UNIVERSITY OF THE WESTERN CAPE

Faculty of Community and Health Sciences

RESEARCH THESIS

Title: Exploring the subjective experience and the psychosocial interventions mothers utilise in managing a child presenting with Developmental Coordination Disorder (DCD)/Dyspraxia.

Student name: Lorenza Ganci

Student number: 3416804

Type of thesis: Full Master’s thesis

Degree: MA Child and Family Studies

Department: Social Work

Supervisor: Dr Athena Pedro

Date: November 2016

ABSTRACT

Background: Developmental Coordination Disorder, often also referred to as Dyspraxia, can be described as a marked impairment in the development of motor coordination affecting daily activities, in the absence of neurological or intellectual dysfunction. Developmental Coordination Disorder is prevalent among 5 to 6% of the population of 5 to 11-year-old children. Primary studies report on psychosocial interventions for children presenting with DCD/Dyspraxia, however there is limited research available.

Aim: The current study consisted of two phases: a systematic review (Phase 1) and a qualitative research study (Phase 2). The aim of the review was to systematically review previous research regarding psychosocial intervention strategies utilised with children presenting with Dyspraxia. This information was used to inform our understanding for the qualitative study (Phase 2) in terms of how parents manage this disorder in the home environment. The aim of this qualitative research study was to explore the subjective experience of mothers who have children presenting with Developmental Coordination Disorder/Dyspraxia and the psychosocial interventions they use to manage the disorder in their home.

Method: Phase 1 of the study consisted of a systematic review that report on psychosocial interventions used for children presenting with Developmental Coordination Disorder/Dyspraxia. Meta-synthesis of included texts was conducted incorporating it with the RE-AIM framework. Phase 2 of the study took on a qualitative approach. Data for the current study was collected by means of three focus groups.

Findings: The aims and objectives for both phases of the present study were obtained. The findings in the studies provide a base of effective interventions that can be used within the home environment for children presenting with Developmental Coordination Disorder. The subjective experience of mothers who have children presenting with Developmental

Coordination Disorder/Dyspraxia included the following: *typical daily life, diagnosis related, required support,* and *interventions.*

KEYWORDS

Developmental Coordination Disorder

Dyspraxia

Psychosocial interventions

Treatment

Home environment

Mothers

Support

Bronfenbrenner

Socio-ecological theory

Qualitative study

ACKNOWLEDGEMENT

During the stages of planning, data collection, data analyses, and the writing-up of this research study, many people provided help and guidance. I would like to take this opportunity to thank the people that have played a significant role in helping me complete my research. I sincerely thank the following people:

- Firstly – thank you God Almighty for blessing me with the opportunity, patience, strength and the capability to achieve my goal.
- Dr Athena Pedro – thank you for your patience, inspiration, encouragement, and supervision throughout this journey, I am grateful for it. Thank you for assisting me tirelessly throughout the process.
- Prof Nicolette Roman – thank you for aiding me and teaching me everything I still needed to know about research and for assisting me.
- Research participants – thank you for your willingness and consent to participate in my study without which my research was not possible.
- Thato Omphemetse Monei - it has been such a pleasure working alongside you throughout this journey. Thank you for being a good colleague to consult and assist me. Thank you for your support.
- My sponsors (Toni and Tracey Ganci): thank you for making it financially possible to further my education as well as the emotional support.
- I would also like to thank my friends and family for their support and encouragement, and providing me with the opportunity to acquire a post-graduate education.

DECLARATION

I hereby confirm that the present thesis, *Exploring the subjective experience and the psychosocial interventions mothers utilise in managing a child presenting with Developmental Coordination Disorder (DCD)/Dyspraxia* is solely my own work. It has not been submitted before any degree or examination in any university and if any text passages or diagrams from books, papers, the Web or other sources have been copied or in any other way used, all references – including those found in electronic media – have been acknowledged and fully cited in the American Psychological Association (APA) referencing style.

____

Researcher: Lorenza Ganci

November 2016

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

- ADHD: Attention Deficit Hyperactivity Disorder
- ASD: Autism Spectrum Disorder
- BOTMP: Bruininks-Oseretsky Test of Motor-Proficiency
- CAS: Childhood Apraxia of Speech
- CP: Cerebral Palsy
- DAS: Developmental Apraxia of Speech
- DCD: Developmental Coordination Disorder
- DSM-V: Diagnostic and Statistical Manual of Mental Disorders Fifth Edition
- DVD: Developmental Verbal Dyspraxia
- M-ABC: Movement Assessment Battery of Children
- OT: Occupational Therapy
- PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses
- PT: Physiotherapy
- RE-AIM: Reach, Effectiveness, Adoption, Implementation, Maintenance
- UWC: The University of Western Cape

CHAPTER 1: INTRODUCTION

1.1 Background

Developmental Coordination Disorder (DCD)/Dyspraxia may be described as a complex presentation of motor and sensory impairments in children which may lead to momentous constraints and participations in daily instrumental activities (Hillier, 2007). Therefore, DCD is characterised by marked motor impairment, in the absence of intellectual or neurological dysfunction (Archibald & Alloway, 2008). Children with DCD struggle especially in environments of "learning through doing", due to the coordination difficulties impacting their physical, social and academic development (Stansell, 2007).

The Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-V) provide the following requirements for a formal diagnosis of DCD (American Psychiatric Association, 2013): firstly, difficulties in coordinated motor skills that are significantly below what is expected of one's chronological age. Such difficulties manifest as clumsiness, slowness and inaccuracy in performing motor tasks. The second criteria states that the deficit in motor skills substantially and persistently impedes with daily activities and impacts on academic/school productivity, prevocational and vocational activities, leisure and play (American Psychiatric Association, 2013). The third criterion requires the onset of symptoms within the early period of development. Lastly, the deficits in motor skills are not attributable by intellectual disability or visual impairment and are not due to a neurological condition affecting movement (American Psychiatric Association, 2013).

It has been reported that there is between 6 and 13% prevalence rate among school aged children, with boys having a higher incidence rate than girls (Hillier, 2007). More recent statistics yield that the onset is in early childhood with a prevalence of 5 to 6% in children aged 5 to 11 years, as cited in the DSM-V (American Psychiatric Association, 2013). DCD is likely to persist into adolescence in 50% of cases where intervention is absent (van Staden, 2013).

It is imperative that identification of DCD and psychosocial intervention for this disorder is sought as early as possible to yield a more positive outcome.

1.2 Problem Statement

According to Stansell (2007), limited studies have provided relevant information on DCD and interventions despite the accumulating high prevalence rate. In addition, current research done in the area is limited in South Africa; this formed the basis of the motivation for this current study.

Caregivers and educators who are involved with the child on a daily basis may recognise the difficulties experienced by the child (Missiuna, Rivard, & Pollock, 2011). These difficulties affect the speech, sensory, and fine- and gross motor abilities of the child (du Plessis, 2013). Consequently, it is vital that the child should be seen by a physician at an early age in order to rule out differential diagnoses, e.g. ADHD, autism spectrum disorder, specific learning disorders, etc. Missiuna, et al. (2011) asserts that children presenting with DCD who are not identified may be perceived as being unmotivated or lazy and they often experience frustration and failure. Moreover, these children stand the risk of developing additional behavioural, social, and physical problems, for example social delinquency.

Psychosocial intervention for children presenting with DCD initially occurs after referral to a Physiotherapist (PT) or an Occupational Therapist (OT), who assists the child in learning to perform everyday tasks more successfully and make recommendations to parents in assisting them to manage the disorder more effectively (Missiuna et al., 2011). For children presenting with symptoms of DCD, early intervention is imperative with regards to learning strategies to compensate for coordination difficulties, to prevent further challenges from developing, and employing interventions that will enhance the child's self-image is crucial as children often compare themselves with their peers (Ayyash & Preece, 2003).

1.3 Significance of the study

This research study explored the experiences of mothers of children presenting with DCD/dyspraxia, as it will aid in assisting our understanding of the disorder and contribute to the body of knowledge. The experiences of mothers raising a child presenting with DCD/dyspraxia will be highlighted and the preferred psychosocial interventions used within the home environment will be identified. This information is important to the population of parents of children presenting with DCD/dyspraxia as well as educators, facilitators and tutors of these children. This information will be beneficial to educators and caregivers working with these children, it will specifically be useful for further development and training of these educators and caregivers. By highlighting the psychosocial interventions used in the home environment, perhaps these techniques and strategies can serve as a guide and practically utilised and adapted to fit within the South African context of the home environment. Therefore, it may facilitate an environment where well-being and full potential of children is held in regard.

1.4 Theoretical Framework

The theoretical framework that was used in this study is the socio-ecological theory developed by Urie Bronfenbrenner. Bronfenbenners theory emphasises the interrelationship of the different processes contributing to an individual’s personality and their contextual variation (Santrock, 2009).

