki and Hatano (2002) which proposes a new approach, emphasising domain-specific conceptual acquisition over domain general development. It assumes that young children actively construct naive theories about

phenomena (such as death, disease and growth) that they encounter in their world. Hatano and Inagaki (1994: 171) state that a growing number of cognitive developmentalists have come to agree that "young children possess 'theories' about selected domains of their world where innate or early cognitive constraints work". Slaughter (2005: 181) further states that this new approach of cognitive development emphasises the role of "causal-explanatory models in organising children's knowledge". Such models drives learning about different domains of experience and indicates that there is a conceptual change in children's learning about phenomena. Wellman, Hickling and Schult (2000: 265) mention that even very young children appear to make theory-like assumptions about phenomena that they observe and experience in their environment and that they use different "theories" to deal with physical, biological and psychological events.

Furthermore, Oakley (2003: 15) mentions that Piaget saw the interaction with the environment as an important factor in cognitive development. Papalia et al (2004: 244) cite Vygotsky, who agreed with Piaget that the child actively constructs knowledge. Vygotsky, however, differed from Piaget, by adopting the view that children's cognitive development is influenced through social interaction with their peers, parents and teachers. Adults direct children's learning most effectively in the zone of proximal development, with regard to tasks children are almost ready to accomplish on their own. Vygotsky emphasised potential rather than present achievement. Thus, a child may have an innate knowledge of biology, and when directed by an adult, he can develop towards a better understanding of a biological theory. Vygotsky's viewpoint implied that the environment influences the quality and quantity of a child's theory of biology. These findings make it essential that cultural variability need to be taken into account during this research study.

It is with this variability in mind that the researcher has decided to enter two different research sites. The one site draws its participants from an urban, lower socio-economic environment. The other site is from a high to middle income suburban environment. The researcher is further interested to discover whether education and cultural environment influences the way in which these two groups of children construct a naive theory of biology.

Siegal (1997: 52) mentions that culture and conversation are powerful influences of ways in which children make predictions about familiar kinds of behaviour, make sense of biological phenomena, and help children to learn rules taking care of plants, animals and themselves. Despite children's competencies in the domain of biology their success at judging the probability of causality is often directed by their cultural experiences and the format and context of the questions that are asked to them. Children who have access to television or books may have more knowledge about biology than those children that are deprived of such learning tools. Children who have lots of interaction with knowledgeable adults over the domain of biology may have greater innate knowledge of biology. A young child whose mother talks to him as she bathes or dresses him learns about his body on a daily basis. With so many children in HIV/AIDS effected families being raised by siblings, such communication is often limited. It is thus imperative that educators are knowledgeable about what young children think and know about the biology of their bodies. This will help educators to guide children towards understanding the function of their bodies and the cycle of life.

The young child's conceptualisation of a naive theory of biology will be further reviewed in Chapter Two.

### **1.3.2 The concept of death explained in research**

Corr and Corr (1996: 29) mention that a systematic study of children's understanding of death began in the 1930's with studies by Schilder and Wechsler (1934), Anthony (1939, 1940, 1972) and Nagy (1948). These studies were primarily descriptive and done through open-ended interview techniques and projective methods such as story-telling or drawing. The main focus point was children's emotional responses to death and their conceptualisation of death (Slaughter 2005: 179). Slaughter cites findings by researchers (Anthony 1940, Nagy 1948 and Von-Hug-Hellmuth 1964) which showed that death was an emotionally charged issue and that it evoked feelings of sadness, anxiety and fear over separation.

Many more studies after 1970 were undertaken about children's understanding of death. In reading early literature regarding the young child's understanding of the concept of death, many different views were discovered. Piagetian researchers concluded that children's understanding of death was limited by their cognitive and



emotional immaturity, and that the effects of individual experiences and socio-cultural variables were minimal (Slaughter 2005:181). Speece and Brent (1996:43) reviewed previous literature and conducted their own research on children's understanding of death. They concluded that the acquisition of the concept of death can be identified using a number of distinguishable subconcepts. They identified five principal sub concepts of death: universality, irreversibility, non-functionality, causality and non-corporeal continuation. They argued that a mature understanding of death involved an understanding of the subconcept causality and non-corporeal continuation.

Research by Hatano and Inagaki (1994: 178), Jaakkola and Slaughter (2002: 326) and Slaughter and Griffiths (2007: 526) have explored the intuitive theory approach of children's understanding of death in terms of their intuitive or folk (naive) knowledge of biology. These researchers have found that young children first acknowledge death in the preschool period. They claim that children do not yet have specific knowledge of the biological properties of life and death, so they make sense of the properties of death and dying in terms of how they understand human behaviour. They link dying to internal or external agents such as poison, gas, guns or fatal illness and do not understand the cause of death. They believe that the dead still need oxygen or water, and that they live in an altered state.

Slaughter (2005: 182) mentions that older preschoolers and school aged children move from understanding that death is caused by psychological (human behaviour) intention to an initial understanding that death is a biological phenomena. They seem to understand that death is not a behaviour of sleeping or going away. There appears to be a major cognitive shift in children's understanding of death between five and eight years. This cognitive shift enables them to demonstrate some elements of a mature understanding of death, reflected in their acquisition of the subcomponent of death, universality and irreversibility. Such findings of recent cognitive developmental researchers are a distinct departure from the psycho-analytical and Piagetian perspective which argued that preschoolers, in the preoperational stage of cognitive development, cannot explain death in terms of biology, that the understanding of death is emotionally constrained and fixed at a certain developmental stage.

The young child's understanding of the concept of death will be further reviewed in Chapter Three.

## **1.4 PROBLEM STATEMENT**

The study of the research literature seems to indicate a relationship between children's acquisition of a naive theory of biology and their explanation of death as a biological phenomena. The researcher will focus on these findings. She makes the following grounded theory statement:

Preschool children can construct a naïve theory of biology by assigning to some human and animal organs a 'vitalistic causality' (life force). They do then explain that the breakdown of certain vital organs ultimately lead to death.

### **1.4.1 Further research questions**

- What constitutes a naive theory of biology?
- What do preschoolers (five and six years) say are the functions (essences) and locations of different parts of body organs in humans and animals (e.g. blood, brain, heart, lungs, stomach, bones, eyes, mouth, tongue, hands and feet)?
- Can preschoolers (five and six years) give an explanation of a 'vitalistic causality (life force) to some of the organs?
- What is implied by the subconcept, causality of death?
- Do preschoolers (five and six years) explain that the cause of death is internal (e.g. disease, illness) or external (e.g. guns, poison, stones)?
- Do preschoolers (five and six years) explain that people die because of psychological intension (e.g. being bad, thinking bad thoughts ect.)?
- In what way does environment and education influence the acquisition of a child's naive theory of biology?
- What are the viewpoints of educators about the implementation of a death education curriculum in preschool?

## 1.5 AIMS AND OBJECTIVES

The research has two focus points. Firstly, the researcher will investigate the naive theory of biology that preschool children (five and six years) may have of human and animal organ function, and whether they give some organs a life force ('vitalistic causality'). Secondly, the researcher will investigate if preschool children (five and six years) give a biological causal explanation for the phenomenon, death. She will focus on how eight preschool children perceive organ location and function of eleven human body organs (heart, brain, lungs, blood, stomach, bones, mouth, tongue, eyes, feet and hands) and nine animal body organs (stomach, brain, lungs, blood, bones, heart, eyes, mouth, ears) and what they say happens if these organs cease to work. If these research findings support the grounded theory that young children do construct a naive theory of biology of human and animal body functioning, it can help parents and educators to answer children's questions about death in a concrete and unambiguous way. Death can then be explained from a biological perspective which leads young children towards a mature understanding of death. Such an understanding can lessen guilt and anxiety about death. Her research will also be beneficial in understanding other domains of life (e.g. sexuality, disease and illness).

Slaughter (2005:185) found in her study that 90% of preschool aged children who had a better understanding of the function of the body, in a short span of time, with relatively minimal instruction, were able to communicate effectively with adults about the issue of death. She states further that "coming to conceptualise death as a biological phenomenon is only one step, although arguably a crucial one, in children's journey towards an adult understanding of death. Being knowledgeable of the framework of biology that young children may have, listening to their questions and being sensitive to their emotional needs can benefit the abovementioned support. It is with this support in mind that the researcher has endeavoured to investigate what young children say about organ organ function and the cause of death.

## 1.6 DEFINITION OF TERMS

Statistics South Africa (2005)

**A death** is a principal event and is the disappearance of life at any time after birth has taken place.

Papalia et al (2004: 10)

**Early childhood (2 - 7)** is characterised by a period of preparation and organization of concrete operations. This is the stage of preoperational thought. Characteristics are egocentric orientation, magical, animistic and artificiality thinking. Thinking is irreversible. Reality is subjective.

Oakley (2003:2)

**Cognitive development** is the study of how the psychological processes and activities in thinking and knowing develop in children and young people, and how they become more efficient and effective in their understanding of the world and in their mental processes.

Slaughter and Griffiths (2007: 526)

**Causality** - understanding that death is ultimately caused when vital organ function breaks down.

Hatano and Inagaki (1994:176)

**Naïve biology theory** is defined as a knowledge system from a biological perspective for biological phenomena.

**Vitalistic causality** is defined as an activity of an internal organ which sustains life.

Jaakkola and Slaughter (2002: 326)

**Biological teleology** - explaining biological phenomena in terms of biological goals and functions of the concept of life.

## 1.7 METHODOLOGY

### 1.7.1 Research design

Most studies done on children's understanding of death from an intuitive biological perspective have been of a quantitative nature. Focus has been on quantifying the amount and type of factual information that children know about their bodies, or whether their factual knowledge about their bodies is related to their understanding of death (Jaakkola & Slaughter 2002: 328). The researcher has decided to investigate within a qualitative framework. Krefting (1991: 14) states that qualitative research is

"a particular tradition in social science that fundamentally depends on watching people in their own territory and interacting with them on their own terms". The rationale for this choice is that the researcher hopes to investigate preschoolers' naive theory of biology and how they use this theory to explain the cause of death. She will do her investigation within the natural educational settings of her participants.

The researcher will use two strategies of inquiry for this research design:

- **Phenomenology**
- **Grounded Theory**

The aim of **phenomenology** is to understand and interpret the meaning of experiences of a phenomenon, topic or concept (De Vos, Strydom, Fouche & Delport 2005: 270). In this case the researcher hopes to understand what young children know and say about human and animal organ location and function and what they know and say about the cause of death. She further hopes to discover, develop and provisionally verify through systematic data collection and data analysis a **grounded theory**, which is based on an abstract analytical schema of a phenomenon (De Vos et al 2005: 270). The grounded theory in this research study under investigation is the naive theory of biology of the preschool child participant.

### 1.7.2 Outline of the chapters

**Chapter One** contains the problem analysis, preliminary literature review, aims and objectives, definitions of the main concepts and methodology of the study.

**Chapter Two** gives a theoretical review on preschool children's conceptualisation of a naive theory of biology with reference to the Piagetian, Neo-Piagetian, information processing, and Vygotsky's socio-cultural approach.

**Chapter Three** gives a theoretical review of children's stages of development, with special emphasis on the pre-operational stage, and the conceptualisation of the concept of death, with special emphasis on the subconcept 'causality' of death.

**Chapter Four** contains the research design, strategies of inquiry, sampling and site selection, data collection, ethical considerations, reliability and validity.

**Chapter Five** contains the data analysis and findings of the research investigation.

**Chapter Six** contains the research report, findings from the literature study, findings from the empirical research, similarities between literature study and empirical research, limitations of the study and recommendations for future research.

## **Appendix**

## **Bibliography**

### **1.7.3 Population and sampling**

The researcher will choose two research sites in which to do her fieldwork: a preschool in Pretoria East and a preschool in the Pretoria CBD. The researcher will gain permission to enter the research field by making an appointment with the principals of both preschools and explain the aim and procedure of the research study. The researcher will use purposive sampling and ask the principal of each school and teacher of each participant to nominate the child participants. All participants will take part on a voluntary basis. Those children who have faced recent bereavement or trauma will not be sampled as participants. Furthermore, the researcher will ask for a signed letter of consent by the parents of the child participants. The researcher will treat all participants in a warm, respectful and professional manner. The parents, educators and children will be assured anonymity and confidentiality.

### **1.7.4 Data collection**

The researcher has decided to use five strategies of inquiry that will allow her to become well-acquainted with the perspectives, ideas and knowledge of her participants. Triangulation enhances reliability and validity in qualitative studies (Babbie and Mouton 2001: 19).

- Semi-structured interviews
- Participant observation during a model building activity

- Projective technique
- A Drawing
- Questionnaires

De Vos et al (2005: 296) state that semi-structured interviews enable the researcher to gain a detailed picture of the participants beliefs about or perceptions or accounts of a particular phenomenon or topic. Data from the participants will be collected after using semi-structured one-to-one interviews over a period of 3 weeks. The researcher will draw up an interview schedule using the Body-part-appeal-to-life-questionnaire developed by Jaakkola and Slaughter (2002: 341) and the Smilansky Questionnaire of Human and Animal Death Conceptualisation (Smilansky 1987: 195-196). Holstein & Gubrium (1995:76) mention that interview schedule enables the researcher to think explicitly about what she hopes to discover and difficulties she might encounter. The researcher will further refer to her literature study in order to construct the relevant questions for the interviews. The participants will be interviewed in a classroom at their preschool. All interviews will be unobtrusively tape-recorded and photographs will be taken of the models built during the model building activity of each participant, after consent has been granted by the participants. During the interviews participants will be asked specific questions related to their understanding of the biology of the human body and the sub concept "causality" of death. De Vos et al (2005: 299) mention that qualitative analysis captures the "richness of themes emerging from the participants' talk". All interviews will be transcribed. De Vos et al (2005: 336) state that relevant insight into data is gained if the researcher does her own interview transcription.

A Styrofoam model of a human and an animal body outline and separate body organs will be used along with the semi-structured interviews in determining knowledge of organ function, organ location and 'vitalistic causality'. A projective activity consisting of a dead frog will be shown to the children and used with the semi-structured interview to determine children's knowledge of 'vitalistic causality' of internal body organs and the sub concept causality of death.

The phenomenological approach is characterised by participant observation as the researcher becomes part of the situation being observed and even contributing to it (Graziano & Raulin 2000:131). Participant observation explains how a phenomenon

occurs naturally. The researcher will observe in great detail how the child participants interact with the abovementioned models and projective activities. They will be encouraged to talk freely and spontaneously. Open-ended questions will be formulated in a clear and precise manner, sensitive to the child's understanding.

### **1.7.5 Data analysis**

Rubin and Rubin (1995:226-227) states that "data analysis begins while the interview is still underway" and fresh in the researcher's memory". The researcher will label all the data properly with a notation system for names, dates and semi-structured interview answers. A more formal and detailed analysis in which additional themes, concepts and opinions are categorized, will be done after leaving the site. The researcher will look for variations and connections between themes, categories and patterns. Creswell (1998: 144) states that classifying means "taking the text apart and looking for categories, themes or dimensions of information". The researcher hopes to identify five to six general themes and interpret the data through her own insight, intuition, personal view and scientific knowledge.

#### *1.7.5.1 Coding Procedures*

Pattern coding, suggested by Miles and Huberman (1994:98) will be used to summarise the interview data meaningfully. Coding represents the operations by which data are broken down, conceptualised and put together in new ways. The data will be broken down into discrete parts and compared for similarities and differences. Theories are built from data. The researcher will organise her data by using colour coding, highlighting themes and categories. Key words and ideas will be noted down. She will also use diagrams in which to organise her data.

Questions will be asked about the phenomena as reflected in the data (De Vos et al 2005:340).

Finally the researcher will evaluate her data and critically search for usefulness, centrality to the research and alternative explanations (De Vos et al 2005: 339). Eventually the researcher hopes to show if her findings are supported or falsified by the research literature (Mouton 2006:109). She hopes that her findings can become part of further empirical investigations into the conceptualisation of young children's



naive biology theory and concept of death. She further hopes to integrate all her findings into a coherent whole and formulate recommendations for future research that relate to existing theoretical frameworks.

#### **1.7.6 Interpretation and presentation**

Mouton (2006: 58) states that the report "is a scientific document and has to conform to the style and format of academic institutions". This research report will be arranged as having an introduction, the literature review, interpretations, recommendations and conclusions. The researcher will use grammar that is simple and clear. She will ask a colleague who is not involved in the research to review the report. She will also make use of a knowledgeable proof reader at the end of writing her report.