This ecological theory stipulates that development reflects the influence of five socially organised subsystems: micro-system, meso-system, exo-system, macro-system and chrono-system (Bronfenbrenner, 1994). The theory further holds that these levels constantly interact with and influence each other. The micro-system is the individual’s immediate system of which they form part of, including all individuals the individual interacts with directly (Duncan, Bowman, Naidoo, Pillay, & Roos, 2012). This could include one’s family, school, friendship network, sports team, or neighbourhood (Bronfenbrenner, 1994; Duncan et al., 2012; Santrock, 2009). The meso-system involves relations between micro-systems or connections between contexts (Santrock, 2009). The social agents in the micro-system are not isolated, they influence and are influenced with the remaining systems (Christensen, 2010). Bronfenbrenner (1979), as cited in Duncan et al. (2012), proposed that development during childhood would be enhanced if the various contexts within which a child interacts were strongly linked. According to Santrock (2009), the exo-system comprises of links between the social settings in which the individual does not have an active role or direct influence and the individuals' immediate context. Examples of factors in the exo-system include: neighbours, legal services, social welfare services and mass media. The macro-system is the system that deals with the cultural context. It includes large-scale societal factors impacting people's lives, ideologies and system beliefs (Duncan et al., 2012). According to Darling (2007), the macro-system can be defined as the wider system of ideology and organisation of social institutions common to a particular social class, ethnic group or culture. Lastly, the chrono-system comprises of the patterning of environmental events and transitions over the life course also it includes sophisticated circumstances as cited by Santrock (2009).

Bronfenbenner's ecological theory will be used as the theoretical framework for this research study to determine how the different intertwined systems affect one another in relation to parenting children with DCD. This model will also be used to illustrate how a mother of a child presenting with DCD's, physical environment and social context are linked in dynamic, interacting and interdependent relationships. Each system is therefore part of a complex whole which is connected to other systems directly or indirectly.

1.5 Methodology

The study consisted of two phases, which consisted of a systematic review (Phase 1) and a qualitative research study (Phase 2). The methodology for the two phases is presented respectively.

1.5.1 Phase 1: Systematic review

Aims and objectives

The first phase of the study comprises of a systematic review on the psychosocial interventions used by parents with children presenting with DCD.

The aim of the review was to systematically review previous research regarding psychosocial intervention strategies utilised with children presenting with Dyspraxia. This information was used to inform our understanding for the qualitative study (phase 2) in terms of which interventions parents use to manage their children in the home environment.

The specific objectives of the systematic review were to:

- identify the appropriate literature for inclusion
- evaluate the literature for methodological quality
- provide a meta-synthesis of the findings of the included studies.

Research question

The research questions for the systematic review were:

- what psychosocial interventions are utilised by parents in treating children presenting with DCD/Dyspraxia?
- what is the content of effective interventions and nature of activities used therein?

Ethics

- Permission to conduct the proposed study was obtained from relevant Ethics Committee at the University of the Western Cape. Plagiarism was avoided by acknowledging other people's work and collaboration was taken into consideration as the review entailed working with paired reviewers.

1.5.2 Phase 2: Qualitative study

Aims and objectives

The aim of this qualitative research study was to explore the subjective experience of mothers who have children presenting with Developmental Coordination Disorder/Dyspraxia and the psychosocial interventions they use to manage the disorder in their home.

The specific objectives of this qualitative study were to:

- explore the subjective experience of mothers who have children presenting with DCD/Dyspraxia.
- identify the various psychosocial interventions use in the home environment by mothers of children presenting with DCD in managing the disorder.
- explore some of the support available as well as the support needed by mothers of children presenting with DCD.

Research question

What are the subjective experiences of mothers who have children presenting with DCD/Dyspraxia and which psychosocial interventions do mothers utilise in managing the disorder in the home environment?

Ethics

This research has been conducted in a professional and ethical manner. Since this study is qualitative and of a sensitive nature, the researcher aimed to maintain high ethical standards. This study has been approved by the Research Ethics Committee at the University of the Western Cape, prior to conducting the study.

This was done through ensuring that confidentiality between the researcher and participants of the focus groups was maintained. Each participant of the study signed a confidentiality form and received an information sheet which explained the study, as well as the rights and responsibilities of the participants. Written informed consent was also obtained by the researcher from all participants

The recording of the focus groups was done as a means of facilitating to accurately gather what the participants said and divulged within the group. The recordings, notes and any other material used to gather information was kept in a safe place. The participants' identity was protected and kept anonymous. Demographics of the participants are used in the report however, no other personal or identifying information of the participants were released.

Each participant was advised that they have the right to leave the study at any point without any negative consequences. They were also not forced to respond to any question they did not feel comfortable to answer.

1.6 Significance of Study

This research study explored the experiences of mothers of children presenting with DCD/Dyspraxia, the purpose was to explore and understand how mothers experience raising a child presenting with DCD/Dyspraxia and also identifying and highlight the preferred psychosocial interventions used within the home environment. This information is important to the population of parents of children presenting with DCD/Dyspraxia as well as educators, facilitators and tutors of these children.

This information is beneficial to educators and caregivers working with these children, it will specifically be useful for further development and training of these educators and caregivers. By highlighting the psychosocial interventions used in the home environment, perhaps these techniques and strategies can serve as a guide and provide practically utilised interventions that can be adapted for the South African context of the home environment. Therefore, it may facilitate an environment where the well-being and full potential of children is held in high regard.

The purpose of this study was also to increase public awareness of the experience of parenting a child presenting with DCD, highlighting the challenges that a mother faces and also drawing attention to these home interventions available for managing DCD. The findings of this study will be disseminated in relevant academic journals and presented at various platforms so that a wide audience of stakeholders working with children may have access to this information. This study therefore contributes to the gap in the body of knowledge and existing literature available in South Africa.

1.7 Structure of Thesis

The thesis is presented in six chapters. **Chapter one** presents the background, problem statement and the rationale for the present study.

Chapter Two is a review of related literature, focusing on conceptualising Developmental Coordination Disorder, parenting, psychosocial interventions as well as the theoretical framework.

Chapter Three outlines the aims and objectives, as well as the research design and methodologies used for both of the systematic review (phase 1) and the qualitative study (phase 2). This chapter also reports on the ethical considerations for both of the phases of the study.

Chapter Four presents the descriptive meta-synthesis which includes the process of results and data extraction presenting the data collected at the various levels of the review and all the data extracted from the studies.

Chapter Five presents the results of the qualitative research study (phase 2), as well as a discussion of the main findings, integrated with previous research (as discussed in Chapter Two), and locating the findings within the theoretical framework which was chosen as a lens through which to view and understand this study.

Finally, **Chapter Six** provides a collective discussion on the results of the study, outlines the limitations and provides recommendations for future studies.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This literature review aims to provide a conceptualisation and synopsis of the current literature with regards to Developmental Coordination Disorder, parenting of a child with special needs, particularly DCD, and the psychosocial interventions used for children presenting with DCD. Lastly, the theoretical framework for this study is also discussed.

There is a limited amount of published articles of South African studies regarding DCD, the psychosocial interventions, and the experiences of parents with children presenting with DCD (Benjamin, 2010). The concept of DCD is reasonably unfamiliar and not well understood (Benjamin, 2010). Therefore, this study contributes to the gap in the body of knowledge of DCD in the South African context.

2.2 Conceptualising Developmental Coordination Disorder/Dyspraxia

2.2.1 Definition

Developmental Coordination Disorder (DCD) is defined in the Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-V) as a motor coordination disorder markedly below expected levels for the child's chronological age and intelligence, which significantly interferes with academic achievement or activities of daily living, is not due to a medical condition, does not meet criteria for pervasive developmental disorder, and if mental retardation is present, the motor difficulties are in excess of those usually associated with mental retardation (American Psychiatric Association, 2013).

According to Stansell (2007), DCD was initially described as congenital maladroitness, followed by a disorder of sensory integration. In 1975 it was renamed as the *clumsy child syndrome* by Dr Sasson Gubbay, since then these diagnostic labels have been discarded and the following terms have developed: Childhood Apraxia of Speech (CAS), Developmental Verbal Dyspraxia (DVD), Developmental Apraxia of Speech (DAS), Sensorimotor Dysfunction, Developmental Coordination

Disorder, Specific Developmental Disorder of Motor Function or Dyspraxia (Stansell, 2007). The preferred term for the disorder is Developmental Coordination Disorder or Dyspraxia (Sugden & Chambers, 2006).

It has been reported that children with DCD manifest motor impairments in fundamentally all motor domains (Dewey, Cantell, & Crawford, 2007). Their performance on activities requiring accurate or rapid goal-directed movements are often impaired, and they tend to work slower than typically developing peers (Dewey et al., 2007).

Recent research (Novak, Lingam, Coad, & Emond, 2011) indicates that DCD is a complex condition associated with other developmental difficulties and long-term risk of psychological and social morbidity rather than an isolated disorder of motor coordination.

In order to differentiate this type of medical disorder and to avoid issues resultant from an expression such as “illness”, the World Health Organisation (WHO), 1993, suggested the use of the term “disorder”. Furthermore, the term “development” indicates that the concerns appear in the early years of development when coordination skills are integrated, which impacts the subsequent development process. To identify the core of this disorder, the term “coordination” is used with the purpose of trying to explain the difficulty in executing and performing skills. Hence, coordination can be interpreted as the ability to have control over multiple relations that occur between the elements that comprise the coordination system (Dantas & Manoel, 2009). Bernstein (1996) described the coordination system controlling the body as a multi-faceted and complex problem, which cannot be resolved even in a limited version by the most current technology in place.

2.2.2 Epidemiology

DCD is four times more common in males than females, and infants born prematurely or with low-birth weights are also at an increased risk (Sadock & Sadock, 2007).

Benjamin (2010) reported that in countries such as Britain, Australia and United States of America, the incidence of DCD has been recorded, yet local data is still ambiguous. This is primarily due to the fact that there is still little known about DCD in South Africa and not many therapists use standardised assessment tools, for example, the Movement Assessment Battery for Children (M-ABC) or the Bruininks-Oseretsky tests for baseline assessments are used, especially in government settings - where resources and time are very limited (Benjamin, 2010).

2.2.3 Aetiology

According to du Plessis (2013), the aetiology of Dyspraxia is not well understood, however it is speculated that brain injuries, genetic, and metabolic deviances may be contributing factors to the disorder. According to the DSM-V, the risk of DCD may be higher due to environmental factors, such as prenatal exposure to alcohol and low birth-weight in children may also contribute to the onset of the disorder (American Psychiatric Association, 2013). Similarly, Sadock and Sadock (2007) state that risk factors postulating to contribute to DCD include prematurity, low birth weight, perinatal malnutrition, and hypoxia. Cognitive and behavioural abnormalities could also be due to prenatal exposure to alcohol, nicotine, and cocaine (Sadock & Sadock, 2007).

Contributions to coordination deficits could also be explained due to neurochemical abnormalities and parietal lobe lesions. Although the causative agents are unknown for both, strong associations have been found between DCD and communication disorders (Sadock & Sadock, 2007). Recent literature has indicated that in children with DCD, signals from the brain to specific muscles involved in balance, are not optimally sent or received. In essence, Sadock and Sadock (2007) claim that these findings implicate the cerebellum as a causative origin of dysfunction for DCD.

Current research also suggests that DCD may exist due to an immaturity of neuron development in the brain rather than due to brain damage (Novak et al., 2011). Hence, individuals presenting with DCD have no clinical neurological abnormality to explain their condition.

2.2.4 Diagnosis and Clinical Presentation

The DSM-V, by the American Psychiatric Association (APA) (2013) provide the following diagnostic criteria for the diagnosis of DCD:

> *A. The acquisition and execution of coordinated motor skills is substantially below that expected given the individual's chronological age and opportunity for skill learning and use. Difficulties are manifested as clumsiness (e.g., dropping or bumping into objects) as well as slowness and inaccuracy of performance of motor skills (e.g., catching an object, using scissors or cutlery, handwriting, riding a bike, or participating in sports).*
>
> *B. The motor skills deficit in Criterion A significantly and persistently interferes with activities of daily living appropriate to chronological age (e.g., self-care and self-maintenance) and impacts academic/school productivity, prevocational and vocational activities, leisure, and play.*
>
> *C. Onset of symptoms is in the early developmental period.*
>
> *D. The motor skills deficits are not better explained by intellectual disability (Intellectual developmental disorder) or visual impairment and are not attributable to a neurological condition affecting movement (e.g., cerebral palsy, muscular dystrophy, degenerative disorder).*

The DSM-V (2013) claims that a diagnosis of DCD can be made by a clinical synthesis of the developmental and medical history, school report, physical examination, and individual assessment using psychometrically sound and culturally appropriate standardised assessments. The manifestation of impaired skills requiring motor coordination (Criterion A) varies with age. Although many young children achieve typical motor milestones, some might experience a delay (i.e., sitting, crawling, and walking). Other areas of delayed developmental skills may include negotiating stairs, pedalling, buttoning shirts, completing puzzles, and using zippers. Even when the skill is achieved, movement execution may appear awkward, slow, or less precise than that of peers. Older children and adults may display slow speed or inaccuracy with motor aspects of activities such as assembling puzzles, building models, playing ball games (especially in teams), handwriting, typing, driving, or carrying out self-care skills (American Psychiatric Association, 2013).

Criterion B claims that DCD is diagnosed only if the impairment in motor skills significantly interferes with the performance of, or participation in, daily activities in family, social, school, or community life. Some instances may include eating meals with age-appropriate utensils without messing, engaging in physical games with others, getting dressed, using specific stationary such as rulers and scissors. According to the DSM – V (2013), a marked slowness in execution of tasks is also common. In adults, everyday skills in education and work, especially those in which speed and accuracy are required, are affected by coordination problems (American Psychiatric Association, 2013).

The onset of symptoms of Developmental Coordination Disorder must be in the early developmental period (Criterion C). However, the DSM – V (2013) claim that DCD is typically not diagnosed before the age of five years because there is considerable variation in the age at acquisition of many motor skills or a lack of stability of measurement in early childhood (e.g., some children catch up) or because other causes of motor delay may not have fully manifested.

Criterion D specifies that the diagnosis of Developmental Coordination Disorder is made if the coordination difficulties are not better explained by visual impairment or attributable to a neurological condition. Thus, visual function examination and neurological examination must be included in the diagnostic evaluation. If intellectual disability (intellectual developmental disorder) is present, the motor difficulties are in excess of those expected for the mental age; however, no IQ cut-off or discrepancy criterion is specified.

The disorder is frequently first noted with a delay in motor milestones, or when the child attempts activities such as playing ball games, buttoning clothes, or holding eating utensils (American

Psychiatric Association, 2013). Difficulties with motor aspects of building models, building puzzles, hand writing, ball games, and organising of belongings where coordination and motor sequencing are required are the areas of difficulty noted in middle childhood. Some of the signs and symptoms that are observed include lack of babbling as a baby; lack of attempt to speak by the age of 12 to 18 months; struggling with motor activities (gross and/or fine); being able to only utter a few syllables or phonics; being a picky eater; and being unable to utter a sound when opening the mouth in an attempt to speak (du Plessis, 2013).

According to the American Psychiatric Association (2013), as cited in the DSM-V, disorders that frequently co-occur with DCD include problems of inattention, such as ADHD, specific learning disorder (particularly writing and reading), speech and language disorder, autism spectrum disorder (ASD), joint hypermobility syndrome, and disruptive and emotional behaviour problems.

In a study investigating difficulties of learning, attention and psychosocial adjustment observed in children with DCD; forty-five children diagnosed with DCD, fifty-one children identified as being suspect for DCD, and seventy-eight children with no motor difficulties participated (Dewey, Kaplan, Crawford, & Wilson, 2002). Results of this study indicated significantly poorer scores on measure of attention and learning (reading, writing, and spelling) among both children with DCD and children suspect for DCD than those with absence of motor problems. Results revealed that children presenting with movement problems are at risk for problems in learning, adjustment and psychosocial adjustment (Dewey et al., 2002).

A study conducted on the potential mechanisms underlying motor coordination in children with DCD, claimed that they experience difficulty processing auditory, visual, and vibro-tactile information (Brien, Lyons, Williams, Mittal, & Bundy, 2008). The researchers explored patterns of choice reaction time in young and older children presenting with, and without DCD by utilising different sensory modalities and a compatibility-incompatibility paradigm. Results yielded that unaffected children responded slower to auditory stimuli than young children with DCD. Moreover, it was implied that the vibro-tactile sensory modality may be the answer to the motor difficulties of children with DCD, while the processing of auditory and visual input is of a developmental nature (Brien et al., 2008).

Children with DCD often present with *neurodevelopmental immaturities* or *neurological soft signs*, such as delay with primitive reflexes or minor problems with balance. The DSM – V (American Psychiatric Association, 2013), describes this as suppressed motor activity, such as choreiform movements of unsupported limbs or mirror movements. Mirror movement is described as the involuntary, simultaneous contralateral, identical movements complementing voluntary movements (Nadkarni & Deshmukh, 2012).

2.2.5 Assessment of DCD/Dyspraxia

Children with DCD are assessed in a variety of ways, but currently there is no appropriate gold standard assessment instrument and no instrument that goes from childhood to adulthood (Kirby & Sugden, 2007). However, in research studies conducted to investigate DCD, the most common standardised tests used, are the Movement ABC (M-ABC) (Henderson and Sugden, 1992) and/ or the Bruininks-Oseretsky Test of Motor Proficiency (BOTMP) (Bruininks, 1978).