#### **1.7.7 Validity and reliability**

During the research the researcher will use the method of triangulation to increase the objectivity of the research. The researcher combines multiple data sources and research methods to achieve this. Validity is the degree the research has succeeded in what it set out to do (Kerlinger 1986: 417). To increase validity the researcher will transcribe all the interviews in great detail. The photographs add further reliability to the research. They compliment the research findings and prove validity. The input of another subject expert (a play therapist) will further add to the validity. In addition the Smilansky Questionnaire is a valid means of examining the understanding of the subconcept 'causality' of death.

#### **1.7.8 Ethical considerations**

The researcher is ethically responsible to all her child participants, the parents and educators. Ethical considerations include informed consent, confidentiality, privacy, anonymity and avoiding emotional or physical harm to all her participants (De Vos et al 2005: 238). All participants were selected on a voluntary basis and assured confidentiality and anonymity through a signed letter of consent. No child, emotionally vulnerable, took part in this research study. The teachers' knowledge about each participant was respected and valued. No photographs of the participants were

taken. At the end of each interview all participants will be asked how they felt about the interview and will subsequently be debriefed, if necessary.

### **1.7.9 Limitations to the study**

Language and time constraints are the most obvious limitations to the study. Furthermore, the problem with qualitative studies, is subjectivity of the researcher and research bias. The researcher will remain sensitive to this limitation throughout her investigation.

## **1.8 CONCLUSION**

In the light of children's tendency to misunderstand death, it is particularly important that they are given accurate and concrete information about death. In explaining the concept of death to children, recent researchers have emphasised that age, cognitive developmental level, experience with death, fear of death and cultural context should always be taken into account (Slaughter & Griffiths 2007: 533). Ideally children should receive information about death before they experience the death of a loved one or face their own death. Such information serves as a base for further explanations of the experience. Children need to know some of the physical aspects of death to understand their loss (Corr & Corr 1996: 121).

With so many children facing death as a result of HIV/AIDS and related illness, the focus needs to be on how to talk about death to children in such a way that they can begin their process of grieving effectively. Bereaved children may not be able to think concretely about death, but if they have received prior information about the biology of death, they may eventually come to integrate their loss more effectively. Recent research, as mentioned earlier in this chapter, has shown that children can acquire a great deal of biological knowledge just by observing their natural world. Not knowing what has caused the body to shut down, leads to misunderstandings and may exasperate children's anxiety about death. Most young children have a desire to learn about their world, ask endless questions and want to make sense of what they see. Primary caregivers should be given guidance on how to talk to young children about death on a biological, psychological and spiritual level. This research study hopes to provide useful information about young children's biological conceptions of

their bodies in relation to their understanding of death. The researcher hopes that her findings will lead to further guidance to educators and parents in answering children's questions about death.

## CHAPTER 2

### **A REVIEW OF RESEARCH ON CHILDREN'S CONCEPTUALISATION AND THE ACQUISITION OF A NAIVE THEORY OF BIOLOGY**

#### **2.1. INTRODUCTION**

In this chapter a review of research on the acquisition of young children's framework theory of biology will be explained, with reference to earlier and recent research on cognitive development in general. The researcher has decided to investigate the naive theory of biology of children in the preoperational stage of development, and how they use this theory to explain death as a biological phenomenon.

Wellman, Hickling and Schult (2000: 267) claim that early in life children develop three distinctive causal-explanatory reasoning systems which they apply to various distinct phenomena. These three systems are:

- a) a naive theory of psychology ( a theory of mind) - children construct human actions in terms of human internal mental states, such as desires and thoughts (e.g. death was caused because of bad thoughts).
- b) a naive theory of physics - an early understanding of mechanical or material phenomena (e.g. death was caused because he bumped his head on the pavement).
- c) a naive theory of biology - an early understanding of everyday physiological states and processes, such as inheritance, illness, birth, growth and death (e.g. he died because his heart stopped beating)

Wellman and Gelman (1992:338) mention that folk, lay or naive theories are "commonsense, non-scientists' everyday understandings of certain bodies of information". Some of these theories are inborn and others are observed through active engagement and observation in the environment.

#### **2.2 THE SUBCONCEPTS OF DOMAIN, THEORY, FRAMEWORK THEORIES AND DOMAIN SPECIFIC-STRUCTURES**

Reis and Tunnicliffe (1999: 14) cite Steven Mitchen (1996), who compared the human mind to a cathedral which has grown "through the addition of chapels: around

a core general intelligence structure of 'chapters of 'technical intelligence, linguistic intelligence, social intelligence and natural history intelligence". The natural history intelligence domain contains at least three sub-domains of thought: that about animals, that about plants and about the geography of the landscape." According to this theory a child's mind contains templates (or skeletal versions of knowledge) that enable him to learn about animals, plants and features in his environment in particular ways. When learning supports these skeletal versions scientific biological theories are eventually formed.

Reiss and Tunnicliffe further mention that children build mental models of the natural and physical environment. These mental models are a child's personal knowledge of the phenomena of interest to him and are representations of an object or an event. The process of forming and constructing models is a mental activity of an individual or group. For the purpose of this research study it is fair to say that children build domain-specific structures within the framework theory of biology to explain biological phenomena. They build skeletal mental models of biological phenomena through observations and learning and use these models to explain biological phenomena. The concepts within a domain may include "core knowledge that comprises fundamental implicit and possibly innate principles that may be evident in infancy, depending on the specific domain.

### 2.2.1 Domain

Binnie and Williams (2002: 343) refer to researchers defining a domain as a set of causal explanatory mechanisms (e.g. principles or theories); ontological commitments (i.e. rules of application of mechanisms); and a set of phenomena to which mechanisms are applied (i.e. ontology) (e.g. Carey 1985: 163). Wellman and Gelman (1992: 340) explain that the term **domain** is used in several separable senses: (a) innately given abilities to acquire certain capacities and skills (e.g. capacity for language and language acquisition); (b) modes of processing tied to particular sensory abilities (e.g. verbal versus visual domains); (c) areas of knowledge that have special properties learnt through experience and expertise; (d) Piagetian cognitive tasks such as domains of classification, seriation and conservations (e) naive theories that explain phenomena in different organised systems of knowledge (such as biology).

### 2.2.2 Theory and framework theories

Wellman & Gelman (1992: 342) mention that framework (or foundational) theories differ from specific theories. Specific theories are detailed scientific formulations about delineated sets of phenomena. Framework theories outline the essences and the basic causal devices for specific theories: a coherent form of reasoning about specific phenomena. Framework theories define domains. Cohen, Manion and Morrison (2006: 11) explain that a theory gathers together all the different bits of empirical data into a "coherent conceptual framework of wider applicability" and they cited Mouly (1978), who mentioned that a theory organises an amount of "unassorted facts, laws, constructs and principles, into a meaningful and manageable form."

Wellman and Gelman (1992: 366) further state that children can be said to possess a framework of foundational theory in a domain if "(a) they honour the core ontological distinctions made in that domain; (b) they use domain-specific causal principles in reasoning about the phenomena; (c) their causal beliefs cohere to form an interconnected theoretical framework".

### 2.2.3 Domain-specific structures

Wellman and Gelman (1992: 337) explain that in the last ten years cognitive development has been reviewed twice and these reviews concerned themselves with the stages of cognitive development and the mechanisms of cognitive change. They refer to earlier researchers who held the view that cognitive development was domain-general. They cite Piaget's (1929) stage theory which describes general stages of thought that apply across various content areas. This means that Piagetian cognitive structures are independent of content and are domain general. Furthermore, the information-processing views of development concerned themselves with the general mechanisms of cognitive thought - how cognitive changes take place. The cognitive system's basic representational format was seen to develop from enactive, to iconic to symbolic. Speed of processing or size of working memory was seen to increase as the child matured and thus influenced all of cognition.

Reviews of the last ten years research have shown that infants and young children have a rich set of cognitive capacities. They seem to have commonsense theories of everyday understandings of certain phenomena. This has led to an interest in domains of cognition and **naive** theories. They state that "there is a general claim that the mind is in some sense compartmentalised, that human conceptual understanding of one sort (e.g. space) is likely to be quite different in character, structure and development from understanding of another sort (e.g. language)". It is concluded that young children do reason according to a naive theory of biology to explain biological phenomena.

#### **2.2.4 Components of a biological knowledge system**

Hatano and Inagaki (1994: 173) define a biological knowledge system as consisting of three components. They are as follows:

- knowledge needed to specify target objects of biology
- ways of inferring attributes or behaviour of biological kinds
- non-intentional causal explanatory frameworks

The first is knowledge enabling one to specify objects to which biological principles apply (e.g. knowledge about living-non-living distinction). The second is a mode of inference which is consistent and can make reasonable predictions for attributes or behaviours of biological phenomena. The third is a non-intentional causal explanatory framework for behaviours needed for bodily processes and individual survival.

Schlottmann, Allen, Linderoth and Hesketh (2002: 1656) claim that preschoolers reason sensibly about the physical and social causality in the real world, especially if they have relevant knowledge to support their reasoning. Wellman et al (2000: 268) cite a few researchers who supported the claim that 3 and 4 year olds develop a causal-explanatory system for reasoning about biological phenomena. They cite Karmiloff-Smith (1992), who states that: "children are naive physicists, biologists, psychologists and linguists".

To understand the advances made by research in the young child's acquisition of a framework theory of naive biology, Piaget's approach to conceptual development will be a reference point of this study.

## **2.3 COGNITIVE DEVELOPMENT IN EARLY CHILDHOOD**

### **2.3.1 Piagetian stages of cognitive development**

Feeny, Christensen and Moravick (2010: 148) explain that according to Piaget children progress through a series of four qualitatively different developmental stages in which a child's mind develops a new way of operating. These developmental stages are explained by Piaget as follows:

**The sensorimotor stage (birth to 2 years)**

**The preoperational stage (between 2 to 7 years)**

**The concrete operational period (between 7 to 11 years)**

**The formal operational period (between 11 and 15 years)**

Feeny et al continue to mention that Piaget postulated that the stages occur in the same predictable sequence for everyone, although the exact age at which a child enters the next stage varies according to the individual and the culture.

Wellman and Gelman (1992: 339) mention that Piaget assumed that children's reasoning in earlier stages is qualitatively different from their reasoning in later stages. Piaget also assumed that at a given point in development, children reason similarly on many problems. Piagetian cognitive structures are thus content-independent and also domain-general. Domain-general approaches explain a broad range of phenomena with a relatively small set of principles.

### **2.3.2 Profile of the toddler**



For the purpose of this research study a brief outline is given below of the toddler in the pre-operational stage of development, according to Piaget's stage theory of development.

### 2.3.2.1 The toddler in the pre-operational stage of development

The toddler years are a time when children are exploring and learning about their environment. They are inquisitive and enthusiastic to learn about all kinds of phenomena. Feeney et al (2010: 161) explain that toddlers are sensory learners and use their five senses to learn about the world. Their memory for objects and events increases dramatically as they grow older and they enjoy imitating the actions of others. As their memory and cognitive skills develop they add their own ideas and plans to make-believe play events. They begin to master a system of speech sounds (phonology), grammatical forms and relationships (syntax), meaning (semantics) and socially-based customs for language use (pragmatics). The toddler learns about himself, the world around him and how to solve problems primarily through play, which is the cornerstone for learning for young children (Gordon & Browne 2004: 167).

Papalia et al ( 2004: 26) and Feeney et al ( 2010: 148) describes the pre-operational stage of cognitive development as follows:

Table 2.1

<p><b>Stage</b></p> <p><b>The preoperational period (2 - 7)</b></p> <p><b>Preconceptual phase (between 2 and 4)</b></p> <p><b>Intuitive phase (between 4 and 7)</b></p> <p><b>Developmental Hallmark</b></p> <p><b>Conservation - realisation that the amount and quantity of a substance</b></p>	<p>The child develops a representational system and uses symbols (word, gesture, or object) to represent people, places and events that is not present. Evolves from one who relies on actions for understanding to one who is able to think conceptually.</p> <p>Learns labels for experience.</p> <p>Thinking based on the way things appear rather than on logical reasoning.</p> <p>Tends to classify by a single salient feature.</p>
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<p><b>stays the same even when location or its shape changes.</b></p>	<p>Begins to develop moral feelings and moral reasoning.</p> <p>Language and imaginative play are important manifestations of this stage.</p> <p>Thinking is still not logical.</p> <p>Egocentric - unable to take the viewpoint of others.</p>
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Ages are approximate

Children in the pre-operational stage of development learn to use language and symbols to represent objects. Vocabulary develops at an outstanding rate as the child explores his world. During this period the child also begins to ask questions about everything that captures his interest - he seeks causes and explanations for almost everything. Furthermore, Piaget's model of cognitive development of children in the pre-operational stage of development postulated that children use fantasy reasoning, magical thinking and realistic causes to explain death (Despelder & Strickland 1992: 103).

De Witt and Booyesen (2007: 23) explain that the young child experiences heightened emotionality that is characterised by temper tantrums, intense fears and unrealistic jealousy. A common display of emotions in early childhood are anger, fear, jealousy, curiosity, happiness, sadness and love. They show their emotions through facial expressions, body postures, movement and tone of voice, as well as in their verbal expressions such as laughing, crying or screaming.

Berk (1997: 394) mentions that the development of empathy begins in the preschool years and is an important motivator for prosocial or altruistic behaviour - "actions that benefit another person without any expected reward for the self". The development of empathy has implications for a child's well-being. Parents who are nurturing and encouraging and who are sensitive to a child's needs raise children who are more likely to be empathetic to others. When a child has lost a parent or primary caregiver and has no sympathetic substitute, he/she may grow up rarely showing signs of concern.

Gordon and Browne (2004: 541) explain that social development is the process through which the child learns acceptable and expected behaviour. Gordon and Browne continue to explain that young children are influenced from birth by the deliberate input from adults (family, caregivers, teachers, peers and the community) to guide them to become socially adapted. Cultural variations determine how children relate to each other, what feelings they express and how they respond to personal events and phenomena in their world.

### 2.3.2.2 *Categories of skills of knowledge of the toddler*

Berk (1997: 20) explains that Piaget's cognitive developmental perspective has stimulated more research on cognitive development of children than any other single theory. Piaget's theory emphasised that children interact directly with their world through discovery learning and direct contact with the environment. Gordon and Browne (2004: 463), Papalia et al (2004: 236) and Feeney et al (2010: 342) mention categories of skills that Piaget argued children in early childhood acquire in order to discover their world. These skills of knowledge are explained by Feeney et al as follows:

- Skills of inquiry - through exploration, examination and communication they learn to evaluate and distinguish between fact and opinion, reality and fantasy.
- Knowledge of the physical world - gain a better understanding of cause and effect as they use objects in their physical world to manipulate and investigate.
- Knowledge of the social world - children become more able to imagine how others might feel, learn appropriate actions by playing with older children, make-believe play.
- Classification - begin to sort or group objects, people and events by shared characteristics into meaningful categories.
- Seriation - begin to understand the difference in the degree of quality such as size, weight, texture or shading.
- Numbers - begin to count and deal with quantities.
- Symbols - children do not need to be in sensorimotor contact with an object, person or event in order to think about it.
- Spatial Relationships - begins to understand aspects of space (near and far).
- Time - begins to understand sequence and duration of events.

Gordon and Browne (2004: 463) mention that a skill is basic if it can be used **transcurricular**: This implies that a child can use it in a variety of situations and activities. If a child is able to explain the biological cause of the biological phenomenon, such as death, he may be able to explain other phenomena such as growth or illness. A skill is also basic if it has **dynamic** consequences. This implies that acquiring the skill leads to other worthwhile responses (i.e. verbal stimulation strengthens verbal abilities / verbal articulation leads to more verbal responses). If a child is exposed to vocabulary of biological concepts, his verbal abilities to communicate about biological phenomena should increase.

Papalia et al (2004: 29) explain that Piaget concluded that cognitive growth occurs through three interrelated principles and describe them as follows

- Organisation - tendency to create complex cognitive structures (schemes) which are dynamic.
- Adaptation - involves two steps: (1) assimilation, taking in information and incorporating it into existing cognitive structures, and (2) accommodation, changing one's cognitive structures to include new information.
- Equilibrium - a constant striving to integrate new experiences with pre-existing experiences by organising mental patterns to restore a state of equilibrium.

### *2.3.2.3 Limitations of cognitive thought, according to Piaget*

Siegler (1999: 24) mentions that Piaget saw children as young scientists trying to solve problems, and detected scientific thinking even in infants (e.g. when infants systematically vary the height at which they drop something from their high chair to the floor to see what will happen). Piaget recognised that toddlers have some understanding of a connection between actions and reactions, but he held the view that pre-operational children cannot reason logically about cause and effect until they reach the formal operational period. Papalia et al ( 2004: 237) mention that Piaget claimed that pre-operational children had limitations of cognitive thought that inhibited their ability to reason logically. Piaget mentioned that they reason by transduction, which means that they mentally link particular experiences, whether or not there is

logically a causal relationship. For example, they may think that bad thoughts or behaviour caused their own or their parents death or illness. Carey (1985: 15) explains that according to Piaget, young children derive ideas of causality from cases in which they themselves intentionally make things happen.