As investigated by Benjamin (2010), the M-ABC has been normed for children 4-10 years of age and includes a screening checklist to be used by teachers and parents. The norm-reference examination is done by a health care professional to establish the specific areas of difficulty. The checklist has four sections with twelve questions and a fifth section with questions about the child’s behaviours related to motor activities (Benjamin, 2010). Each of the first four sections has questions regarding the child’s performance in one of the following environments: Child stationary, environment stable (e.g. cutting); child moving, environment stable (e.g. walking); child stationary, environment changing (e.g. catching); and child moving, environment changing (e.g. running and kicking a ball). Benjamin (2010) reports that a total score is calculated and used to determine if the child is at risk for movement problems (below 15% but above 5% cut-off score) or has movement problems (below the 5% cut-off score).

The norm-referenced examination has three sections, each section containing items for each of three age bands: 4 - 6 years; 7 – 8 years and 9 – 10 years. Items are divided into manual dexterity, ball skills and static and dynamic balance sections including activities such as threading beads, putting pegs in a pegboard, catching and throwing a bean bag, balancing on one leg, jumping, hopping and heel-to-toe walking. A total score is used to determine if performance is within normal ranges, if a motor impairment is present or if the impairment is serious (Henderson and Sugden, 1992).

The Bruininks-Oseretsky Test of Motor Proficiency is a test of gross and fine motor function for children from 4.5 to 14.5 years of age (Bruininks, 1978). The test has subscales for running speed and agility, balance, bilateral co-ordination, strength, upper limb co-ordination, response speed, visual-motor control and upper limb speed and dexterity. The test is largely one of co-ordination and balance but it has subtests with items that are clearly related to functional demands for school-age children, such as cutting within lines and ball activities and physical education skills such as sit-ups, shuttle-runs and long jumping. The test was normed on 765 United States subjects. The test takes 45 – 60 minutes to administer. The quicker test, Bruininks-Oseretsky Test of Motor Proficiency-Short Form (BOTMP- SF) is an abbreviated form and takes 15 – 20 minutes to complete. These are examples of test used to determine developmental delay and they are not designed to be used for the identification of DCD. Cairney and colleagues (2009) conducted a study to determine whether the BOTMP would be a valid and useful alternative to the M-ABC for identification of DCD. The short form of the BOTMP was administered to 2058 children and 24 subjects were randomly selected for further testing using the M-ABC. The results yielded a positive predictive value of 0.88 with a 95% confidence interval. They concluded that the short form of the BOTMP was a reasonable alternative, but also emphasised that further research is needed to determine the sensitivity and the specificity of the short form.

David (2006) emphasises the importance of observing the child with co-ordination difficulties in their natural environment such as the classroom or playground, while they participated in everyday functional activities. The researcher also holds that the following background information is pertinent when in the process of making a diagnosis of DCD: a medical history including pregnancy, delivery and past and current health status; developmental history; previous musculoskeletal and neuromuscular examinations and history of the current functional status from the family and school staff.

Results of the Hamilton review (2002) emphasise that diagnosis of DCD is determined by taking a careful history that includes a review of fine motor, visual, adaptive and gross motor milestones and performing a physical examination.

David (2006) also adds that children with DCD may have slower response times and have difficulty in the following areas:

1. identifying the important details of the task.
2. analysing the task to understand is components.
3. using past experience to plan a new strategy (execute a plan)
4. executing the task as planned
5. using feedback to make alterations for the next attempt

An accurate and definitive diagnosis of DCD is difficult, but the literature attempts to list differentiating criteria. One of the diagnostic criteria as described by Hamilton (2002) is poor performance in sports. However, little evidence exists to substantiate why this is so and whether cardiovascular fitness and general exercise endurance may play a role. Perhaps future studies could explore the exercise tolerance of children without any physical impairment to that of children diagnosed with DCD, as the findings would provide some insight and a better understanding into the disorder and the impact it has on the typical motor development. If discrepancies do exist, it would be easier to address the issue of physical performance, which in turn, would enhance concentration and thus the ability to learn in the classroom environment (Benjamin, 2010).

A neurological assessment may also reveal problems with body functions such as soft neurological signs including muscle weakness (especially of the hands); poor coordination (especially finger-to-nose movement) and finger-thumb opposition. There is also the possibility of choreiform movements seen as small jerky twitches of the upper extremities. However, this is not seen in all children with DCD (David, 2006).

Often when motor difficulties are persistent in a child, parents seem to the ones who recognise problems in their child, due to proper identification of signs and symptoms that are hindered by the lack of reliable tests and baseline data (Zoia, Barnett, Wilson, & Hill, 2006). Zoia et al. (2006) claim that standardised measures for movement skills are more readily available for school age children. A recent measure to aid in the identification of younger children with DCD is the Children's Activity Scales (ChaS), which uses a checklist approach in contrast to conventional assessment of performance. The checklist is suitable for children of the ages between 4-8 years at the risk of DCD. It encompasses a parent (ChAS-P) and teacher (ChAS-T) checklist. In particular, the measure's major strength is that it has been developed in order to provide information about a child's ability to function within the context of their natural environment. The measure focuses on fine and gross motor skills, ball skills mobility, organisation in space and time during the performance of activities of day to day living, common school and preschool activities.

2.3 Parenting and support mechanisms

The following section provides a discussion on parenting and support mechanisms required by these parents. While the literature on mothers of children presenting with DCD is scant, informative literature was found on parenting of children with special needs. This highlights the gap in the body of knowledge in the subject matter and the need to conduct a study on the experience of mothers of children presenting with DCD so that appropriate interventions may be developed to assist parents and caregivers affected by this disorder.

The importance of exploring parents' knowledge, beliefs and values has been highlighted as these factors may influence the development of their child presenting with DCD (Missiuna, Moll, Law, King, & King, 2006). Missiuna, Moll, et al. (2006), report that limited studies have explored the perspective of parents who have children with coordination complications. It is vital to understand the environmental context within which children and their families live in order to provide optimal family-centred care (Missiuna, Moll, et al., 2006).

According to Ertem et al. (2007) studies have shown that knowledge by mothers about child development is important as it has vast implications on the developing child. Research (Kolobe 2004; Huang, Caughy, Genevro & Miller, 2005) conducted in Western countries has highlighted that very little research exist on parental knowledge regarding child development. South African research is viewed terms of research as a Western country due to the country's social norms, traditional customs, belief systems and the country's history which is embedded in European Colonisation However, it should be made known that even though a large majority of South Africa's culture has been historically influenced by western cultures through colonisation; South Africa is still a very diverse and complex nation with many African traditional views, beliefs and customs (Spiegvogel, 2009).. Therefore, when looking at child development and the knowledge thereof, one must maintain an awareness of factors that may influence parental knowledge of child development.

Research studies (Du Plessis & Conley, 2007) have yet to show the similarities or differences of parental knowledge and knowledge of child development within a diverse spectrum of cultures such as seen in South Africa. Du Plessis and Conley (2007) states that apart from South African being rich in culture there are also socio-economic challenges that impact parental knowledge as well as parenting styles. Research studies that have been done previously indicate that there is some correlation between socio-economic status and parenting knowledge and styles.

According to Dervishaliaj (2013) parenting can be a rewarding experience; however, it is often accompanied by high levels of stress due to challenges, difficulties, and frustrations parents face in daily life. Unexpected challenges and demands are placed on parents of children with developmental disabilities, for which they are not necessarily prepared (Dervishaliaj, 2013). The nature of the child's abilities and limitations in areas of mobility, communication, cognition, behaviour or learning may present situations that are not typical of most other families. Dervishaliaj (2013) stated that life changing implications for the whole family occurs when having a child with special needs. Sanders and Morgan (1997) stated that several studies that have been conducted within this area have indicated that higher levels of stress are experienced among parents of children with special needs compared to those with typical development (Dervishaliaj, 2013).

According to Meral (2012), the internal and external resources of overcoming a crisis play a significant role in efforts of families for coping with adaptation and stress due to having a child with a developmental disability. These resources includes family role structure, family members' personal resources, and related features to family contributing to organisation and close society of family such as friends, neighbours, relatives, professionals, and other societal institutions of social support (Meral, 2012). Meral (2012) state that support can be monetary, instrumental, informative, physical, and emotional aids provided by people around the individual and it enables the individual to feel cared for, loved, valued, reduces negative effects of a crisis and protects one's psychological health. Within a family, family social support can be provided in various support types, such as in the home environment, towards the child and the family. Research has shown that the increase of social support to families with a child that have a special need influences more positive interactions with and behaviours towards the child (Meral, 2012).

A study was conducted regarding the frequently asked questions parents of children presenting with DCD pose to paediatricians when meeting with them (Missiuna, Gaines, Soucie, & McLean, 2006). It is reported that parents seek information and express concern about their child's movement difficulties and seek the causes of their child's lack of coordination. In addition, parents also seek to know whether DCD is the correct diagnosis and whether other developmental disorders are involved (Missiuna, Gaines, et al., 2006). Missiuna, Gaines et al. (2006) conducted a literature review, addressing frequently asked questions, by critically appraising the available literature; the results were displayed in the format of a synopsis. The themes that were reported on include: a description; the causes; the prevalence; problem areas; comorbidity; the benefits of being diagnosed; the prognosis; and guidelines regarding helping the child.