Carey (1985:10) explains that Piaget probed children's knowledge about bodily processes in his clinical interviews and found that the young child is animistic. Piaget claimed that the three threads of childhood animism: (1) animistic causality, (2) over-attribution to intentional states of inanimate objects, and (3) over-attribution to "alive" to inanimate objects are linked together. Animistic means that inanimate objects are attributed living properties and essences as well as attributing animate characteristics of animate objects (typically humans) to inanimate objects. Personification means giving human attributes to any non-humans (Inagaki & Hatano 1987: 1013).

Wellman et al (2000: 267) mention that Piaget and his colleagues (Inhelder & Piaget, 1958) concluded that only in the formal operational period can children think logically and provide biological causal explanations about an event and formulate theories to predicate causal relations. Piaget held the view that pre-operational children's immature reasoning systems withheld them from reasoning logically about cause and effect.

Papalia et al ( 2004: 237) summarise these limitations of cognitive thought as follows:

Table 2.2

<b>Limitation</b>	<b>Description</b>
Centration	Children focus on one aspect of a situation and neglect others.
Irreversibility	Children fail to understand that some operations or actions can be reversed, restoring the original situation.
Focus on states rather than transformations	Children do not use deductive or inductive

	reasoning; instead they jump from one particular to another and see cause where none exists.
Egocentrism	Children assume everyone else thinks, perceives and feels as they do.
Animism	Children believe that inanimate objects have lifelike qualities, such as thoughts, wishes, feeling and intentions.
Inability to distinguish appearance from reality	Children confuse what is real with outward appearance.

These limitations of cognitive thought led to Piaget's view on the development of the young child's concept of "what is alive".

## 2.4 PIAGET'S VIEW ON THE DEVELOPMENT OF THE CONCEPT OF "LIVING"

Piaget maintained that there are five stages in the development of the concept of "living". These five stages are as follows:

Table 2.3

Stage 0 (age 0 - 5)	No concept of living.
Stages 1 (age 6 - 7)	Things that are active in any way, including falling or making a noise, are said to be living.
Stage 2 ((age 8 - 9)	All things that move, and only those, are said to be living.
Stage 3 (age 9-11)	Things that appear to move by

	themselves, including rivers and the sun, are said to be living.
Stage 5 (over 11)	Only animals (or animals and plants) are said to be living.

Piaget 1929: 196)

Reis and Tunnicliffe (1999: 13) mention that Piaget's data has been taken to show that activity and movement become the basis for children's decisions about what is "alive" and that even inanimate objects that move are alive. Piaget argued that children under ten interpret physical phenomena in terms of the intentional states of inanimate objects (e.g. the sun is hot because it wants to keep people warm) but argued that by age ten childhood animism has virtually disappeared and inanimate objects are no longer judged alive.

Piaget's early work has been expanded on by a number of researchers who have shown remarkable understanding of young children's biological knowledge. In contrast, careful research on Piaget's stages of the concept of living has suggested that young children use "alive" metaphorically, rather than believing that inanimate objects behave or think like humans and are truly alive (Reis & Tunnicliffe 1999: 13).

## **2.5 RECENT RESEARCH ON PIAGET'S VIEW OF YOUNG CHILDREN'S UNDERSTANDING OF NON-INTENTIONAL CAUSALITY**

Wellman, Cross and Watson (2001: 657) mention that in the last 25 years of cognitive development researchers have found that in early competence studies on various tasks young children fail not because they lack the conceptual competence, but rather because they were finding the testing situation too demanding or confusing. This research has had several desirable results: Young children's knowledge was undeniably underestimated; information-processing analyses have shown how children arrive at answers and responses ; and domain-general accounts of cognitive competence have yielded to more precise domain-specific understanding of children's conceptions and skills. Wellman et al further mention that each proposed developmental change (e.g. Piaget's conservation competence, Carey's proposed shift from naive psychology to naive biology and false-belief understanding) disappeared in the mist of task variations showing unsuspected cognitive strengths in

infants and young children. Their research indicates that between ages two and five, children's knowledge about their own and others mental processes advances dramatically.

Research by Gopnik, Sobel, Schulz and Glymour (2001: 621) found that young children's understanding of familiar events in the physical world enables them to reason logically about cause and effect. They state that before age five, children seem to understand how physical objects cause each other to move; how biological entities cause growth, inheritance, and illness; and how desires, emotions and beliefs cause human actions. Young children can predict causality and provide causal explanations and even make counterfactual causal claims. They continue to mention that there appears to be systematic changes in the kinds of causal knowledge that children possess between birth and age five. There are even some studies that suggest that exposure to relevant evidence about a particular domain can accelerate the development of a causal understanding of that domain. These research findings suggest that children are actually learning about these causal relations from evidence they encounter in their learning environment. In this way a child's scientific understanding develops.

## **2.6 THE CHILD AS SCIENTIFIC THINKER**

Lind (1997: 75) defines science as "a process of finding out and a system for organising and reporting discoveries". Feeney et al (2010: 343) mention that life science (the study of living things - plants and animals) is inherently interesting to children. Life science involves the structures, origins, growth and reproduction of plants and animals. Interest in their own growth can also lead children to explore their bodies. Feeney et al continue to mention that children's play is full of scientific exploration.

Nguyen and Gelman (2002: 495) speculate that young children's everyday understanding and interaction with plants and animals lead to an initial understanding of biological phenomena. This initial understanding may be limited, but they argue that young children draw inferences from one living thing to another. This process may establish the groundwork for a coherent and biological concept of death. For



example, a child who sees a dead bird in the garden begins to develop an initial understanding of biological phenomena.

In relation to understanding death as a biological phenomenon, Inagaki and Hatano (2004:356) proposed that young children who are reluctant to rely on intentional causality and cannot yet use mechanical (physical) causality explanations might rely on an intermediate form of causality, which they refer to as 'vitalistic causality'. They define 'vitalistic causality' as an activity of an internal organ, which initiates or sustains life. This activity is described by them as a vital force which can be conceptualised as "unspecified substance, energy or information". This implies that it is the organ's activities that cause the body to work or cease and that the organ's workings are independent of the person's desire, thoughts or wishes.

Kostelink, Soderman and Whiren (2004: 297) mention that children who are in the process of observing, thinking and reflecting on actions and events are doing science. They state that preschool children observe, try out simple operations and question adults repeatedly, although they believe that events simply happen or happen by magic. They continue to mention that as neural pathways mature, children gain more experience and information and begin to give more correct explanations of cause and effect, although still limited. They encourage educators to consider children's prior knowledge base, relate new learning experiences to this base and modify the presentation of new and subsequent experiences on an individual or small group basis. These research findings suggest that education and the cultural environment can contribute to children's acquisition of biological theories to explain biological phenomena.

## **2.7 EXPLAINING THE CONCEPT OF 'VITALISTIC CAUSALITY' IN YOUNG CHILDREN'S NAIVE THEORY OF BIOLOGY**

Jaakkola and Slaughter (2002: 326) cite Keil (1994) who proposes that children use a functional/teleological explanatory schema to reason about biological phenomena, and that this principle is universally present in adult's biological reasoning. Keil's (1992/1994) studies seem to show that children have a domain-specific causal explanatory principle that they use to reason about biological entities and processes, and that they use this principle to explain only biological phenomena. This principle is

defined as teleological in the sense that it explains the function(s) of a biological phenomenon.

As Jaakkola and Slaughter (2002: 326) explain: "In order for teleological/functioning reasoning to count as a biological principle for young children, these goals and functions must be specifically biological". They further propose that the concept of "life" counts as a biological goal. They add that when something is alive, it functions as a biological system under biological laws. When something is not alive (either because it died or was never alive) biological laws do not apply. Their studies explored the issue of biological teleology in the context of children's understanding of the human body, whether and when children begin to conceptualise the human body in terms of this main goal of maintaining life, and how they understand that the factual information they have or are learning about body organs is integrated into this principle.

Slaughter (2005: 182) cites Inagaki and Hatano (2002) who supported her claims about children's naive theory of biology, and mentions that this construction of the body as a "life-machine" serves to organise and structure children's knowledge about the human body and other biological phenomena, and develops further learning about biological phenomena. Inagaki & Hatano (2004: 356) further state that children who made references to "life" when explaining vital organ function (e.g. heart, lungs, heart) were classified as "Life Theorisers" in comparison to those who had not yet acquired a life theory of the body (Non-Life Theorisers) (Hatano & Inagaki 1994: 178, Jaakkola & Slaughter, 2002: 325, Slaughter 2005:183). In their studies some four year olds qualified as Life-Theorisers and virtually all six to ten year olds were classified as Life-Theorisers. Their results showed a qualitative increase in referring to certain organ function as a goal to maintain "life". Once children began to appeal to "life" (4 - 6) as goal of organ function, the number of life appeals remained stable across age groups. Children tended to make life appeals to just a few vital organs, which showed their understanding of the function of vital organs. There was an interesting pattern of relations between children's life appeals and knowledge of organ function. Their studies reflected that young children had discovered that there is a thing called "life" and that the body acts to sustain it.

Slaughter (2005:183) mentions that recent cognitive developmental research have shown that young children who are already "life theorists" will argue that death as opposite of life must involve the cessation of all bodily activity and that death must be caused by the breakdown of some aspect of vital organ functioning. The Life-Theorisers were more likely to conceptualise death as a biological process than the Non-Life Theorisers. They were also more likely to say that the death is irreversible. Slaughter continues to mention that these findings imply that "Life Theorisers" use a teleological principle reason about the biological phenomena of death. This "life" theory of the body results in children moving from a misunderstanding of death as a behaviour to an initial understanding of death as a biological phenomenon. How children's life theorising and knowledge of bodily function are related to the development of their biological theory, is still being researched.

## **2.8 CONCLUSION**

In summary, one can conclude that the development of children's cognitive information-processing capacities, their ability to think about phenomena using domain-specific causal-explanatory mechanisms, their interaction within their cultural environment, and their exposure to being taught about biological phenomena all contribute to the young child's conceptualisation of a framework theory of biology. Children can then reason about organ function as having a biological goal (teleological principle). The acquisition of such a principle leads them to formulate a naive framework of biology for biological phenomena. This enables them to understand the causality of death as a biological phenomenon and leads to a mature understanding of death.

## **CHAPTER 3**

## AN EXPLANATION OF THEORETICAL CONCEPTS AND PERSPECTIVES RELATED TO UNDERSTANDING A CHILD'S CONCEPT OF DEATH

### 3.1 INTRODUCTION

Heilman (2005: 17) states that "connecting the dots between cause and effect, between expectation and experience, between what we know and what we feel, between what we've heard and what we see, makes the ancient and difficult business of bereavement somewhat more manageable". As educators, psychologists and care workers we need to know how young children understand, think and feel about death, and what their death experiences are, if we are to support them in reaching a mature understanding of death. In this chapter an explanation will be given on important theoretical concepts of death related to this research study.

Kastenbaum (1992: 99) mentions that children's thoughts about death is "an interesting and ever-shifting mixture of solid fact, wishful thinking, guesswork, and the occasional riveting insight". He captures the tone of a young child's view of death in the following scenario: A four year old girl is visiting her 84-year old great-grandmother in a hospital ward. The little girl says to her great-grandmother: " You are old! That means you will die. I am young, so I won't die, you know ... but it's all right, Gran'mother, just make sure you wear your white dress ... then after you die, you can marry Nomo (great-grandfather) again, and have babies." This belief that death is only a temporary state of affairs and that the dead exists in an altered state of living, is seen by developmental psychologists as a child's immature view of death.

Slaughter and Griffiths (2007: 526) mention that children first acknowledge death in the preschool period and typically think that death happens only to the sick and aged, that it can be avoided and that death is an altered state of living. Slaughter (2005: 179) explains that adults recognise that death is universal, that is comes to all living things, that death is the final stage in the life cycle, that it is inevitable and irreversible, and that it is ultimately a biological event which involves the ultimate breakdown of vital body organs.

Slaughter (2005: 179) continues to mention that for the past 50 years research on children's understanding of death has spanned the psychoanalytical and Piagetian

research traditions. Slaughter explains that recently developmental psychologists have begun to investigate how children make the transition from an immature concept of death to an adult-like, biological understanding of death. The psychoanalytical researchers concluded that death is a highly emotionally charged concept. The Piagetian researchers concluded that an understanding of death is influenced by age and cognitive developmental stages. Recently, researchers from a biological perspective have concluded that children who have a naive understanding of biology can reach a mature understanding that death is a biological phenomenon. Recent research has revealed that when young children begin to conceptualise death as a biological phenomena their conceptualisation of death begins to develop towards an adult's understanding of death - as final and caused by a biological phenomena. (Slaughter 2005: 185)

## 3.2 BASIC CONCEPTS OF CHILD DEVELOPMENT

### 3.2.1 Development, maturation, heredity and environment

Feeny et al (2010: 132-134) mention that in early childhood education educationalists refer to the **development** of the whole child. This implies the physical, cognitive, language, social and emotional development of the child. The growth in the body, brain, sensory capacities, motor skills and health all form part of his physical development and may influence other aspects of development. Mental abilities include learning, memory, language, thinking, moral reasoning and creativity change or remain stable as the child develops. Personality, emotional life and social relationships interacts as part of his psychosocial development. Educators further mention that these areas are interconnected and influence each other. Feeny et al, further mention that development follows a predictable pattern, that rates of development vary, that development is influenced by maturation and experience and proceeds from top down and from centre outward, and finally that culture affects development.

De Witt & Booyen (2007: 2) mention that **maturation**, which is a continuous process over a life-time, is programmed according to a genetically-determined plan which are hardly affected by influences of the environment. Papalia et al

( 2004: 9) define maturation as "the unfolding of a natural sequence of physical changes and behaviour patterns" of the body and the brain. They continue to mention that as children develop into adolescents and then into adults, differences in innate (inborn) characteristics and life experiences play a greater role as children interact with their environment.

Papalia et al (2004: 9) define **heredity** as the "genetic endowment inherited from the biological parents at conception". Apart from heredity, the environment supplies further influences that determine development.

**Environment** involves those influences coming from the "world outside the self beginning in the womb". Major contextual influences determine development, such as family, socio-economic status and neighbourhood, culture and race and the historical context that the child experiences through his life (Papalia et al 2004: 9).

A number of researchers have developed theories that describe, explain and predict behaviour about how children learn and grow. Theory provides a framework for understanding children's development. For the purpose of this dissertation Piaget's Cognitive Theory of Development will be a departure point from which to explain a young child's acquisition of a naive theory of biology in relation to this understanding of the subconcept 'causality' of death.

### **3.3 A BRIEF REVIEW OF THREE THEORETICAL PERSPECTIVES ON STAGES OF DEVELOPMENT**

#### **3.3.1 The psychosexual and psychosocial theory of development**

Gordon and Browne (2004: 133) define the psychodynamic theory as being about personality development and emotional problems. They continue to mention that all psychoanalytic explanations of human development emphasise the critical importance of relationships with people and the stages of personality development. The psychodynamic or psychoanalytic theories look at development in terms of internal drives that are often unconscious or hidden. These drives motivate human thinking and behaviour and provide the foundation for universal stages of

development. Sigmund Freud (1856-1939) was the founder of psychoanalysis which aimed at giving patients insight into their unconscious emotional conflicts.

### 3.3.1.1 Freud's theory of psychosexual development of the three to six year old child

Gordon and Browne (2004: 134) explains that Freud personality was the most important aspect of child development. Personality was defined by three structures:

- Id - instinctive part that drives a person to seek satisfaction
- Ego - the rational structure that is a person's sense of self
- Superego - the moral side that informs the person right from wrong

Papalia et al ( 2004: 23) mention that Freud's personality stage theory contended that personality developed in a fixed pattern of stages that emerged as the child matured naturally. Each stage had its own area of pleasure and crises, between meaningful others, in the child's life. If any unresolved conflict or crisis occurs in any stage, such as the death of a parent, it may give rise to personality problems that may continue throughout life. For example, if a child's parent dies and the id does not receive sufficient satisfaction during the oral stage, it may be reluctant to leave that stage until satisfaction is obtained. It may also receive too much satisfaction during the oral stage and may want to retain oral-stage satisfaction later in life. Freud referred to these obstacles as positive or negative fixations that influenced a child's personality development.

Gordon and Browne (2004: 134) explain that Freud held the view that the way a child is treated in each stage determined whether he would develop healthy or abnormal personalities. In particular the mother-child relationship is important at each stage, thus the interaction between the child's wishes and needs and how these were heeded to by the mother or other adults, determined the outcome of development. For the purpose of this research study a summary of the child in the Phallic stage of personality is given:

Table 3.1

<b>Phallic (3 - 6 years)</b>	Child becomes attached to parent of the
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	other sex and later identifies with same-sex parent. Superego develops. Zone of gratification shifts to genital region.
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Ages are approximate

Papalia et al (2004: 26)

Other theorists, including Erik H. Erickson, expanded and modified the psychoanalytic perspective of Freud.

### 3.3.1.2 *Erickson's theory on psychosocial development of the three to six year old child*

Papalia et al (2004: 25-26) mention that Erik Homberg Erickson (1902-1994) maintained that development proceeds through eight stages of psychosocial development across life span. Each stage involves what Erickson called an "identity crisis" in personality which acquires the development of a particular "virtue" or strength before developing to the next stage. A second key point of Erickson's theory is "balance" which implies that a child's wishes and the demands of the environment must be balanced with "a mentally healthy dose of each emotion" relevant to a specific developmental stage (Gordon & Browne 2004: 134).

Erickson's model postulates that the child's (3 to 6 years) psychosocial development in Stage Three involves the emotions initiative versus guilt. The child endeavours to find his own purpose and goals, but is very concerned of his parents' approval when he expresses initiative and individuality. The child begins to become more socially isolated and feels rejected when he does not get approval for his achievements.

For the purpose of this research study reference is only made to Erickson's Psychosocial Development of the child in Stage 3 (three to six years) as summarised by Papalia et al (2004: 26).



Table 3.2

<b>Initiative versus guilt (3 - 6 years)</b>	Child develops initiative when trying out new activities and is not overwhelmed by guilt. Virtue: purpose
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Ages are approximate.

When a child loses a parent or other primary caregiver during this stage of development when initiative is to be developed, it can have serious implications for his psychosocial development towards the next stage of "industry versus inferiority". The preschoolers' fantasies of a parent's death may be accompanied by feelings of guilt. He may "fantasise" that his "bad words" to his parent, "I wish you were dead", caused the death of his parent. This leads to an overwhelming feeling of guilt when his parent or primary caregiver has died (Lewis, 2004: 150).

Furthermore, during this stage the child is preoccupied with his body and may be very concerned about bodily disfigurement. A child's awareness of his body is relevant to this research study as the researcher will investigate a young child's knowledge of organ location and organ function (DeSpelder & Strickland 1992: 99-102).

### 3.3.2 Jean Piaget and the constructivist theory of development

Gordon and Browne (2004: 142) explain the Cognitive Theory as "the structure and development of human thought processes and how these processes affect the way a person understands and perceives the world". They mention that Jean Piaget (1896 - 1980) did groundbreaking research on how children think and what they think about, by combining his clinical method with observation and flexible questioning. Piaget concluded that children acquire three kinds of knowledge as they grow: physical, social and logical-mathematical. These three kinds of knowledge structures are as follows:

- Physical knowledge - the knowledge of external reality that is gained from doing things and acting on the physical world.

- Social knowledge - the knowledge learned from observing others
- Logical-mathematical - the understanding of logical relationships that are constructed as children observe, compare, think and reason about phenomena in their environment.

Piaget further theorised that as children interact with the environment they develop organised ways of making sense of phenomena and experiences. Case and Okamoto (1996: 189) mention that of all constructs in Piaget's theories the notion of a general logical-mathematical structure has been mostly disputed by new emerging data. In the context of Piaget's theory the logical-mathematical structure implied that children have a small number of universal cognitive structures that play a role in organising their thinking and that major changes take place in their cognitive structures.

Case and Okamoto (1996: 191) mention that new data has concluded that children's intellectual processes are far more content-, context- and culture-specific than Piaget suggested. Neo-Piagetians proposed that children's cognitive structures can be viewed as sets of specific schemes or schemas, but constrained as a result of their limited general processing capacity. Furthermore the Learning Theorists concluded that children's cognitive structures are seen as domain-specific conceptual networks that are less integrated than those of adults and which fail to capture certain essential features of the domain that they represent. Socio-historic theorists held the view that children cannot yet fully initiate the symbol system and activity patterns that have been developed by their culture. Case and Okamoto propose that children's cognitive structures are "rich networks of concepts and conceptual relations; that structures are module-wide (not system-wide); undergo periodic revolutionary change, and the timing of these changes is co-dependent on children's experiences and changes in their general processing capabilities; the content of children's central concept structures become progressively distinctive with age, since it is linked to the conceptual and notational systems of the culture children operate in".

The researcher is interested to investigate in what way content, context and culture influences the preschoolers naive theory of biology acquisition.

### 3.3.3 The sociocultural theory of development

Papalia et al (2004: 33) explain that the sociocultural perspective concludes that development takes place under the influence of a social context. The child interacts with the environment and is an inseparable part of it. The social and cognitive realms are interconnected. Papalia et al further explain that Lev Semenovitch Vygotsky (1896-1934), a sociocultural theorist, agreed with Piaget that children are actively involved with their environment, but went further to conclude that children learn through social interaction and that cognitive growth is a collaborative process.

Vygotsky saw mental functioning as action in the way that the child responds to his environment. This action can be defined as the thinking, reflecting and reasoning of the child whilst using language which enables him to see things in a new way. Learning is achieved when the child cooperates with others in a variety of social settings (parents, teachers, peers and other people) and through cultural symbolic representations (e.g. the media, art, language, play, songs, metaphors ect.). Vygotsky's theory puts emphasis on the role of interpersonal processes and the role of society which provide the framework out of which the child develops meaning.

Flavell, Miller and Miller (1993: 15) note that Vygotsky held the socio-cultural view that the guidance and support given to the child is the main process of the child's cognitive development. According to Vygotsky, adults must help direct and organise children's learning before they can master or internalise it. This helps the child cross the zone of proximal development (ZPD), the gap between what he can do and is not quite ready to accomplish by themselves. When the child's level of understanding is deliberately (but not unrealistically) challenged, then the child is more likely to learn about new phenomena without experiencing that he has failed. Vygotsky emphasised that instruction should be geared to the ZPD of the child receiving the instruction.

Vygotsky's sociocultural theory should encourage educators to guide children's knowledge about biology. Feeney et al (2010: 153) cites Cople and Bredenkamp who mention that Vygotsky's concept of a zone of proximal development (ZPD) is of great use to early childhood educators. When teachers take children's physical, emotional, social and cognitive development into account and identify goals for children that are challenging and achievable, when they talk with children and help

them to create meaning, children's abilities develop. This theory emphasises the importance of the child's social context in which learning takes place (Feeney et al, 2010: 153).

In relation to this research study it is implied that if adults direct and guide children's knowledge of biology, the child can develop an understanding of scientific theories of domains (i.e. physical, psychological and biological). Research by Slaughter (2005: 185) has suggested that young children who acquire a biological knowledge of biological phenomena, can develop towards a mature understanding of the cause and effect of biological states, such as death. She states that "recent research documenting the relevance of children's developing a folk theory of biology to their understanding of death provides practitioners with a new and informed perspective for guiding children on that journey".

### **3.3.4 The Multiple intelligence theory**

Berk (1997: 21) mentions that new ways of understanding children are constantly being investigated, and these discoveries build on existing theories. The emphasis on information processing is an example of such a new approach. Klahr (1992 ), as cited by Berk, mentions that psychologists suggested that the human mind might be viewed as "a symbol-manipulating system through which information flows". Klahr concludes that information is actively coded, transformed and organised from the moment the senses absorb it (input) and behaviour follows (output). Like Piaget, the information-processing approach regards children as "active sense-making beings, who modify their own thinking in response to environmental demands. These thinking processes include perception, attention, memory, planning strategies, categorisation of information and comprehending the written or spoken language. These processes are similar at all ages, but present to a lesser extent in children. The information-processing theorists state that there are no stages of development (Berk, 1997: 22-23).

Flavell et al (1993: 8) describe the human mind "as a computer - a complex cognitive system that manipulates and processes information coming in from the environment or that is already stored in the system". The system encodes, recodes, decodes, compares and combines information with other information, storing it in

memory or retrieving it from memory. As Siegler (1991: 59) states, "The quality of children's thinking at any age depends on what information they represent in a particular situation, how they operate on the information to achieve their goal, and how much information they can keep in mind at one time."

### **3.4 HISTORICAL OVERVIEW OF RESEARCH ON CHILDREN'S UNDERSTANDING OF DEATH SPANNING THE PSYCHOANALYTIC, PIAGETIAN, NEO-PIAGETIAN AND INTUITIVE THEORY TRADITIONS**

Research documenting how children of different ages understand the concept of death and dying has spanned the psychoanalytic, Piagetian and recently the intuitive theory research traditions (Slaughter and Griffiths 2007: 525).

#### **3.4.1 The psychoanalytical perspective**

Slaughter (2005: 175) mentions that the first published research on children's understanding of death was carried out by investigators working from a psychoanalytic perspective. The early research revealed two insights: (a) Children find death to be an emotional issue. It involves sadness, anxiety and fear over the separation which death brings. Death is linked to separation anxiety, infantile fear of the dark, abandonment and physical immobility. Despelder and Strickland (1992: 92) mention that by the time children are four or five years, death-related thoughts and experiences are seen in their songs, play and in the questions they ask about death. Furthermore, they conclude that at first children conceive death as partial, reversible and avoidable, but as they mature they eventually arrive at the concept that death is final and inevitable.

##### *3.4.1.1 Pioneering studies*

Kastenbaum (1992: 100) reports on two important investigations of children's concepts of death that were conducted in Europe during the 1930's from a psychoanalytical perspective. Kastenbaum (1992: 101) cites Sylvia Anthony (1940, 1970), who found that normal children do think about death and that they are quite capable of discovering death for themselves and formulating ideas about it. Kastenbaum further cites Maria Nagy (1948/1959), whose investigations pioneered

many subsequent studies on children's understanding of death. Her results could be categorised into three major developmental phases, although there was some overlapping (Kastenbaum 1992: 103-104)

- First stage - death is not final (0 to 5 years). "To die...means the same as living on but under changed circumstances. If someone dies no change takes place in him. , but rather our lives change since we no longer can see the dead person as he no longer lives with us" (Nagy 1948).
- Second stage - the child now tends to personify death (5 to 9 years). "Death is seen as a separate person". Several children spoke about a "death-man" who goes about at night" (Nagy 1948).
- Third stage - death is irreversible, universal and final (9 to 10 years onwards). "Death is a thing from which our bodies cannot be resurrected" (Nagy 1948).

Slaughter (2005: 180) mentions that the psychoanalytic researchers concluded that young children's capacity to understand and accept death was limited by their cognitive and emotional immaturity and that children's misapprehensions about death made them more anxious about death. She continues to explain that the Piagetian research on children's understanding of death was more systematic. Piagetian researchers focused on the cognitive rather than the emotional aspects of children's understanding of death, and tied developments in death understanding to other cognitive skills that the child acquired at a specific Piagetian stage.

### **3.4.2 The Piagetian perspective**

Slaughter (2005: 182) mentions that a second focus on research into children's understanding of death came in the 1960's and 1970's and was done from a primarily Piagetian perspective. The development in death understanding was linked to development in other cognitive skills (the acquisition of object constancy, conservation and invariance, differentiation between animate and inanimate objects, self from non-self and the comprehension of futurity of time). Slaughter further mentions that Piagetian researchers delineated sub concepts of death understanding and evaluated the capacity of children to answer questions correctly in relation to the different sets of subcomponents. A mature understanding of death was seen as a mastery of all subcomponents of the death concept. The subcomponents of

universality and irreversibility were seen to be acquired during the concrete operational stage and cessation and causality only in the formal operational stage of cognitive development.

Slaughter (2005: 181) summarises the findings of Piagetian research on the acquisition of children's understanding of death as follows:

- **Preoperational:** Children think of death as temporary or reversible and tend to characterise being dead as having concrete behaviours (closed eyes, being still or departing).
- **Concrete operational:** Children recognise that all living things must die and that death is irreversible, but that death is caused by external influences (gunshots, accidents, germs) originating outside the body.
- **Formal operational:** Children hold a more mature view of death as inevitable, universal, final, and as part of the life cycle of all living things. Death is understood as the breakdown of the body. This understanding reflects actual theoretical, biological knowledge and shows a mature understanding of death.

Despelder and Strickland (1992: 89) mention that similar to other aspects of child development, children's understanding of death evolves through the interplay of experiences and level of maturity, but does not correspond precisely to chronological age. They continue to mention that a child's understanding of death "reflects a process of continuous adjustment and refinements as new experiences cause a re-examination of his/her values and responses - a child's understanding of death can change dramatically in a very brief time".

Kastenbaum (1992: 106) refers to Nagy's research which mentioned socio-historical influences and believed that death constructs were influenced by interaction with the environment. He states that research from the intuitive theory perspective have provided empirical evidence that chronological age of a child is not as important as his level of maturation and learning experiences. Attention has shifted to determining the relative influence of maturational and environmental factors.

### 3.4.3 The intuitive theory research traditions

Slaughter (2005:181) mentions that in the last decade or so a new approach has emerged on how children understand the concept of death. This approach implies that children reason about the body, life and death from a naive theory of biology. The acquisition of a "life" theory of the body results in a change of children's thinking about death: death is understood as a biological phenomenon, not governed by psychological intention (e.g. behaviour, drives or desires).

Children understand that death is not caused through psychological intention but as the result of biological causality. This emerging notion that the ultimate goal of human body functioning is to maintain life results in a change in children's understanding of death. As Slaughter (2005: 183) states "once children come to conceptualise the body as a 'life machine', then they also recognise that any major malfunction of the body will result in the cessation of life - that is, in death".

### **3.5 A BRIEF EXPLANATION OF THE COMPONENTS OF A MATURE CONCEPT OF DEATH**

Slaughter and Griffiths (2007: 526) mention that the number of subcomponents of the death concept has varied across studies. The majority of researchers recognise the following five major aspects of death understanding, mastered by children in a relatively fixed sequential order. The order is as follows:

- **Inevitability** - the acknowledgement that living things must die eventually
- **Universality or applicability** - the understanding that death happens to all living things
- **Irreversibility or finality of death** - the recognition that the dead cannot come back to life
- **Cessation or non-functionality** - the understanding that death is characterised by bodily processes ceasing to function
- **Causation** - the understanding that death is ultimately caused by a breakdown of organ functions.



Slaughter & Griffiths (2007: 527) further conclude that the majority of developmental researchers operationally define the mature death concept as mastery of some or all of the subconcepts of death.

### **3.6 CONCLUSION**

The literature study of a child's intuitive theoretical knowledge of biology has shown that young children can develop towards a biological understanding of death. This then leads to a mature understanding of the final subconcepts of death, cessation and causation. Slaughter (2005: 185) encourages educators and related practitioners to acknowledge the importance of children's underlying naive biology (or lack of it) when talking to them about the concept of death. She views it as important that children are given relevant biological information that focuses on human body functioning to maintain life. The researcher hopes that her study will show that it may be beneficial to introduce and incorporate biological explanations about organ function in explaining death to children.

## **CHAPTER 4**

### **RESEARCH DESIGN**

#### 4.1. INTRODUCTION

Neuman (2000: 6) states that people's beliefs, behaviour and interactions are studied in the social sciences. De Vos et al (2005:41) define social science research as "the systematic, controlled, empirical and critical investigation of social phenomena, guided by theory and hypotheses about the presumed relations between such phenomena. Babbie and Mouton (2001:72) summarise the process of empirical research as having the following four elements: a research problem, a research design, empirical evidence and conclusions.

This research approach will be conducted from a qualitative paradigm: a qualitative research design. Babbie (2001: 281) defines design as "the approach a researcher uses to study a particular phenomenon." Creswell (1998: 2) defines design as "the entire process of research from conceptualising a problem to writing the narrative." The researcher attempts to gain a first-hand and holistic understanding of young children's (five to six years) **naive** theory of biology in relation to their understanding of the causality of death as a biological phenomenon. This will be done through a flexible strategy of problem formulation and data collection throughout the empirical investigation process (Fortune and Reid 1999: 94). The flexibility of the qualitative research design is especially important when observing young children in their natural environments, because they are spontaneous, unpredictable and impulsive. The researcher will take the ethical considerations of using child participants into account.

#### 4.2 CONCEPTUAL FRAMEWORK OF THIS RESEARCH STUDY

Wellman and Gelman (1992: 342) state that infants and young children rapidly acquire certain bodies of knowledge that eventually are framed into conceptual acquisitions: framework theories. Such theories define domains (e.g. biology) and coherently categorise phenomena into bodies of different domains. Wellman and Gelman further conclude that such domains outline areas for discovery - research programs - rather than being finished bodies of understanding. Framework theories are open-ended and constraining; they lead to the development of more specific theories but initially define the domain of inquiry. Framework theories differ from specific theories in the sense that they are not detailed scientific formulations about phenomena. Framework theories could exist within individuals as well as in scientific

communities, constituting areas of human thinking for further conceptual development.