In a recent qualitative study, conducted by Novak et al. (2011) in the United Kingdom (UK), 15 parents of children presenting with DCD were interviewed by making use of semi-structured interviews. Results indicated that DCD was an all-encompassing condition dominating all aspects of family life. The researchers reported that parents were frustrated by the lack of knowledge and expertise of health and educational professionals working with children presenting with DCD. There was also a perceived lack of good quality accessible information and support services available. By default, parents became the "expert" on DCD for schools and other services and had to advocate for their own children and DCD. Novak et al. (2011) report that parents found parenting a child with DCD to be frustrating, exhausting, guilt-ridden, and at the same time rewarding. The parents also had limited time to provide for the needs of other family members. Parents provide additional support for longer to their child with DCD and had concerns for their future regarding whether they would develop into independent beings and their education or possible employment opportunities (Novak et al., 2011).

According to Missiuna, Moll, et al. (2006), positive outcomes have been reported in previous studies when parents are involved with the understanding, identification, management and treatment of the child's struggles. It has been reported that parents become empowered in this process, particularly when they are able to access educational materials that provide evidence-based guidelines and strategies (Missiuna, Moll, et al., 2006).

A challenge that families of children with DCD often face is the lack of knowledge, recognition and understanding of the disorder by others. Missiuna, Moll, et al. (2006) report on two studies that have explored the experiences of parents when trying to obtain a diagnosis for their child's motor difficulties. The one was conducted in Scotland (Stephenson, McKay, & Chesson, 1990) and the other in Australia (Ahem, 2000). Both studies emphasised the frustrations parents experience and the numerous attempts made to get confirmation regarding their child's condition from health care professionals. Studies have revealed that although parents are often able to identify difficulties experienced by their child, they are uncertain as to when and how to address their concerns (Missiuna, Moll, et al., 2006). In their qualitative study, adopting a phenomenological approach, Missiuna, Moll, et al. (2006) explored the experiences and insights of 13 parents of children presenting with DCD. Each parent partook in two in-depth interviews and completed a set of questionnaires. Three main themes were identified in the findings, which captured the experience of parents in an attempt to understand and get assistance for their child. The first theme highlighted parents' impressions of their child's difficulties, which included their initial observation and becoming aware of the problems the child encounters, and seeking support from outside. The second theme referred to the pathways followed by families in the attempt to affirm their perceptions and obtain services for their child, which was often met by dead ends and their initial concerns were often disregarded by health professionals. The final theme emphasised some common challenges parents face in trying to cope with the limitations of their child, parents often wonder whether they should get a task done or encourage independence, whether they should follow the lead of the child or challenge the child to change, and whether a formal diagnosis is necessary or not (Missiuna, Moll, et al., 2006).

2.4 Psychosocial Interventions

The following section discusses the role of intervention and the various psychosocial interventions and approaches universally used for the treatment and management of DCD .

Recognising DCD in early development is important, as children benefit from prompt intervention (Carslaw, 2011). If children are left untreated, adverse effects on academic performance, self-esteem and engaging in sporting activities can ensue. Symptoms usually continue into adulthood if children are not diagnosed early and do not receive appropriate intervention, which may later lead to problems such as unemployment (Carslaw, 2011).

Tan (2007) stated that the chances of a child developing coping strategies are greater with early intervention. Effective 'remedies' are those that specifically address each child's unique needs. According to Tan (2007), in order to receive suitable modifications, services and accommodations in school, each child should have an individual education plan drawn up. Parents and teachers may provide order and structure, support in planning and organising, as well as security and reassurance for the child. It is essential to assist the child to form ideas, plan actions and carry them out (Tan, 2007). Related to the above-mentioned theories, Carslaw (2011) suggested practical measures that can be utilised to accommodate for the surroundings of the child and thus ease some of the challenges experienced by the child. For example; to assist the child to keep time, use a kitchen timer to display the amount of time that the child has left to complete a task. Carslaw (2011) claims that having structure and a set routine is essential so that children understand what is expected of them. The structure and routine help children take command of their environment and thus boost their self-esteem to engage with tasks and activities. Structuring various activities on various days makes the routine predictable for the children. For example, teachers could be asked to give out letters on certain days. Teachers utilising a clear timetable incorporating colours and symbols indicating various tasks for certain days of the weeks can also be helpful for children. Teachers can also ensure that distractions are kept to a minimum. Parents can also be advised to dress their children in comfortable clothing that is easy for the child to remove. If children can feel more in control of their environment they will feel more relaxed and this facilitates an atmosphere conducive for learning.

Kirby and Sugden (2007) found that the progression in children with DCD concludes that the majority of children do not outgrow the condition without appropriate intervention. These researchers highlight the need for longitudinal studies in this area of study as research for DCD is not as comprehensive as with other developmental disorders, such as Autistic Spectrum Disorder, ADHD, and Dyslexia (Kirby & Sugden, 2007).

Missiuna et al. (2011) remind readers of the importance of educating the child with DCD in order for them to become aware of their limitations and strengths. In addition to gaining an understanding of ways to compensate for various motor and coordination difficulties. As a result, children will be more motivated to attempt tasks which they find difficult, as well as a greater chance of experiencing success. Despite coordination difficulties persisting, children can be encouraged to participate successfully in various settings such as school, home and the community. In addition, considerable improvement in the ability to perform particular activities can be noted (Missiuna et al., 2011).

According to findings in their study, Missiuna, Gaines, et al. (2006) report that a health practitioner's primary role is to recognise early description of motor difficulties described by parents, conduct neurological and developmental examinations, and conduct a differential diagnosis. Parents often work in collaboration with health and educational professionals, including: occupational therapists (OTs), physiotherapists, psychologists, speech/language pathologists, and educators (Missiuna, Gaines, et al., 2006). It is speculated that the required evidence for choosing a treatment approach in the case of a child presenting with DCD, is the effect of the intervention on improving functional performance and motor skills (Ayyash & Preece, 2003). Missiuna et al. (2011) state that the child needs to be taught tactics to compensate for their coordination difficulties and it is suggested that adequate opportunities should be provided to practise these motor skills they have to learn. Smits-Engelsman, et al. (2012) systematically reviewed literature regarding the efficacy of motor interventions for children presenting with DCD. They reviewed studies published between 1995 and 2011 about the effect of motor intervention in children with DCD. Twenty-six studies meeting the inclusion criteria for the review was included and the interventions were coded under four styles: (1) task-oriented intervention, (2) traditional physical therapy and occupational therapy, (3) process-oriented therapies, and (4) chemical supplements (Smits-Engelsman et al., 2012).

In comparing the different intervention approaches, strong effects were indicated in task-oriented intervention, and physical and occupational therapies, while process-oriented approaches were found to be weak. In reviewing chemical supplements as an approach, three studies investigated the treatment with methylphenidate and supplementation of fatty acids and vitamin E, no effect was indicated (Smits-Engelsman et al., 2012). The interpretation was made that children receiving intervention produce benefit and show improvement of motor performances, over and above no intervention. Moreover, task-oriented intervention yields stronger effects than other approaches, while insufficient evidence is available for the use of chemical supplements for children presenting with DCD (Smits-Engelsman et al., 2012).

Niemeijer et al. (2007) conducted a study on DCD, with the aim of evaluating neuro-motor task training (NTT) for children with DCD. Participants comprised of a treatment and a non-treatment control group of children presenting with DCD, inclusion criteria required a score below the fifteenth centile on the Movement Assembly Battery for Children (M-ABC). The M-ABC and the Test of Gross Motor Development – 2 (TGMD-2) were administered before and after nine weeks of 30-minute sessions of NTT, or nine weeks without intervention (Niemeijer, Smits-Engelsman, & Schoemaker, 2007). Practitioners reported on the treatment goals and tasks trained each session. It was found only the treated group displayed improvement on the M-ABC and the TGMD-2, indicating that that NTT is effective and that motor performances do not improve spontaneously (Niemeijer et al., 2007).

Similarly, Kirby and Sugden (2007) studied a body of literature pointing to success of implementation of intervention strategies. These researchers refer to two major intervention approaches, often referred to as either task-oriented approaches, or process-oriented approaches (Kirby & Sugden, 2007).

Although task-oriented approaches concentrate on the tasks themselves, it makes use of a range of methods. Successful feedback has been reported with the use of task-oriented approaches among a range of children. The basis of these approaches is the interaction between the task to be learned, the child's resources and the context in which it is set. The tasks are often broken down into smaller parts, or taught directly depending on consultation with the child and the parents (Kirby & Sugden, 2007).

According to Kirby and Sugden (2007), health care professionals (such as physiotherapists and occupational therapists) usually administer process-oriented approaches which have been described to be broad-based and include methods such as sensory integration therapy. The aim of this approach is to pinpoint the process or the underlying process in which the child has not yet developed appropriately and which have been found vital for successful performance or acquisition of motor skills. Therefore, the intervention aims to improve the child's kinaesthetic functioning for example, with the aim of this transferring to the functioning of several motor skills (Kirby & Sugden, 2007).

Speech and language therapists can help the child gain control over speech muscles, whereas psychologists can address social and self-esteem issues. The occupational therapist and physiotherapist can assist a child in improving their life skills and motor development, including balance, fine and gross motor coordination, visual-motor skills and perception (Curtin, Baker, Staines, & Perry, 2014).

According to Missiuna, Rivard and Pollock (2011), "M.A.T.C.H." is a strategy to help a child presenting with Dyspraxia. "M.A.T.C.H" means: 1. modifying tasks, 2. altering one's expectations, 3. teaching strategies, 4. changing the environment and 5. helping through understanding (Missiuna et al., 2011).

Modifying tasks involves changing aspects of an activity that are too difficult to perform for the child, while remembering that the child can still experience success if an effort is made to participate in the task (Missiuna et al., 2011). When altering one's expectations, one has to consider the ultimate goal of a task and bear in mind where one can be flexible. An example Missiuna et al. (2011) used to illustrate this concept was when extra time was allowed, or alternating methods of completion for a task, which would make the difference between an experience of failure or a lesson learned for a child with DCD. Teaching strategies involves the investigation for alternate teaching strategies designed for special needed children, which are also useful for neurotypical children in a classroom (Missiuna et al., 2011). Changing the environmental factors for a child can improve performance or make it more difficult, therefore one has to consider what is going on around a child when they are experiencing difficulty or success (such as level of activity, visual distractions, or noise). Understanding the nature of DCD will help one to problem solve and provide the child with a rich learning experience. When a child feels supported and understood, they may be more likely to attempt new activities and persevere with them until success is achieved (Missiuna et al., 2011).

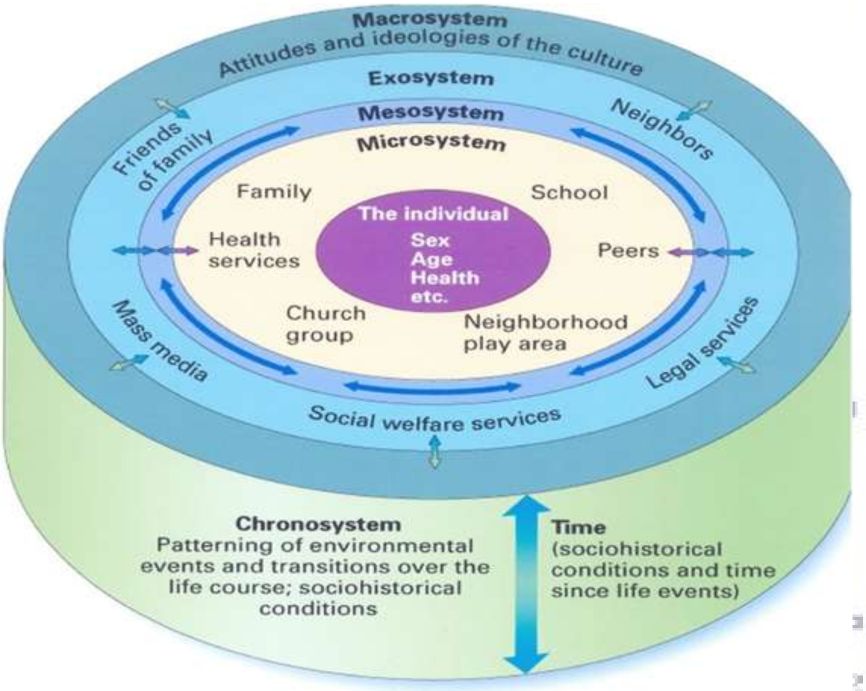
Kirby and Sugden (2007) found through means of a meta-analysis that task-oriented approaches have been found to be one of the more successful approaches in the management of the disorder, and should be implemented by health practitioners and paediatricians running children's' services. Similarly to ASD, DCD is not regarded as a categorical disorder but rather as a dimensional disorder. Hence, health practitioners from various fields working with children who have a range of developmental disorders need to routinely enquire more about motor difficulties, including social and communication, language, and attention disorders (Kirby & Sugden, 2007). These researchers claim that time and money may be wasted in children being passed from service to service due to the inability of health care practitioners to appropriately diagnose.

2.5 Theoretical framework

Bronfenbrenner initially named the theory, ecological systems theory, addressing only the child's surroundings but later modified the name in 1994, recognising the child's biological disposition, therefore, calling it the bio-ecological systems theory (Simpson, 2011).

Bronfenbenners theory emphasises the interrelationship of the different processes contributing to an individual's personality and their contextual variation (Santrock, 2009). This ecological theory preserves that development reflects the influence of five socially organised subsystems: micro-system, meso-system, exo-system, macro-system and chrono-system (Bronfenbrenner, 1994). These levels constantly interact with and influence each other. Figure 1 depicts Bronfenbrenner's ecological system's theory.

Figure 1: Bronfenbrenner's Ecological System's Theory



(Santrock, 2009)

The micro-system is the individual's immediate system of which they form part, including all individuals the individual has direct interactions with (Duncan et al., 2012). The system has a direct effect on the individual and in this system the most direct interaction takes place with social agents (Santrock, 2009). This system could include the following: one's family, school, peers, neighbourhood, religion, health services, and sports team. Christensen (2010) have added that this system entail immediate experience and personal interaction regarding interpersonal relationships within the different settings within this system.

The meso-system involves relations between micro-systems or connections between contexts (Santrock, 2009). The social agents in the micro-system are not simply distinct or isolated they all influence one another (Christensen, 2010). Thus the meso-system attempts to explain the nature of the relationship between the different social agents in the micro-system. Therefore, the meso-system is the set of linkages between the different micro-systems of an individual. According to Darling (2007) Bronfenbenner proposed that development will be enhanced if the different settings in which the developing person is involved in are strongly linked such as values taught at school and at home often correspond.

Santrock (2009) stated that the exo-system consist of links between the social settings in which the individual does not have an active or direct role and the individuals' immediate context. Examples of factors in the exo-system include: neighbours, legal services, social welfare services, mass media and friends and family. Christensen (2010) aver that this system consists of interconnectedness between the micro- and meso-systems and those system with which the individual has no direct contact but which may affect the functioning of these two systems.

Cultural factors that have an impact on an individual comprise of behaviour patterns and beliefs and these are usually passed on from generation to generation (Santrock, 2009). The macro-system is the system that deals with the cultural context. It includes large-scale societal factors impacting people's lives, ideologies and system beliefs (Duncan et al., 2012). According to Darling (2007), the macro-system can be defined as the wider system of ideology and organisation of social institutions common to a particular social class, ethnic group or culture.

Lastly, the chrono-system consist of the patterning of environmental events and transitions over the life course, it also includes sophisticated circumstances as cited by Santrock (2009).

Bronfenbenner's ecological systems theory was deemed appropriate as a theoretical framework for this research study to determine how the different intertwined systems affect one another in relation to parenting children with DCD. One needs to consider each system in order to understand mother's role in raising a child with DCD, the complexities that exist with this disorder and how children are influenced by the various contexts.

This model was also used to illustrate how a mother of a child presenting with DCD's, physical environment and social context are linked in dynamic, interacting and interdependent relationships. Each system is therefore part of a complex whole which is connected to other systems directly or indirectly.

2.6 Conclusion

The chapter discussed the in detail the meaning of DCD/Dyspraxia, parenting a child with DCD/Dyspraxia, support needed by these parents and the psychosocial interventions for children presenting with DCD/Dyspraxia.

The next chapter will discuss the research methodology of the systematic review and qualitative study. The chapter discusses the aims and objectives for each phase of the study, the methodological framework by providing the research design of the studies, stipulating the inclusion and exclusion criteria as well as the retrieval and assessment strategies used in the review. The chapter further explains the process involved in the methodological quality appraisal of the intervention studies in the review and the instruments/tools used in the review. The chapter also discusses the method of analysis for the study, stipulates the ethical considerations of the study.

CHAPTER 3: METHODOLOGY

3.1 Introduction

The study consist of two phases, which comprises of a systematic review (Phase 1) and a qualitative research study (phase 2). The methodology for the two phases are respectively discussed.

3.2 Phase 1: Systematic Review

The first phase of the research study comprised of a systematic review on the various intervention strategies used as treatment for children presenting with DCD/Dyspraxia. Herewith follows a detailed account of the methodological procedures employed during the execution of the present study and is reported in a descriptive manner.