The naive theory of biology provides the framework for the empirical research and the hypotheses derived from this theory are submitted for empirical investigation. The researcher will investigate the conceptual framework of naive biology of young children's thinking about biological phenomena. Recent research findings hypothesise that young children can understand biological phenomena from a naive biological perspective. The phenomena under investigation are human and animal organ function with reference to them having a function of sustaining 'life'. Furthermore, the researcher will investigate if preschool children understand that the cessation of certain body organs ultimately lead to death. She hopes to discover how the framework theory of naive biology is influenced by the cultural system within which her participants operate.

### **4.3 RESEARCH DESIGN, RESEARCH METHODS, SITE AND SAMPLING COLLECTION AND OUTLINE OF THE RESEARCH DESIGN**

#### **4.3.1 The qualitative research design**

Babbie (2001: 281) defines design "as the approach a researcher uses to study a particular phenomenon." Creswell (1998: 2) defines design as "the entire process of research from conceptualising a problem to writing the narrative".

Patton (2002: 129) mentions that one of the strengths of qualitative methods are the "inductive, naturalistic inquiry strategy of approaching a setting without predetermined hypotheses". The researcher will use the approach of orientational qualitative enquiry, which begins with an explicit theoretical perspective (the naive theory of biology). This perspective determines the conceptual framework which will guide the fieldwork and interpretation of findings. She has chosen the research strategies of enquiry of phenomenology and grounded theory to guide her empirical investigation.

#### **4.3.2 Choice of methodology**

The various strategies of enquiry used to design qualitative research is determined by the purpose of the study, the nature of the research question, and the skills and

resources that are available to the researcher. The research process will also reflect the procedures of the chosen design. In qualitative research the researcher creates the research strategies best suited to their research, or designs the whole project around the strategies selected. De Vos et al (2005: 269) and Creswell (1998: 50) identify the following two strategies of inquiry of qualitative research:

- Phenomenology
- Grounded Theory

#### *4.3.2.1 Phenomenology*

De Vos et al (2005: 270) describe the aim of **Phenomenology** as to understand and interpret the meaning of experiences of a phenomenon, topic or concept. The researcher will analyse the conversations and interactions with her participants. She will use the strategies of participant observation and interviews as methods of data collection. Data will be systematically collected and the meanings, themes and general descriptions of the participants will be analysed within a specific context. She will keep the literature that she has reviewed in mind throughout her empirical investigation. It will guide her investigation and form the background to her empirical study in the field. For the purpose of this research study the researcher hopes to understand what meaning young children give to organ function and to the sub concept causality of death. The researcher will enter the participants' educational setting. She will place herself in the shoes of her participants by being interactive observer during the investigation.

#### *4.3.2.2 Grounded theory*

According to Rubin and Babbie (2001: 392) grounded theory is a term used with reference to the creation of theory based more (but not exclusively) on observation than on deduction. Creswell (1998: 241) states that the researcher formulates an abstract analytical schema of a phenomenon, i.e. a theory that explains some action, interaction or process. In the case of this research study the researcher hopes to find out if the assumption that young children use a naive theory of biology to understand biological phenomena, agrees with previous research. Mark (1996: 214) concluded that a grounded theory approach is primarily concerned with the generation of a

theory, rather than testing it. The researcher hopes to discover, develop and provisionally verify through systematic data collection and data analysis a **grounded theory**, which is based on the conceptual framework, i.e. the naive theory of biology of the young participant (De Vos et al 2005: 270). If the empirical research generates the hypothesis that children do reason within the framework of a naive theory of biology, the hypothesis can further explain other phenomena in many biological settings (e.g. sexuality and disease).

#### **4.3.3 LOCATING SITE**

The researcher believes that going directly into the field of study and observing it in detail can lead to a comprehensive understanding and grounding of the conceptual framework under investigation. She further believes that attitudes and meanings children have towards the phenomena under investigation can be best understood within the child's natural educational setting.

Pellegrini, Symons and Hoch (2004 :54) define natural settings as "these places where individuals and groups really functions" and go on to mention that it is imperative that a researcher spends considerable time observing participants in those situations that they ordinarily exist. In this way a researcher can understand why, what and how they do or say things.

The researcher chose two cultural settings in which to do her field work (Pretoria East and Pretoria CBD). The preschool in Pretoria East was chosen because the researcher knows the principal and the school setting. The researcher is interested in looking at cultural diversity and for this reason chose a preschool in Pretoria CBD. Both these preschools are easily accessible to the researcher. The preschools will provide ample opportunity to explore the necessary research questions as they are information rich.

#### **4.3.4 Selection of participants**

A sample is a small representation of the whole, and the most basic considerations in a qualitative research design are sample size and representation. The size must be adequate to provide enough data for phenomena under investigation with reasonable precision (De Vos et al 2005: 82).

Patton (2002: 244) argues that there are no rules for sample size in qualitative inquiry. Sample size depends on what the researcher wants to know. Sarantakos (2000:156) describes sampling as being relatively limited, based on saturation, not representative and involving low cost and less time. Sampling begins after the actual investigation has begun (De Vos et al. 2005: 328).

In this research study the researcher will therefore use non-probability sampling. The researcher will use the technique of purposive sampling to achieve this. In purposive sampling a particular case is chosen because it illustrates some feature or process that it of interest for a particular study (Silverman 2000: 104). A Purposive sampling method ensures that the cases selected are "information rich" (Gall, Borg & Gall 1996: 218). Erlandson (1993: 33) mentions that the data selection process must provide rich detail that maximises the range of specific information about the context. Before choosing the purposive sampling technique the researcher thought critically about the parameters of the population and then chose the selection of cases accordingly. The teachers in both schools have conversed the curriculum theme 'My Body' with the children. Teachers at both preschools have talked to the children about death, as some children at have had death experiences (e.g. a pet, grandparent, friend or parent). The concepts of biology and death will not be completely unfamiliar to the child participants.

The researcher thus believes that she will find data that is typical and divergent to her research findings, using the purposive sampling technique. At both schools the principals and participants' teachers will choose the children who should take part in the research study. The reason for this is that they know best which children will be most suitable to take part in the research study on a cognitive, emotional and social level. The researcher will ask eight participants between the ages five and six to take part in the research study.

Other participants will be the principal and the teacher of both schools. The teachers will be asked to complete a short background questionnaire about each child participant's cognitive, emotional and social background, and experience or non-experience with death, prior to interviewing and observing the participants. They will further be given a short questionnaire to complete about their views on a death education curriculum and the theme 'My body' (See Appendix 3 and 4).

The researcher will use the expert knowledge of a play therapist to review the feasibility of her study and her data collection methods as part of a pilot study. The pilot study pre-empts any problems that may arise during the actual interviews.

#### **4.4 DATA COLLECTION**

The researcher will collect data for this research study through participant observation and interviewing. Participant observation and interviewing are regarded as typical research procedures for a qualitative research design. In participant observation the gathering of data takes place through the observation and the taking of field notes. Various data collection techniques will be used, for instance open-ended narrative and semi-structured interviewing, drawing and building a model.

##### **4.4.1 Access to the preschools**

The researcher will make a preliminary phone call to the principals of both preschools requesting an appointment to discuss her planned research. A convenient date will be determined. The researcher will then visit both principals at the preschools and explain the purpose, aims and strategies of her research study. She will assure anonymity of all the participants and emphasise and promise confidentiality. She will present the teachers with copies of the letters to give to the parents asking for their informed consent to allow their children to take part in the research. The parents have to sign a form stating that they do or do not give their consent. This must be returned to the researcher prior to her investigation in the field (see Appendix 1 and 2). Hakim (2000:143) mentions that informed consent is a necessary condition rather than a luxury or an impediment. No participant will be coerced to take part in the research and will do so on a voluntary basis. Neuman (2003: 124), Babbie (2001: 470) and Thomas and Smith (2003:21) define consent as "voluntary participation". Furthermore, the teacher of each child participant will be asked to complete a questionnaire about the participants capabilities to be enrolled in the empirical investigation (see Appendix 3).

At the end of the field study, when the researcher knows more or less everything about her chosen topic under investigation, she will leave the participants in a gradual manner. She will tell the children beforehand when she is going to finish and will give the participants (children and teachers) a small gift.

#### 4.4.2 Participant observation

Participant observation can be described as a qualitative research procedure that studies the natural and everyday set-up of a particular situation or community. Observation leads to the generation of hypotheses or ideas. In this study the researcher aims to understand children's knowledge about biological phenomena by observing what they draw, build and say about organ location and function. Schurink (1998: 279) concludes that participants' conceptions of reality are only accessible to those who observe them closely. Only then can participants' viewpoints be clearly captured. Creswell (2003: 185-188) and Ritchie and Lewis (2003:35) mention that the researcher interacts with the child participants in a relaxed and informal way, observing what they say and do during the research process. De Vos et al (2005: 280) mention that involvement in the process of research enhances acceptance by the participants. This is especially important in doing research with children as they need to trust the researcher. There is however caution that the researcher's interaction can result in subjectivity which could lead to research bias.

The researcher will introduce herself to the participants as a group. She will sit down on the floor with them and ask them general questions about themselves and tell them a little about herself. As Bodgen and Biklen (1982: 43) states, "the researcher must blend into the woodwork and strive to interact with her participants in a natural and unobtrusive way, being non-judgemental and non-threatening". The quality of data is enhanced if there is a good relationship between the researcher and the participants. In this research study the researcher will explain to the child participants what they are going to do, She will explain to them that she wants to find out what they know about how their body works and where certain organs are found on the body of a human and animal.

The researcher will then take each participant individually, over a period of three weeks, into a separate room at the school to do the projects and interviews. The researcher will observe how each participant "builds" the cardboard cut out organs onto the human and the animal body styrofoam model. She will further observe how they make their drawings and interact with the projective frog activity. Throughout these activities she will ask them open-ended and semi-structured questions. She will



make field notes as she observes and take photographs of each child's model construction and drawing, using only first names as labels for the participants photos' and drawings - so as to protect the anonymity of each participants.

In recording her observational notes, the researcher will do the following:

- identify the observer
- provide relevant detail (age, sex, socio-economic and experiences with death) on an index card
- date and time of the observation
- setting (classroom)
- activity being observed

#### **4.4.3 Questionnaires and interviews**

Interviewing is the predominant mode of data collection in qualitative research. De Vos et al (2005: 287) mention that the quality of the interview depends mainly on the skills of the researcher as interviewer. The researcher will do her own interviewing, as she is comfortable with the technique which she has often used in working with children in other therapeutical situations. She will allow her participants to do 90% of the talking and ask clear and brief questions. She will use words that the child participants can understand and which are relevant to their life-world. She will always conclude her interviews with a general question, such as "Is there anything that you feel you still want to tell me? or How did you feel about this activity?" This also serves as a way of debriefing a child participant after an interview. She will also make sure that she does not exhaust the child participants as their attention span is short and they soon get tired.

Qualitative studies typically employ unstructured or semi-structured interviews. The researcher will have a set of predetermined questions on an interview schedule, but the interview will be guided by the schedule rather than be dictated by it (De Vos et al 2005: 296) The researcher will use the "Life Theorising Questionnaire developed by Jaakkola and Slaughter (2002: 341-343) as a guideline during the semi-structured interviews of children's knowledge of organ location and organ function (see Appendix 5). The researcher will use the Smilansky Death Questionnaire (1987: 195-196) as a guideline to investigate the participants' knowledge about causality of death

(see Appendix 6). The researcher will use minimal verbal responses, paraphrasing, clarification, reflection and encouragement as effective communication techniques during the interviews. She will also probe for deeper response to a question without doing emotional harm to her participants (De Vos et al 2005: 290).

All interviews will be tape-recorded after permission has been obtained from the participants. The researcher will use a battery-operated tape recorder and have spare batteries available. The tapes will later be transcribed for analysis. The researcher will place the tape recorder inconspicuously so as not to suppress the spontaneity and freedom of the child participants. Photographs will be taken of the participants' model construction and drawings. This will be done in conjunction with participant observation and serve as a means for remembering and studying the detail that may have been overlooked.

Since the researcher is using child participants she will not take field notes whilst observing, as the children may find them inhibitive and intrusive. She will make these field notes after the observations and interviews, as soon as she leaves the research site, and before returning for the next day's session. Her field notes will include both the empirical observation and interpretation. She will expand the field notes beyond immediate observation (Silverman 2000:140).

#### **4.4.4 Reliability and validity of the present study**

According to Guba in Poggenpoel (1998:331) as well as Mouton (2006: 107), the trustworthiness of the results should be ensured. Reliability and validity ensure that the research findings are objective. Reliability refers to the consistency, and variability to the truthfulness of the research data and findings (Pellegrini et al 2004: 140). Reliability and validity are of a serious concern to a researcher engaging in participant observation, because it is difficult to create exactly the same situation in order to reach the same results as in the original study (De Vos et al 2005: 277). The researcher has used various methods to ensure that her research is reliable and valid.

Observer fatigue can affect reliability. The observations will thus be spread over two weeks. The researcher will use a tape recorder to record the exact words the

participants use, and will transcribe them as accurately as possible. She will also note exact behaviour, using field notes. She will try to be as objective as possible and avoid her own feelings to cloud her observations.

The method of triangulation (using various data-collection techniques) which includes tape recording, transcribing of interviews and taking of photographs will help to assure reliability and validity to the research study. The researcher will use the participants' language and do her research in the natural environment of the child participant as a way of keeping the research reliable and valid. She will check for subjectivity and research bias when analysing data and reporting her findings.

#### **4.4.5 Ethical considerations**

*The Concise Oxford Dictionary* (1982: 331) defines ethics as "relating to morals; morally correct, honourable". Bodgan and Bilken (1982; 48) state that "two issues dominate traditional official guidelines of ethics in research with human subjects": informed consent and the protection of informants from harm".

These guidelines attempt to ensure that:

- informants take part in the research project on a voluntary basis and understand the nature of the study, the dangers and obligations involved.
- informants are not exposed to risks that are greater than the gains of the research study.

##### *4.4.5.1 Informed consent*

To obtain informed consent the researcher has given letters to the principal, the relevant teachers and the parents of the child participants, stating the aim, procedure and ethical aspects that the researcher is adhering to during the research (e.g. confidentiality, privacy and anonymity). An informed letter of consent bearing the subjects signature must be returned to the researcher prior to the research in the field. Furthermore, all participants will be informed about the purpose of the research and that the findings will be published. The participants will be assured that their identities would not be disclosed when the findings are presented.

#### 4.4.5.2 *Physical or emotional harm*

Dane (1990:44) mentions that the researcher must ensure that, within reasonable limits, no subject is exposed to any form of physical discomfort during the research project. The researcher will ask the principal and teachers at each of the schools to select the children they know are not vulnerable.

#### 4.4.5.3 *Deception of participants*

The researcher is aware that deception of which she is not aware can take place, because she may misunderstand what is said by the child participants during the interviews. She will use the method of reflection and feedback on a continuous basis during her interviews to make sure that she has understood correctly..

#### 4.4.5.4 *Violation of privacy*

Privacy implies the element of personal privacy, while confidentiality means that all information will be handled in a confidential manner (De Vos et al 2005: 61). To achieve privacy, no photograph of any participant will be taken and all information giving during the interviews and observations will be treated anonymously.

#### 4.4.5.5 *Competence of the researcher*

Babbie ( 2001: 475) mentions that an obligation rests on the researcher to make sure that she behaves in an ethically correct manner in reporting correctly on the data analysis and the results of the study. From the moment of composing her research population, to sampling, to utilising the methodology and processing the data, to the writing of the research report, the researcher should constantly be aware of her ethical responsibilities and commitment to her participants (De Vos et al 2005: 63). This research project is being done across cultural and economic boundaries, and the researcher will be very sensitive not to make any value judgments on any member of her research study. She will gather the necessary background information through interviewing the principals and teachers so as to become knowledgeable beforehand of the values, norms and climate of her research community (Strydom 1993: 11).

#### 4.4.5.6 Cooperation with collaborators

De Vos et al (2005: 64) suggests that there be a formal contract between all participants of the research project. This avoids any misunderstanding that may arise during the empirical research. The researcher will provide a letter to all adult participants and parents of participants, stating the aims, procedure, ethical commitments and possible outcome of the research study.

#### 4.4.5.7 Publication of findings

Strydom (1993: 18) mentions that the findings of the research study must be submitted -in written form to the reading public. Researchers should compile their research report as accurately and objectively as possible. Dane (1990: 53) states that report writing includes "doing all you can to make sure that your report is as clear as possible and contains all the information necessary for readers to understand what you have written". Babbie (1990: 345) mention that the researcher should state the limitations of the research study and mention the shortcomings (e.g. sampling procedure or data analysis).

The researcher will follow the guidelines in De Vos et al (2005: 66):

- The researcher will -make sure that her written report is accurate, objective, clear, unambiguous and contain all the essential information.
- Shortcomings and errors will be admitted.
- Subjects will be informed about the findings in an objective manner, without offering too many details or breaching the principle of confidentiality.
- All due recognition will be given to sources consulted and people who collaborated.
- The researcher will try to avoid biasing the results.

#### 4.4.5.8 Restoration of participants

Judd et al (1991:517) advise that during debriefing sessions the participants get the opportunity to talk about their experiences and through debriefing, problems generated by the research experience can be corrected. Babbie (2001: 475) mentions that debriefing sessions complete the learning experience. All participants

will be asked individually how they felt after each activity and be encouraged to talk about the experience. On completing the field work, a follow-up telephone call will be made to each school to find out how the participants are doing.

#### **4.5. DATA ANALYSIS**

Cohen et al (2006: 281) mention that transcribing is a crucial step since there is the potential that data can be lost, distorted or reduced of complexity. Transcriptions inevitably lose data from the original interview, because a transcription represents the "translation from one set of rule systems (oral and interpersonal) to another very remote rule system (the written language)". As Kvale (1996: 167) remarks, "the transcript can become an opaque screen between the researcher and the original live interview situation". The researcher must therefore not view the transcripts as revealing everything that took place during the interview. Cohen et al (2006: 282) mention that the researcher must transcribe what was being said, the tone of voice of the speaker, the mood of the speaker, indecipherable speech and any other events that took place during the interview session.

After the interviews have been transcribed the data must be analysed. In qualitative data, the data analysis tends to be a reflective, reactive interaction between the researcher and the decontextualised data (Cohen et al, 2006: 282).

De Vos et al (1998) and Miles and Huberman (1994) as cited by Cohen et al (2006: 283) give the following guidelines for data analysis, which the researcher will adhere to:

- (i) Read through all the transcripts. Get a sense of the whole.
- (ii) Select the best interview and read through. Jot down thoughts in the margin.
- (iii) Count frequencies of occurrence (of ideas, themes, pieces of data, words).
- (iv) Note patterns and themes which may stem from repeated themes and causes, explanations or constructs.
- (v) Try to use informed intuition to reach a conclusion and make sense of the plausibility of data.
- (vi) Cluster items together into categories, types, behaviours and classifications.
- (vii) Make final decision on categories.
- (viii) Analyse the categories one by one.

(ix) Recode if necessary.

Cohen et al (2006: 283) mention that having performed the first round of coding enables the researcher to detect patterns and themes and to begin making generalisations (see Appendix 7).

#### 4.6 VERIFYING

Kvale (1996: 237) mentions that validation of findings must take place at all seven stages of the interview-based investigation:

- **Thematising:** The theoretical underpinnings of the research must be sound and there must be a logical link between theory and research questions.
- **Designing:** The research design must be adequate and sound in terms of methodology, sampling and ethical considerations.
- **Interviewing:** The data must be trustworthy and the interviews must be conducted to the highest standard, with regular validity and reliability checks.
- **Transcribing:** The translations from the oral to a written medium should be faithful to the key features of the original media.
- **Analysing:** The methods of analysis and interpretations must be faithful to the data.
- **Validating:** The most appropriate forms of validity for the study must be decided on.
- **Reporting:** The report must fairly reflect the study and must be understandable and fair when read.

#### 4.7 REPORTING

Kvale (1996: 263-6) suggests several elements of a report:

- an introduction that include the main themes and contents
- an outline of the methodology and methods (from designing to interviewing, transcription and analysis)
- the results (the data analysis, interpretation and verification)
- a discussion

In her report the researcher will use direct quotations that will illuminate and relate to the general text whilst maintaining a balance with the main text. Direct quotations will be contextualised and accompanied by a commentary and interpretation. Such quotations will be particularly clear, useful, and will include an indication of how they have been edited. Finally, these quotations will be incorporated into the natural written style of the report (Cohen 2006: 286-287).

#### **4.8 TIME FRAME**

Mouton (2006: 199) mentions that qualitative studies are usually less structured than surveys and that the researcher should be flexible. She should anticipate that scheduling could change and make allowance for it.

The researcher will allocate the following time frame to the research study:

- Literature study - 3 months
- Data collection
- Observation and interviews ( 3 weeks)
- Final analysis and interpretation (2 months)
- Integrating results and writing the report (1 month)

#### **4.9 CONCLUSION**

Mouton (2006: 55) state that "the research design is a plan or blue print of how you intend conducting the research." The preceding chapters gave important background information on research about the acquisition of children's naive theory of biology in relation to their understanding of the subconcept causality of death. Chapter Four presented a detailed description of the social science research approach that the researcher will undertake regarding the phenomena of interest. A research approach is a process of scientific inquiry in which the researcher learns and knows things about the world around him. Babbie and Mouton (2001: 72) state that science is "an enterprise dedicated to finding out". In this chapter an overview was given on the research design that the researcher will use during her empirical investigation. Chapter Five will provide a more in-depth account of the data analysis and the research findings obtained during the investigation.



## **CHAPTER 5**

### **RESEARCH FINDINGS**

## 5.1 INTRODUCTION

The literature study explored research regarding the nature of children's early understanding of biology. A number of critics of the naive theory perspective have responded with both theoretical and empirical studies that shows that children can acquire biological knowledge at a young age. This contradicts the research of earlier researchers from the psychoanalytical and Piagetian perspective. Recent theoretical research shows that children do acquire domain-specific causal explanatory principles that they use to reason about biological entities and processes. Furthermore theoretical research has explored the issue of teleological principles in the context of children's understanding of organ function. Findings have shown that even young children can begin to conceptualise the human body in terms of the ultimate goal of maintaining life and that they explain the body as "a life machine" that keeps the body alive (Jaakkola and Slaughter 2002: 325).

The empirical research explored children's factual knowledge of organ function and organ location, as there have been few comprehensive studies in this regard. The researcher's main goal was to look for evidence that showed that preschoolers use a naive theory of biology to reason about the function of body organs, with reference to a life force ('vitalistic causality'). She then related their understanding of organ function to their understanding of the cause of death as a biological phenomenon.

## 5.2 DISCUSSION OF FINDINGS

A total of eight children took part in the study. Children were sampled from urban and suburban preschools. The preschools represented a mixture of socio-economic and cultural backgrounds. The data from two more additional children were excluded from the study due to being absent after the first day of research.

### 5.2.1 Findings from the semi-structured interviews of human and animal body organ functioning

Findings from the semi-structured interviews and participant observation of the model building activity that showed teleological reasoning in terms of biological goals were arranged in the following themes:

### 5.2.1.1 Theme 1

Findings that showed 'vitalistic causality' - that certain body organs maintain life (seen in reference to: "alive, live, dead, die, death, broke, the body no more works").

Examples of direct quotations:

"The brain will break"; "The heart will break"; "*As jou lyfie doodgaan, kan jy glad nie meer lewe nie*", (when your body dies, you can't live); "If someone is dead he can't see, hear, move, become alive"; "*As 'n mens nie bloed het nie kan sy hartjie nie meer pomp nie en dan gaan sy hartjie dood en dan kan hy nie meer leef nie ...*" (If you don't have blood your heart won't pump and then your heart dies and then you can't live); "*Sy brein hou hom aan die lewe ... as sy brein werk lewe hy*" (His brain keeps him alive...if his brain works, he is alive); "*Die longe bars*"; "*Die brein hou op se vir die ander deeltjies wat om te doen*", "*Sy liggaam hou op werk*" (The lungs burst. The brain stops telling the other parts what to do); "*Sy hart het gaan staan*" (His heart has stopped); "The brain dies"; "The lungs are going down, going down, going down ..."; "When the body dies, they never blow"; "No more works"; "Won't blow"; "If he does not have a tummy, he will sit with the bones and feel cold"; "The lungs will get brown ... "blood will boil"; " Blood gets out"; "*As jy nie 'n hart het nie, sal jy doodgaan*" (If you don't have a heart, you will die); "*As jy nie bloed in jou lyfie het nie, gaan jy dood*" (If you don't have blood in your body, you will die).

Seven participants referred to "death, breakdown of some organs, ceasing to work of some organs" in their answers to the question: What would happen if you don't have X (e.g. heart, brain, lungs, blood, stomach)?, although not all organs were given a life agency (e.g eyes, mouth, tongue). Three suburban participants and three urban participants answered that if you don't have the major life-giving organs (heart, brain, lungs, blood) you will die. One urban participant said that if you don't have a brain, you will not send the message, but answered that if you don't have a heart, lungs and blood you will die. One urban participant mentioned that if you don't have these major life organs "it will hurt ... there will be many blood...it will be sore...you will vomit", and was not able to give a "life agency" function to these organs. This could imply that language barriers led to a misunderstanding of the questions. However,

this participant gave the most graphic description of pain and discomfort in answering the question, "what would happen if you don't have X?".

#### 5.2.1.2 Theme 2

Findings that showed biological teleological reasoning in terms of:

- Organ function of the brain, heart, blood, lungs, stomach, eyes, mouth, tongue, hands, feet, bones of humans
- Organ function of the brain, heart, blood, lungs, stomach and bones of animals.

#### Category 1 - Blood

Two suburban participants could give a correct explanation of the function of **blood**. Five urban participants and one suburban participant could not explain the function of the blood but four of these participants said that you will die if you don't have blood: "Sit with the bones"; "*doodgaan*" (dies); "Goes out", "Hurt, Die". It would seem that young children are unfamiliar with the complexity of the function of the blood, if not given adequate information about its workings.

#### Category 2 - Heart

Two suburban participants and one urban participant could give a correct explanation of the function of the **heart**. Four urban participants and one suburban participant gave a psychological explanation for the function of the heart: "He will sing with his heart... he will sing with Jesus...because God love him"; "*Om jou op te pas...om vir jou krag te gee*" (To look after you, to give you power); "So he can hear" / or incorrect biological explanation for the function of the heart: "It is blowing its heart"; "Heart for breathing"; "To love someone".

#### Category 3 - Brain

Two urban participants and the three suburban an participants could explain the function of the **brain** correctly. The function of the brain was associated with answers such as "Because the brain...he eat...the brain the message"; "*Dit laat jou dink*" (It makes you think); "You smell some cookies, then the brain says that it

is cookies". Three urban participants were unsure about the function of the brain, but one participant said that "he just wants to have the power". Two of these three urban participants, when asked by the researcher "What will happen if he did not have a brain?" answered "It will be sore...will not walk"; "Sick ...go to the doctor"; "No message". The other participant mentioned that "the brain will break" if he dies".

#### **Category 4 - Lungs**

All three suburban participants and two urban participants gave a correct explanation of the function of the **lungs**. Three urban participants gave an incorrect or unclear biological explanation for the function of the lungs: "Lungs to eat"; "To smoke"; "You must tell mommy, if you don't have the lungs ....".

#### **Category 5 - Stomach**

All three suburban participants and three urban participants associated the **stomach** with food and eating. Two urban participants gave an incorrect biological explanation for the stomach: "Stomach to blow"; "It is for babies"; "It is a shoulder".

#### **Category 6 - Bones**

An explanation of the function of the **bones** were answered with words such as "to work nicely"; "Will do things"; "Because he must be strong"; "You will feel cold" (when asked why do you have bones) and "You must not feel cold if you have the bones" (which could imply that bones may be associated with a skeleton).

#### **Category 7 - Non-vital organs**

All participants could explain the function of the **eyes, mouth, tongue, hand and feet** correctly.

##### *5.2.1.3 Theme 3*

Findings that show an understanding of internal (biological) causality of death for humans and animals - reference to biological reasons as the cause of death (e.g heart attack, brain died, could not breathe).

Examples of direct quotations:

Researcher: "*En hoekom dink jy gaan **mense** soms dood?*" (Why do you think people die?).

Participant: "*Hulle kry 'n hartaanval.*" (They get a heart attack).

Participant: "*Hulle is breindood.*" (They are brain dead).

Participant: "Something is going to happen to someone. And then after they are going to have a heart attack here."

Participant: "Michael Jackson died because he had a heart attack."

Participant: "*Want jy moet lug in jou lyf kry, anders gaan jy dood.*" (Because you have to get air into your body, otherwise you will die).

Researcher: "*En hoekom dink jy gaan **diertjies** (hond, padda, voeltjie, kat) dood?*" (Why do you think do animals die (dogs, frogs, birds, cat)?)

Participant: "*Want hy het 'n siekte.*" (He has an illness).

Participant: "*Hy het vrot water gedrink.*" (He drank dirty water).

**Category 1** - Findings that show that children explain the cause of death in humans as a result of **external causality** (e.g. gunshots, poison, ect.).

Examples of direct quotations:

Researcher: "And why do you think **people** sometimes die?"

Participant: "When they killed them with the gun ... they choke."

Participant: "They mustn't eat the poison."

Participant: "He was hit with the stone."

Participant: "They just take a gun and a stone and take a bullet, now you throw her and you shoot; then you take a bullet ... they die."

**Category 2** - Findings that show that children explain the cause of death for animals as a result of **external causality** (e.g. gunshots, poison ect.).

Examples of direct quotations:

Researcher: "Why do you think did the **animal** (dog, frog, bird, cat) die?"

Participant 1: " Because if he eat the glue, then he die."

Participant 2: "Because they kicked it."

Participant 3 " Because of some people doing guns, bullets."

**Category 3** - Findings that show that children explain the cause of death in humans and animals as a result of **psychological intention** (e.g. he died because his brother was angry with him or the "bogy man" let her die).

No answers that support this view were given by the participants.

It was found that all three participants (from the suburban preschool) and only one participant from the urban preschool could give an internal biological explanation for the cause of human and animal death. The rest of the urban participants from the urban schools gave external explanations in human and animals in graphic detail, for the cause of death. There was no indication that any of the participants used psychological intention as the cause of death.

### **5.2.2 Findings from the participant observation of organ location during the styrofoam model building activity.**

The participants were asked to place the cardboard cut out body organs onto the styrofoam model of a human and an animal (dog). Photographs were then taken of each child's construction of organ location. This activity gave the researcher an indication whether the child understood organ location. However, because organ location is presumably non-theoretical in nature, knowledge of organ location do not have any relation to the participants understanding of biological teleology. It mainly gave the researcher an idea to what extent teaching about body organs has been introduced to the participants and what knowledge they had of organ location.

**Category 1** - An explanation of human organ location (the brain, heart, blood, lungs, stomach, eyes, mouth, tongue, hands, feet, bones).

**Category 2** - An explanation of animal (dog) organ location (the brain, heart, blood, lungs, stomach, bones, eyes, mouth, ears).

Three suburban participants and two urban participants placed each organ correctly on the human and animal body model. Findings showed that it was unclear to three of the urban participants where the brain is located as they placed them on the torso of the body. Findings showed that two urban participants placed the lungs near the throat. The rest of the urban participants placed the lungs correctly on the upper part of the torso. The animal styrofoam model verified the results, as they correlated positively with the photos' of the human styrofoam model of each participant.

### 5.2.3 The projective 'dead frog' activity

This activity was used as verification of findings that explained children's knowledge of organ function, with reference to 'vitalistic causality'. Furthermore, it verified data supporting the viewpoint that children have a biological understanding of death as a biological phenomenon.

The following questions were put to six participants: (Two participants were excluded from this activity because of absence.)

Why do you think did the froggy die?

Can the froggy see, move, feel, hear when he is dead?

What happens to the froggy when he is put in the ground ... can he become alive again?

What happens to the heart, lungs, blood, brain when the froggy dies?

The direct answers from the semi-structured interview:

Table. 5.1

Participant	Cause of death	Finality of death	Function of organs



<b>Participant 1</b>	"Stone"	"Can't see; can hear; can move and jump; can feel, can come alive again; can get out of the ground."	"The heart is jumping; the heart, brain, blood is sore."
<b>Participant 2</b>	"Sitting in the sun... sun got in his eyes."	"Can't see, hear, move; Can't get out of the ground; if put back in the water, the froggy will not become alive again."	"The body stops; the tummy pains; the blood gets out; the heart stops; the brain stops; don't know what the lungs do; stops breathing."
<b>Participant 3</b>	"No more food and no more drinking."	"Can't feel, hear, move; he will jump, jump, jump and it doesn't more to run; it will bite you when it is dead; can't see when it is dead; he lie down so he does not want to sleep; when the frog is in the ground, it will not get out again because you close for it."	"The brain will be a small head; when the blood is here it means he must not drink it."
<b>Participant 4</b>	"People they kill it; you cut ... some people"	"He doesn't see at the back when there is people; not feel"	"The heart starts to go out ... it doesn't get more blood; the"

	cut them and then they cook it and after they let it to be meat."	anything; feel a little bit of pain ... because they hit him ... if they kill him and after they eat him, he doesn't feel anything; he doesn't do anything ... can't become alive again ... and the children and you put them in the sand they will not survive again; can't hear ... can't move; no, he just stay there."	blood goes out; worms come out when he dies; the brain, heart, lungs do not work ... huh-uh."
<b>Participant 5</b>	<i>Die water het vrot geraak</i>  "The water became dirty."	<i>Kan nie sien, hoor, spring, voel nie.</i>  "Can't see, hear, jump, feel."	<i>Hart hou op klop; longe bars, bloed loop uit; magie wil nie meer werk nie; brein hou op se vir ander deeltjies van sy lyfie wat om te doen.</i>  "Heart stops beating; lungs burst; blood runs out; stomach no longer works; brain stops telling the other parts of his body what to do."