3.2.1 Aim

The aim of the review was to systematically review previous research regarding psychosocial intervention strategies utilised by parents in managing children presenting with DCD/Dyspraxia. This information was used to inform our understanding for the qualitative study (Phase 2) in terms of which interventions parents use to manage their children in the home environment.

3.2.2 Objectives

The objectives of the systematic review were:

3.2.2.1 to identify appropriate literature for inclusion

3.2.2.3 to evaluate the eligible records for methodological quality

3.2.2.4 to provide a meta-synthesis of the findings of included studies

3.2.3 Review Questions

The systematic review strived to answer the following:

- what psychosocial interventions are utilised by parents in parenting children presenting with DCD/Dyspraxia?

- what is the content of effective interventions and nature of activities used therein?

Hence, which literature would constitute a consolidated evidence base of filtered information on strategies aimed at enhancing psychosocial intervention strategies to include in the treatment and management of DCD/Dyspraxia?

3.2.4 Research Design

A systematic review was utilised in the first phase of the current study to identify psychosocial strategies used for children presenting with CDC/Dyspraxia.

A systematic review is deemed appropriate since it is a means of identifying, evaluating and interpreting all available research relevant to a particular research question and is considered the highest level of evidence (Higgins & Green, 2006; Staples & Niazi, 2007). Higgins and Green (2011) further state that a systematic review attempts to collate all empirical evidence that fits pre-specified eligibility criteria in order to answer a specific research question. It uses explicit, systematic methods that are selected with a view to minimizing bias, thus providing more reliable findings from which conclusions can be drawn from and recommendations made (Oxman & Guyatt, 1993).

This was deemed an appropriate methodology for the present study as it provided a systematic summation of studies reporting on the coherence and methodological rigour. In doing so, the present study addressed one of the gaps identified in the narrative literature review. The systematic review enabled the researcher to compile and synthesise data from all relevant sources meeting the inclusion criteria, whilst minimising bias as an effort to answer the presented review questions.

3.2.5 Inclusion Criteria

Studies were eligible for inclusion based on the following:

- Types of studies

The present study reviewed studies with qualitative, quantitative and mixed-method methodologies. All research designs within these methodologies were considered to ensure that all available studies, latest developments in research and knowledge regarding psychosocial interventions implemented with children presenting with DCD/Dyspraxia were covered.

Studies that were included were accessible through electronic databases at the library of the University of the Western Cape. Studies were required to be full text, open-accessed, peer reviewed and in the English medium.

Outcomes of studies were allowed to be presented statistically, descriptively or a combination of the two approaches.

Studies were eligible for inclusion if they reported on the outcome of psychosocial interventions which indicated improvement in the development of the children presenting with DCD/Dyspraxia. Additionally, full text articles have been considered for inclusion to enable the identification of readily accessible current best evidence regarding psychosocial interventions to be implemented at home which could enhance the development of a child with Dyspraxia.

- Types of participants

The review considered studies that included psychosocial interventions implemented with children presenting with DCD/Dyspraxia.

- Time Period

The present study adopted the timeframe between 2003 and 2013, for review purposes, have been based on the assumption that the most recent literature (10 years) would be accessed to provide evidence of current best practice.

3.2.6 Exclusion Criteria

Studies have been excluded if they were not published within the designated time period, if they were not housed in one of the databases available at the UWC library, if they were not peer-reviewed and were not available as full texts or in English.

Additionally, studies published in foreign language only have been excluded as well as studies which did not address psychosocial approaches in the management and treatment of children presenting with DCD/Dyspraxia. Literature reviews and randomized control-trials were also excluded.

3.2.7 Levels of Review

The systematic review was conducted on three levels, namely:

1. identification of suitable titles
2. screening of abstracts
3. evaluation of full texts for eligibility

The description below includes the strategies and instruments employed at each level.

Identification

Literature was retrieved from database searches.

- Database Search

Database searches started with the identification of appropriate keywords and search terms. The following keywords were identified from literature: ‘Developmental Coordination Disorder’, ‘DCD’, ‘Dyspraxia’, ‘Apraxia’, ‘treatment’, ‘management’ and ‘psychosocial interventions’.

These preliminary keywords were entered into the following electronic databases: Ebscohost, SAGE, Biomed and Sciencedirect, in order to identify text words and search terms contained in titles and abstracts and the index terms used to describe the articles. However, these keywords only produced a limited amount of data. As a result, the following new keywords were identified namely 'social interventions', 'children', and 'parents'. Keywords were further explored and combined by using Boolean operators such as 'AND' and 'OR' in order to increase the power and the efficiency of the search. The final keywords were combined into eight strings namely:

> 'psychosocial interventions' OR 'social interventions' AND 'children' AND 'Dyspraxia'
>
> 'psychosocial interventions' OR 'social interventions' AND 'children' AND 'DCD'
>
> 'interventions' AND 'parents' AND 'children' AND 'DCD'
>
> 'social interventions' AND 'children' AND 'Dyspraxia' OR 'DCD'
>
> 'treatment' OR 'management' AND 'children' AND 'DCD'
>
> 'treatment' OR 'management' AND 'children' AND 'Dyspraxia'
>
> 'interventions' AND 'treatment' AND 'children' AND 'DCD'
>
> 'interventions' AND 'treatment' AND 'children' AND 'Dyspraxia' OR 'apraxia'

The strings mentioned above were used in a comprehensive search of library databases and published research reports available at the University of the Western Cape library. The databases at the UWC library are organized according to subject or discipline and the comprehensive search was done across three broad areas: Health; Education; Social Science and Natural science.

Screening

The title stage was used to select articles for inclusion based exclusively on the relevance of the title by two reviewers. The articles identified as appropriate for inclusion were then assessed at the abstract reading stage.

Abstracts were retrieved based on the titles successfully identified as relevant in the previous level. A pair of reviewers worked together by screening abstracts for further inclusion, using the inclusion and exclusion criteria of the study.

Articles deemed appropriate for inclusion moved onto the next level of the review, whereas studies meeting the exclusion criteria did not proceed to the next level. The information of all abstracts that were assessed was recorded in the Abstract Summary sheet.

The abstracts meeting the inclusion criteria at the abstract stage were considered for full text reading. In this stage, two reviewers assessed the selected articles using a quality assessment tool.

Attention was directed towards the characteristics of sample groups, the accessibility of full texts of studies, study designs, methods of analysis, outcome measures, time period and language of included studies.

<u>Eligibility</u>

The abstracts of studies that were successfully screened in the previous level moved forward to full text reading. These studies were evaluated for quality of evidence was assessed using the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework adapted from Glasgow (1999; 2001) and Blackman et al. (2013). This is a useful tool to translate research into practice by promoting the development and evaluation of interventions (Matthews, Kirk & Mutrie, 2014).

Eligibility for inclusion in the summation was determined by a threshold score set by the primary researcher in consultation with the supervisor. Below is a description of the critical appraisal tool used and the threshold score set for inclusion in the review.

Critical Appraisal Tool (RE-AIM)

The critical appraisal tool used to assess the methodological quality of studies to be included in the review (Appendix G) was adapted from Glasgow (1999; 2001) and Blackman et al. (2013). The inclusion criteria made allowance for studies using qualitative and/or quantitative methodologies. As a result, the critical appraisal tool for this study was selected taking into account the published guidelines for reviewing qualitative studies (Letts et al., 2007) and quantitative studies (Law et al., 1998). The Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework (Dzewaltowski et al., 2004) was used to further assess the quality of evidence. Matthews, Kirk and Mutrie (2004) assert that the RE-AIM model is a valuable tool to convert research into practice through the promotion of development and evaluation of interventions.

A comprehensive approach to deliberating five aspects imperative in evaluating the prospective public health impact of an intervention is offered when using the RE-AIM framework. Matthews et al. (2014) describe these dimensions as follows:

- *Reach* of the intervention for the intended target population
- *Effectiveness* of the intervention in achieving the desired positive outcomes
- *Adoption* of the intervention by target staff, venues and/or organisations
- *Implementation*, consistency and adaptation of the intervention protocol in practise
- *Maintenance* of intervention effects on individuals or settings over time.

Sweet, Ginis, Estabrooks and Latimer-Cheung (2014) suggest that the RE-AIM framework has been applied to understand the impact of implementation of interventions. Furthermore, in order to work with this framework, Sweet et al. (2014) add that a pair of reviewers need to work together at every level and record relevant information. However, in the case in which the reviewers disagreed, they are to consult their supervisor and engage in a discussion to reach an agreement.