Participant 6	<i>Siekte</i>  "Illness"	<i>Kan nie sien, hoor, spring en voel nie.</i>  Can't see, hear, jump and feel."	<i>Hartjie hou op klop...gaan staan, longetjies hou op werk, brein hou ook op, bloed stop.</i>  "Heart stops beating ... stands still; lungs stop working; brain stops working; blood stops."
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It appears that the suburban participants had a better understanding of the causality of death. Two suburban participants gave an internal explanation related to illness and disease ("*vrot water en siekte*" / dirty water and illness) when explaining cause of death. All urban participants gave an external explanation for the frog's death.

#### 5.2.4 A drawing of the inside of a human body

The participants were asked to make a drawing of the inside of a human or animal body. Only four urban participants and one suburban participant were asked to explain their drawings as a result of time constraints.

In the drawings done by four urban participants, the concept of "blood" featured prominently. Answers to open-ended questions about their drawings were: "They shoot the mouth." One urban participant drew blood running out of the stomach and said, "The blood goes out." A second urban participant, when explaining her drawing said, "that is the stomach with blood running out." A third urban participant drew a figure and said, "those are bones, blood and the heart inside. A fourth urban participant said, "the dead animal is walking and someone shot her." She also drew a human figure and drew the blood, the heart, the breast and the lungs. Two of the urban participants drew

their figures lying down. Only one suburban participant made a drawing (a dead frog) and said that it died because it drank "vrot (dirty) water".

### **5.2.5 Findings from the questionnaire on educational setting. completed by the teachers**

The following questions were put in a questionnaire for the teachers to answer. The researcher was interested to investigate the viewpoint of the teachers about a death education curriculum in preschool. Furthermore, she wanted to know in what way the theme of 'My body' had been introduced to the preschool participant.

#### *5.2.5.1 Question 1*

#### **Has the theme of 'My Body' been introduced to the children?**

Answer from the urban school:

"The theme 'My Body' consists mainly about body parts that can be outwardly seen by the child. This includes big body parts like arms, legs, and the head. Smaller body parts are also discussed like fingers, toes and facial parts. Then we discuss the finer detailed parts. The function of these body parts are discussed as well as the personal hygiene of the body."

Answer from the suburban school:

"The theme of my body has been introduced to the children. The outside of the body is dealt with in detail with some reference to the inside of the body."

#### *5.2.5.2 Question 2*

#### **Has the topic of "death" been talked about in the educational setting?**

Answer from the urban school:

"The topic is not discussed as a theme but will be discussed in play therapy sessions, when deemed necessary."

Answer from the suburban school:

"There are children in our school who have lost a parent. Children are then encouraged to support their friends, but the topic of death is not dealt with in great detail in educational context. It is discussed with the bereaved child in a therapeutical context."

#### 5.2.5.3 Question 3

**Your views about death education being included as part of the curriculum?**

Answer from the urban school:

"Death education is a very relevant topic in the educational set-up due to the increasing impact of HIV/Aids is having on the child. There is definitely a need to implement an age-appropriate and developmentally appropriate education program in the preschool."

Answer from the suburban school:

"Many children do encounter the death of someone close to them as a result of crime or illness. It is important that it is discussed with children. Parents and educators often don't know what to tell children. It would be helpful if they are assisted to do so in an appropriate manner."

### 5.3 SUMMARY OF FIELD NOTES

The researcher noted down some field notes after her semi-structured interviews about some aspects of her research.

#### 5.3.1 Entering the field

The principals of both schools and the teachers of the participants were friendly, cooperative and supportive. They completed the questionnaires of

background information on the child participants and educational setting in time and gave all relevant parents the letters of consent, which were returned prior to the research. The activities were done in a bright, uncluttered room at the urban school and in a classroom and the doll's house of the suburban school. There was a bit of noise coming from the outside playground at the suburban school, but it did not seem to distract the participants. The doll's house was used because the classroom was occupied by children as a result of the rain. The participants seemed comfortable and at ease in all the venues.

### **5.3.2 Semi-structured interviews and styrofoam modelling activity done on an individual basis.**

The participants were actively involved in the semi-structured interviews and model building activity. However, the attention span of some of the urban participants seemed shorter than that of the suburban participants. The suburban participants gave more additional information than the urban participants when answering the semi-structured questions. Two of the urban participants were more verbally fluent than their urban peers in expressing themselves. The urban children were very trusting of the researcher and did not hesitate to take part in the activities.

### **5.3.3 Projective 'dead frog' activity.**

The participants of both urban and suburban preschools were curious about the dead frog. Two of the participants touched the plastic bag in which the frog was kept. One participant said: "*dit is grillerig*" (it is 'yucky' to touch the frog) and one said "*dit voel nie baie lekker om die dooie padda te sien nie.*" (it does not feel nice to see the dead frog.) This activity was done on an individual basis.

### **5.3.4 A drawing of the inside of the human body.**

The children were given charcoal and a large piece of paper onto which to do their drawings. They did not spend too much time on this activity as it was

done in a group after the semi-structured questionnaire and model building activities. It may be that by that time they were tired. The researcher asked each participant individually open-ended questions about their drawings.

Note: See Appendix 4-6 for semi-structured interviews and questionnaires.

#### **5.4 SUMMARY OF FINDINGS**

It would seem that education and access to information influence the understanding of the function and location of internal body organs. The less information a child has the more they misunderstand the function of the internal body organs such as the blood, heart, brain, lungs and stomach. The usage of the semi-structured interview about animal (dog) organ function and the animal styrofoam model was used as verification of data. If participants said the same about human organs it would imply that they would say the same about animal organs and vice versa. This was indeed the finding.

Furthermore, the direct quotations of all the participants about the 'vitalistic causality' of organ function show that young children do indeed understand that some body organs maintain life and that the breakdown of these organs will lead to death. These findings imply that young children in the preschool years have acquired a naive theory of biology through which they explain organ function. These findings further imply that education, cultural environment and socio-economic factors are variables in children's understanding of a naive theory of biology. The findings of the drawings imply that the urban participants may have had greater visual exposure to violence and may have seen a dead person. The answers given by the teachers on a death education curriculum highlight the need for guidance in how to talk to children about death.

### **CHAPTER 6**

#### **RECOMMENDATIONS AND LIMITATIONS OF THE STUDY**

## 6.1 INTRODUCTION

The researcher began her social research process by identifying and formulating a researchable problem. She then drafted a research proposal, selected a paradigm and reviewed previous literature about the topics under investigation. She selected her research strategies, methods of data collection, chose her research site and participant samples, collected data through participant observation and tape-recorded semi-structured interviews and questionnaires, and analysed her data. The conclusions, recommendations and limitations to the study is dealt with in this chapter.

This research project concluded that investigating the naive theory of biology of preschoolers adds substantial value to research regarding young children's understanding of the concept of death. The study addressed the question: "What naive theory of biology do preschoolers (5 and 6) have of organ function and how do they use this theory to explain the cause of death?" Do they understand 'life' as a biological goal in explaining organ function? In order to find answers to these questions, the researcher formulated subquestions (see Chapter 1.4.1) which guided her qualitative research.

Chapter 2 investigated children's conceptualisation, and acquisition of a naive theory of biology. Chapter 3 provided an explanation of the theoretical concepts and perspectives related to a young child's understanding of the subconcept 'causality' of death. Chapter 4 outlined the qualitative research design and Chapter 5 presented the data analysis and the findings of the empirical investigation. This final chapter summarises and interprets the findings, evaluates the research process, discusses limitations of the study and makes recommendations for further research.

## 6.2 SUMMARY OF FINDINGS

### 6.2.1 Literature review



The starting point of this research study was to review in literature young children's conceptual concepts of learning and naive knowledge theories, with special emphasis on the naive theory of biology. Furthermore, a literature review was done concerning young children's understanding of the concept of death from various perspectives. The following subsections summarise the findings:

#### *6.2.1.1 A naive theory of biology*

The literature review of a naive theory of biology (Chapter 2) was guided by the research subquestions:

- What constitutes a naive theory of biology?
- What do preschoolers (five and six years) say are the functions (essences) and locations of different parts of body organs in humans and animals (e.g. blood, brain, heart, lungs, stomach, bones, eyes, mouth, tongue, hands and feet)?
- Can preschoolers (five and six years) give an explanation of a life force ('vitalistic causality') to some of the organs?
- What is implied by the subconcept, causality of death?
- Do preschoolers (five and six years) explain that the cause of death is internal (e.g. disease, illness) or external ( e.g. guns, poison, stones)?
- Do preschoolers (five and six years) explain that people die because of psychological intension (e.g. being bad, thinking bad thoughts ect.)?
- In what way does environment and education influence the acquisition of a child's naive theory of biology?
- What are the viewpoints of educators about the implementation of a death education curriculum in preschool?

i. What constitutes a naive theory of biology?

The naive theory of biology concerns core (basic) knowledge about plants and animals and their characteristics and includes core knowledge about categories of

living things, and higher level concepts, such as inheritance and illness. Such core knowledge within a domain (e.g. biology) comprises fundamental implicit and possible innate principals seen to be evident in young children (Binnie & Williams 2002: 344). A naive theory of biology must have at least two demonstrable components: (a) the living-nonliving and mind-body distinctions and (b) a set of causal devices (internal mechanisms enabling causal reasoning) for biological phenomena (Inagaki & Hatano 2006: 177). The literature study has shown that there is a general consensus, in recent decades, that children as young as five years possess a theory-like knowledge system that can be called a naive theory of biology, which involves a set of causal devices enabling children to make predictions and give explanations for biological phenomena (see 2.7). It is therefore hypothesised that preschoolers can explain that vital organs have a life force ('vitalistic causality') that keeps the body alive, and that the cessation of such organs lead to death. Death is then understood as a biological phenomenon (Slaughter 2005: 185). Taking this viewpoint, findings from the empirical investigation have shown that preschoolers (five and six years) explain that when vital organs stop working, a human or animal will die (See 5.2.1).

ii. What do preschoolers say are the functions (essences) and locations of different body organs in humans and in animals and do they ascribe a life-force ('vitalistic causality') to some organs?

Knowledge about organ function, organ location and reference to vitalistic causality were investigated and presented in the literature review to illustrate that preschoolers' biological knowledge may have been underestimated. The core theoretical assumption of Piaget's theory is that children are active thinkers and that they are constantly trying to construct more advanced understandings of the world around them (See 2.3.2.2). Children, as noted by Gordon and Browne (2004: 463) use basic skills or knowledge transcurricular. This implies that if they can understand that certain organs maintain life, they can understand that the breakdown of such organs, will ultimately lead to death. Furthermore, the empirical research has shown that children's knowledge has dynamic consequences. A child who has accurate knowledge about organ location and organ function is able to reason accurately about other biological phenomena. The preschool participants showed skills of knowledge that Piaget referred to as skills of inquiry, adaptation and equilibrium. They were able to assimilate the information that the research activities required and incorporate them

into their existing cognitive structures. They then changed their cognitive structures to include the new information of each research activity. It appeared that they were constantly striving to integrate new research experiences with pre-existing experiences to answer the semi-structured interviews and do the research projects. The researcher agrees with Piaget that children are young scientists who can think scientifically when trying to solve problems.

Recent biological perspective research has indicated that between ages two and five children's knowledge about their own and others' mental processes advances dramatically (See 2.5). This implies that young children's understanding of familiar events in the physical world enables them to reason logically about cause and effect (Gopnik et al 2001:621). The empirical investigation supports the claim that preschoolers show more advanced biological reasoning about biological phenomena than was argued by Piaget. The literature review found that preschoolers use teleological/functional reasoning when they explain biological phenomena (Jaakkola & Slaughter 2002: 337). This was found to be the case during the empirical investigation. Jaakkola and Slaughter (2002:325) claim that between four and eight years children's factual knowledge of organ function and organ location increases at the same rate across age span.

Researchers from a biological perspective found that between four and six years of age there was a dramatic increase in appeals to the goal of 'life' of organ function. Children further tended to make life-appeals to only vital organs which showed a differentiation in their understanding of organ function (Hatano & Inagaki 1994: 178; Jaakkola & Slaughter 2002: 325 and Slaughter 2005: 183). This literature review emphasises that many researchers of cognitive development have come to adopt the idea that children acquire knowledge through domain-specific rather than domain-general processes as was concluded by Piaget (See 2.3.2.3). The empirical investigation has shown that children reason about biological phenomena using domain-specific rather than domain-general processes. This implies that children build skeletal mental models of biological phenomena that they encounter in their natural environment through observations and learning, and then use these models to explain organ function and organ location. Furthermore, their explanation of the cause of death is influenced by their skeletal models of biological phenomena (See 5.2.1.3)

iii. Do preschoolers explain that the cause of death is internal, external or psychological?

The literature review, documenting how young children understand death, has spanned the psychoanalytic (Chapter 3.4.1), the Piagetian (Chapter 3.4.2) and the intuitive theory research traditions (Chapter 3.4.3). Recent studies that have investigated the progression of the subcomponents of death have found that, only in the early school years, do children conceptualise death as characterised by bodily processes that have ceased to function. The final subcomponent of the concept of death to be acquired, is causality (See 3.5).

Furthermore, several researchers have argued that understanding the specific causal mechanisms that result in the ultimate cessation of bodily function leading to death, is the most inclusive and complex subcomponent, and so is the last to be mastered (Slaughter & Griffiths 2007: 527). Studies from an intuitive theory tradition have claimed that preschoolers' 'life' theory of the body results in a change in their understanding of death as a behaviour to an initial understanding of death as a biological phenomenon, governed by biological principals (See 3.4.3). The researcher asked the question whether preschoolers, who have acquired a core knowledge of biology, explained death as a psychological phenomenon, or whether they gave an internal or external explanation for the cause of death. Findings showed that those participants who were not highly knowledgeable about organ function, gave an external explanation for the cause of death. Those who had prior knowledge about organ function were able to give an internal explanation for the cause of death.

These findings contrast Piaget viewpoint that children's thinking develops according to sequential fixed stages and that preschoolers reason by transduction. This would imply that preschoolers ascribe a psychological reason for the cause of death. The empirical investigation showed no evidence of a naive theory of psychology in explaining the cause of death (See 5.2.1.3).

iv. In what way do environment and education influence the acquisition of a child's naive theory of biology? What are the viewpoints of educators about the implementation of the topic 'death' as part of the life-skills curriculum?

Vygotsky claimed that education and environment influence children's learning (See 3.3.3). Vygotsky's concept of a zone of proximal development (ZPD) is of great value to educators. This concept implies that social interaction and cognitive growth is a collaborative process. The researcher claims that preschoolers who are interactively taught about the outside and insides of their bodies can develop in their core knowledge of biology, and reach a mature understanding that certain organs in the body function to maintain life. She further believes that if children are given concrete and unambiguous information about the biology of death, they can reach a mature understanding of death. The impact of developing a child's core knowledge of the biology of the human body is profound for both parents, educators and children. Knowing what to tell children about their bodies and the causality of death can alleviate much misunderstandings and apprehension surrounding such biological phenomena.

Furthermore, the researcher was interested to investigate the viewpoint of educators concerning the topic of death education. In a study done by Pratt and Hare (2001: 279) it was found that early childhood educators accepted that preschoolers are curious about death but that teachers were not entirely comfortable to deal with the subject of death with young children. Findings from the literature review considered death education for preschoolers to be important (See 3.6). However, most did not feel prepared to discuss death as a formal part of the curriculum or when it arose naturally.

### **6.2.2 Evaluating the research design.**

The second objective of this qualitative study was to explore, with a group of eight preschool participants and four adult participants, purposively chosen, what core knowledge of biology they have acquired, and how they used this knowledge to explain the cause of death. The empirical investigation was done over a period of three weeks using the method of triangulation: Individual semi-structured interviews, a model-building activity, projective technique, a drawing and a questionnaire were used (See 4.4). Triangulation assured validity and reliability (See 4.4.4). Data was analysed according to thematic analysis. After establishing a rapport with the preschool participants (five and six years) the researcher was interested in discovering what they knew and said about organ function, organ location and the

cause of death. She did this through the semi-structured interview, the styrofoam model building activity, the participant's drawing of the inside of the human body and the projective 'dead frog' technique. All child participants were eager to take part in the activities and interacted well with the researcher. The researcher was very mindful of the emotional wellbeing of her participants throughout the investigation (see 4.4.5) All the parents of the participants gave their consent prior to the empirical investigation (See 4.4.5.1) Educators were asked about their views on a death education curriculum at preschool level. This was done using a questionnaire. At the end of the empirical investigation the researcher took all her data, analysed it and wrote down her findings, recommendations for further research and conclusions (See 4.4.5.7)

### **6.2.3 Interpreting the empirical research.**

Conclusions about findings of the empirical research are briefly summarised below:

#### *6.2.3.1 Do preschoolers give an explanation of a life force ('vitalistic causality') to some organ function?*

Findings from the empirical research showed that all preschool participants could give correct explanations for the function of the eyes, mouth, tongue, hands and feet, but did not give them a 'life agency'. The responses of the preschool participants regarding life-appeals to certain body organs were seen in words such as "break, not alive, stops working, stops, dies, death, burst, down ... down ... down, live, life, dead (See 5.2.1.1). To argue that children are using a life theory as a general biological goal, they had to actively make direct life appeals to different body parts. This was found to be the case with most of the explanations for the vital organs. Most of the participants made appeals to 'life' in the following organs: heart, brain, blood, stomach, lungs. Teleological reasoning, with respect to the goal of life, was intertwined with their knowledge of organ function.

This research project concludes that the preschool participants (five and six years) showed an understanding of biology separate from their understanding of psychology, and that the quality of their understanding is related to prior teaching about organ function. Furthermore, the participants could conceive that certain body

functions maintain life, which implied a 'vitalistic causality'. They could conceive that the body is a 'life machine' and could recognise that any major malfunction of some organs in the body will result in the cessation of life - that is death. It seems that as their understanding of the body, as a biological goal to maintain life develops, they begin to conceptualise that death is a biological phenomenon. As Slaughter (2002: 183) states "thus the acquisition of the biological causal-explanatory notion of life was linked to a relatively mature, biological understanding of death". Children who reasoned about the body in terms of psychological intention showed relatively immature understanding of death in contrast to children who had acquired a naive biological 'life' theory of the body.

Knowledge about organ location seemed to be linked to the teaching of organ function. All the preschool participants from the suburban school gave correct explanations of organ location for all organs. This seems to be the result of prior teaching about body organs. Hatano and Inagaki (1994: 337) concluded that the initial acquisition of the concept of life as a biological goal is closely related to increases in children's factual knowledge of specific organ function. In contrast, because organ location is presumably non-theoretical in nature, it was not expected that children's knowledge of organ location is related to their understanding of organ function. The findings during the empirical investigation suggested otherwise. The more participants understood organ function the more accurately they understood organ location. However, it was not found that correct understanding of organ location showed biological knowledge of organ function.

#### *6.2.3.2 What reasons do preschoolers give for the cause of death?*

With the exception of three preschool participants, the rest mentioned that external events cause death (e.g. gun shots, poison, stones). The remaining three preschoolers who showed a clear understanding of teleological reasoning with respect to the goal of life, explained that a person dies because of the cessation of one or more vital organ (See Chapter 5.2.2.3). This view is supported by Inagaki and Hatano (See 2.7) who concluded that when children, who are 'life theorists', are asked to choose between either an intentional, vitalistic or psychological causal explanation for bodily phenomenon, they preferred vitalistic explanations.

### 6.2.3.3 *In what way do environment and education influence the acquisition of a child's naive theory of biology?*

Slaughter (2005:184) mentions that recent cognitive developmental research generates more specific guidelines for talking about death with children and acknowledge the importance of children's underlying naive theory (or lack of it) to their capacity to conceptualise death. She points out that a child who believes that the heart is for loving cannot understand that someone has died, because his heart stopped. Slaughter furthermore mentions that children can adopt a biological understanding of death if they are given an opportunity to learn relevant biological notions that focuses on vital organs that maintain life. The researcher discovered during her empirical investigation that participants who thought of the heart in terms of a framework of naive psychology, could not understand that death involved the cessation of bodily functions.

Vygotsky argues that the way in which children express what they think reflects both their cultural knowledge, their environment and their minds (See 3.3.3). During this research study it was found that children who had been taught about the function of body organs in greater detail, had a better understanding that the breakdown of vital organs lead to death. Children who had less teaching confused certain vital organs with having behavioural functions (e.g. "the heart is for loving"). It seems that when children do not have enough knowledge of a animate object, they use personification or person analogy in a constrained way. However, they do not use this knowledge to all organs indiscriminately.

These findings could imply that there is a cultural difference in talking to children about body function. The findings can also conclude that a lack of knowledge by parents or educators, regarding the biology of the body, influences the amount of knowledge children have about organs. Such findings emphasises the importance of teaching age appropriate biology of the body to preschool children. In this way they will begin to understand that certain organs have a "life agency" and that the cessation of such organ functioning ultimately lead to death. Furthermore, participants who had limited knowledge about organ function were inclined to give an external explanation (e.g. guns, poison, sticks) for the cause of death. The participants from the urban research setting gave greater detailed graphic



representation of violent death than participants from the suburban settings. This could mean that they are more exposed to violence than participants from the suburban environments.

#### *6.2.3.4 What are the viewpoints of educators about the implementation of the topic 'death' as part of the life-skills curriculum?*

The questionnaires completed by the educators suggested a need for guidance on how to explain the concept of death to children. Educators further emphasised the fact that young children ask questions about their bodies and death. These viewpoints are confirmed by the investigation of Pratt and Hare (2001: 285) who supports the need to include a component of death education in teacher preparation programs.

The influences of environmental, educational and socio-economic advantage were considered to have a significant impact on the acquisition of a naive theory of biology. Participants who had received prior teaching about the body, who were more exposed to books, the media or communication with their caregivers showed a better understanding of organ function. Participants who were deprived of such input seemed to have less knowledge and showed some misunderstandings about organ function and organ location. This research study concludes that teaching enhances a naive theory of biology.

Whether naive biology gradually emerges out of naive psychology or is a distinct theory from the start is still debatable. It could be that young children acquire vitalistic biology through every day experiences such as somatosensation (Hatano & Inagaki 1994: 181). When children acquire an autonomous domain of biology is still an open question which calls for further research.

### **6.3 RECOMMENDATIONS**

The research indicated that the conceptualisation of a naive theory of biology can lead to the development of a mature understanding of death. Talking about death is both highly emotional and cognitively complex. Recent cognitive developmental researchers suggest that children's underlying naive theory of biology should be acknowledged, in talking to children about death. This may serve to alleviate some of the emotional impact of losing a loved one (Slaughter 2005: 184). Inagaki and Hatano (2006: 179) emphasise that studies of naive biology provide science educators with empirical bases for formulating instruction.

The researcher makes the following recommendations:

- Include the topic of death as part of the content of the life-skills curriculum.
- Explain the concept 'death' in terms of a biological phenomenon in the life-skills curriculum.
- Explain misunderstanding surrounding the concept 'death' in the life-skills curriculum, keeping cultural diversity into account.
- Equip educators through workshops, dealing with death and bereavement, with the necessary information on how to talk to children about death and its effects. Take time to provide teachers with detailed explanations that introduce or incorporate biological knowledge about the life-cycle of all living things and body function.
- Write a series of children's books on the topic of organ function and organ location.
- Include in the content of the theme 'My Body', information on the 'inside of my body'. (Empirical evidence has shown that preschool children are mostly taught about the outside of their bodies)
- Provide holistic training to preschool teachers on the theme 'My body'.

#### 6.4 LIMITATIONS

This qualitative research was non-standardised and did not attempt to generalise. The main aim was to gain an in-depth understanding of the perspectives of a small sample of participants. (See 4.4.3) The technique of snowball sampling could also have been used, but the researcher decided against it as a result of time and cultural constraints. Language limitations at mostly urban schools would make it difficult to collect information from other samples. However, if the researcher had more time

she could have investigated children knowledge from those schools by working through an interpreter. Doing research with young participants also has its challenges as it is prone to misunderstandings and research fatigue. Furthermore research bias and subjectivity could have influenced the research process. The researcher used the input of a play therapist to check for validity and reliability. Finally, the topic of death is charged with emotion and the researcher had to take utmost care not to harm the children psychologically in any way. Bereaved children were not included in the research study. This could pose future challenges for researchers wanting to investigate bereaved children's naive biological theory. This reality could limit research possibilities.

## 6.5 FUTURE RESEARCH

Future research could focus on the following issues:

- How naive biology theory emerges, develops and changes in various cultural and socio-economic environments? More studies need to be done in the contexts of developing countries/
- How children infected with HIV/AIDS understand the disease from a naive biology theory perspective?
- How young children who have had a personal death related experience and who have been given prior teaching on biology differ in their conceptualisation of death from children who have had none such prior teaching?
- The processes by which a child's naive biology evolves into an adult theory of biology
- Research of older participants theory of biology (which is more adult-like), and how they use this theory to understand sexuality, illness and the concept 'death'.
- Research into young children's understanding of the sub-concept causality and non-corporeal continuation after death.

## 6.6 FINAL COMMENTS

Death as a topic of discussion can no longer be ignored in society. In South Africa millions of children have death related experiences as a result of HIV/AIDS. The stigma, secrecy and lack of information given to young children exasperates children's misunderstandings of the concept of death. Furthermore, the lack of teaching about biological phenomena makes children fall back on their earlier-developing naive psychological theory, and make them interpret what they understand of death in terms of their knowledge about human behaviour. It has become imperative that more research is done on the way in which children understand biological phenomena such as sexuality, illness and death - especially in a South African context. This research project has endeavoured to investigate the preschool child's knowledge of organ function and to find out if they explain biological phenomena from a 'life goal' perspective. This was found to be the case and creates challenging areas for further research. Furthermore, education needs to advance a child's naive theory of biology so that other biological phenomena can be explained biologically.

Recently, the researcher experienced the gratitude of a preschool teacher who attended a planning session on the theme 'My Body' presented by the researcher. The teacher introduced the theme of the 'Inside of my body' to her preschool class. She commented that she herself have never before thought much about the insides of her own body, and the function and location of her organs. After having received information about this theme, she was able to present it to her class. The feedback was that the children seemed most interested in the topic under discussion. The teacher commented that it was very interesting to learn and teach about this topic of biology. Such comment can serve as an encouragement to researchers to further investigate young children's naive theory of biology and conceptualisation of the sub-concept , causality of death.

## **APPENDIX 1**

## LETTER TO PARENTS

Box 1332  
Groenkloof 0027

Dear Parent(s)

### RE: A PSYCHOLOGY OF EDUCATION RESEARCH STUDY

I am currently busy with my Masters Degree in the Psychology of Education. I must do research at a preschool for my empirical study. My topic under investigation is as follows:

**To investigate the knowledge that young children (ages 5 to 6) may have of human and animal organ location and -function, and how they explain the cause of death in humans and animals.**

I need eight children as participants for my research study. The children will be nominated by their teacher. I need permission to use your child in my research study. At the bottom of this letter is an agreement of consent. Please complete it and return it back to the school before.....

The research method will be as follows:

- A semi-structured interview with your child about human and animal organ location and organ function. Example of question: Can you tell me where is your heart in your body and what does it do?
- An activity using a model of a human and animal body outline on which the child must place the different organs (e.g. heart, lungs, stomach, brain, veins, bones, eyes, mouth, tongue, hands, feet = humans / heart, lungs, stomach, brain, ears, bones, veins, mouth, eyes = animal (dog)
- A drawing of "dead".

- A projective activity in which a dead frog will be used to encourage the children to talk about the reasons why they think the frog has died.

All individual interview sessions with your child will be tape recorded after having gained permission by you as parent. Photographs will be taken of children's model construction of the organs, but NO photograph will be taken of your child. This is against the ethical rules of the research study.

Anonymity, confidentiality and privacy is promised and assured at all times. No child will be forced to take part in the study and all sessions will be informal, playful and relaxed. Your child will be asked about his/her feelings and experience of the activities and you will receive feedback on all participation that your child took part in. Research will take place over a period of four weeks.

Please contact me if you have any further enquiries or questions. I would be happy to answer them.

Thank you in advance

Sincerely

Milandre Vlok  
083 26 35835  
012 361 2701

## **APPENDIX 2**

## **AGREEMENT OF CONSENT**

I GIVE/ DO NOT GIVE MY CONSENT THAT MY CHILD (Please cross out non-relevance)

-----MAY PARTICIPATE IN THIS RESEARCH STUDY. I UNDERSTAND THAT ALL INFORMATION WILL BE TREATED CONFIDENTIALLY AND ONLY BE USED FOR THIS RESEARCH STUDY. I FURTHER UNDERSTAND THAT MY CHILD'S ANONYMITY WILL BE ASSURED AT ALL TIMES.

DATE.....

SIGNATURE.....

## **APPENDIX 3**

## TEACHER INFORMATION ON THE CHILD PARTICIPANT

EDUCATIONAL SETTING (e.g. playgroup, pre-school, school)

AGE OF CHILD

LANGUAGE (e.g. vocabulary, articulation, ability to express ideas, understanding of spoken language)

MOTOR (Fine motor)

MOTOR (Gross motor)

TASK APPROACH (e.g. attention, flexibility, effort)



SOCIAL-EMOTIONAL (e.g. mood, affect, expression of feelings)

GENERAL IMPRESSION OF CHILD

CHILD'S EXPERIENCE WITH DEATH AT THE EDUCATIONAL SETTING  
(e.g. themes, stories, a dead animal at school, news from home)

Date completed

THANK YOU

**APPENDIX 4**

## TEACHER INFORMATION ON EDUCATIONAL CONTEXT

EDUCATIONAL SETTING (e.g. playgroup, pre-school, school)

HAS THE THEME "MY BODY" BEEN INTRODUCED TO THE CHILDREN? Briefly comment on the content of the theme.

HAS THE TOPIC OF "DEATH" BEEN TALKED ABOUT IN THE EDUCATIONAL SETTING? Briefly comment on the way it was presented.

GENERAL COMMENT BY THE TEACHER ON HER VIEWS ABOUT DEATH

EDUCATION BEING INCLUDED AS PART OF THE CURRICULUM.

Date completed

EXAMINERS NAME

THANK YOU!

EXAMINERS NAME

DATE

**APPENDIX 5**

## **SEMI-STRUCTURED INTERVIEW ON LOCATION AND FUNCTIONALITY OF ORGANS IN A HUMAN AND AN ANIMAL BODY**

- Where is X?
- What is X for?
- What would happen if someone didn't have X?
- Why do we eat food?
- What happens to the food that we eat?
- Why do we breathe air?
- What happens to the air that we breathe?

## APPENDIX 6

### **SEMI-STRUCTURED INTERVIEW ON UNDERSTANDING CAUSALITY OF DEATH**

#### **CHILD'S CONCEPTS RELATED TO HUMAN DEATH?**

1. Of what do people die? Of what other reasons can people die?

Why?

2. Can a dead person see? Why?

3. Can a dead person hear? Why?

4. Can a dead person move? Why?

5.. Can a dead person feel? Why?

#### **CHILD'S CONCEPTS RELATED TO ANIMAL DEATH?**

6. Have you ever seen a dead cat or dog?

7. Of what do cats and dogs die? Of what other reasons can dogs die? If a child's answer to question 6 is that he has see a dead bird, for instance include birds in question 7)

8. What do we do with dead dogs and cats?

9. Does a dead dog know that he is dead? Why?

10. Does a dead dog or a dead cat feel anything? Can he feel pain? Why?

11. If a dog dies and is put in the ground, can he become a live dog again. Why?

12. Can a dead dog see? Why?

13. Can a dead dog hear? Why?

14. Can a dead dog move? Why?

15. Can a dead dog get out of wherever he is put? Why?

**APPENDIX 7**

**A MODEL FOR DATA COLLECTION OF PARTICIPANTS' KNOWLEDGE OF  
ORGAN FUNCTION, ORGAN LOCATION, 'VITALISTIC CAUSALITY' AND  
CAUSALITY OF DEATH**

PARTICIPANT	Life	Non-life	Function	Internal	External			
HUMAN								
Blood								
Bones								
Heart								
Stomach								
Lungs								
Brain								
Eyes								
Tongue								
Mouth								
Hands								
Feet								
ANIMAL								
Blood								
Bones								
Heart								
Stomach								
Lungs								
Feel								
Move								
See								

Photo's:

HUMAN	Correct	Brain	Lungs
ANIMAL	Correct	Brain	Lungs

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