- Threshold score

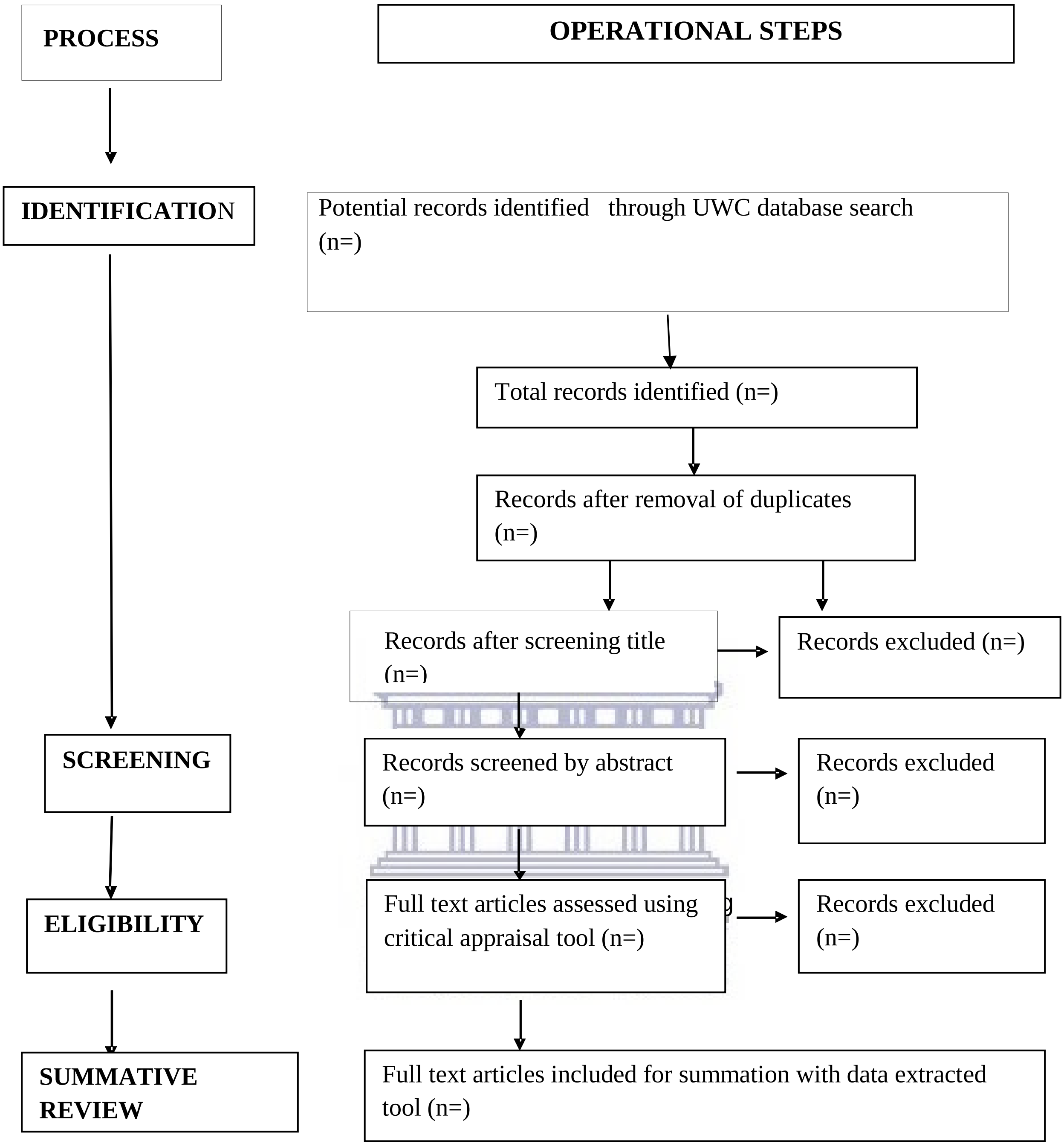
Each fully reviewed study was awarded a composite percentage indicating its methodological rigor and overall quality from weak (0-40%), moderate (41-60%), strong (61-80%), or excellent (81-100%). In order to be included in the review, full text articles had to obtain a threshold score of 61% or higher (i.e. "strong"). The critical appraisal tool was designed to be quite comprehensive. Therefore, the cut-off score of 61% could be set so as to not exclude articles due to a too stringent requirement. All full text articles that satisfied the threshold score proceeded to the data extraction process. The stringent appraisal and high threshold score for eligibility excludes poorly structured studies with inadequate methodologies and in turn increases the validity and reliability of the current study as it provides the best amalgamated group of findings from which decisions and conclusions may be drawn (Hemingway & Brereton, 2009).

- Data extraction sheet

All the articles satisfying the threshold score, was subjected to the data extraction process. Data extraction was done by using a self-constructed data extraction tool that was based on the objectives of the study and the different levels of the analysis.

Figure 2 below is a flow chart that reflects the levels of review and the operational steps included at each level. The flow chart was adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reference for preferred ways of reporting systematic review processes (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009).

Figure 2: Levels of Review



3.2.8 Method of Review

A pair of reviewers worked together at every level of evaluation and documented their findings independently. At the end of each level, the reviewers compared their findings and recorded it accordingly.

3.2.9 Analysis

According to Screiber, et al. (1997), a meta-synthesis can be defined as "bringing together and breaking down of findings, examining them, discovering essential features and, in some way, combining phenomena into a transformed whole". A meta-synthesis can lead to new interpretations of research, as well as develop new theories through the extension of knowledge (Thorne, Jensen, Kearney, Noblit & Sandelowski, 2004). Sandelowski, Docherty and Emden (1997) acknowledged three types of meta-synthesis used for systematic reviews. The first identified type of meta-synthesis is *theory building* which looks more broadly at a research phenomenon (Finfgeld, 2003). *Theory explication* is the second type, which is a way of reconceptualising the original phenomenon by fleshing out abstract concepts. Finally, *descriptive meta-synthesis* relates findings on a theoretical level to build a tentative theory. Although these types of meta-synthesis are discussed as independent methods, they are rather interconnected and co-dependent (Finfgeld, 2003).

These forms of meta-synthesis are not discrete, but are complimentary. The present study has incorporated a descriptive meta-synthesis integrating it with the RE-AIM framework as the framework can play an important role in further strengthening the evidence base for the effectiveness of interventions for children presenting with DCD/Dyspraxia.

The literature was reviewed by ranking studies based on the extensiveness of the information on the intervention such as the scope of the intervention, the theoretical orientations etc. (as reflected in the objectives). Moreover, classification of studies was ranked according to the methodological rigor as measured by the quality appraisal tool. In addition, the RE-AIM framework was in part assessed and reported on the *Reach* (proportion of the target population); *Efficacy* (success rate of the intervention defined by positive outcomes); *Adoption* (proportion of settings, practices and plans that will adopt this intervention); *Implementation* (extent to which the intervention is implemented as intended in the real world) and *Maintenance* (extent to which a program is sustained over time).

3.2.10 Ethics

The systematic review utilised published articles which are considered to be in the public domain, ensuring transparency and thus no further permission for access was required. Permission to conduct the study was obtained from the Higher Degrees and Senate Research Committees at UWC (Appendix I).

The primary researcher is a registered student at the institution and has full access to the databases available in the library of the University of the Western Cape. All steps were employed by the researcher to maintain the integrity of the study through the avoidance of misconduct and plagiarism.

3.3 Phase 2: Qualitative Study

Phase 2 of the present study adopted a qualitative approach; therefore, the subjective experiences of participants were explored which enhanced the richness and depth of the inquiry. This study explored the subjective experiences of mothers of children presenting with DCD/Dyspraxia.

In the following section, the aims, objectives, research question, research design and research setting are discussed; the research procedure, data collection and analysis, reflexivity, and credibility, comfortably, dependability and transferability and trustworthiness are also presented. Lastly, the ethical considerations are also presented.

3.3.1 Aim

The aim of this research study was to explore the subjective experience of mothers who have children presenting with Developmental Coordination Disorder/Dyspraxia and the psychosocial interventions they use to manage the disorder in their home.

3.3.2 Objectives

The specific objectives of the qualitative study were to:

- explore the subjective experience of mothers who have children presenting with Developmental Coordination Disorder/Dyspraxia.

- identify the various psychosocial interventions use in the home environment by mothers of children presenting with DCD in managing the disorder.
- explore some of the support available as well as the support needed by mothers of children presenting with DCD.

3.3.3 Research Question

What are the subjective experiences of mothers who have children presenting with Developmental Coordination Disorder/Dyspraxia and what psychosocial interventions do they use to manage the disorder in their home environment?

3.3.4 Research Design

The research design refers to the plan of the researcher, in order to conduct the study and to collect the data. The current study adopted an exploratory research design, as it assists in accounting for subjective personal account. Terre Blanche et al., (2011) stated that the need for an exploratory approach arises when the researcher does not have a clear idea regarding the information of the topic. According to Visagie (2010), an exploratory study aids a researcher to develop concepts more clearly and to understand the issue. Therefore, the present study employed a qualitative approach, as it would be best suited to conduct the study and formulate the research question from an exploratory research design.

Exploratory studies searches for ideas, patterns, and themes (Shaughnessy, Zechmeister, & Zechmeister, 2010). In this research study the researcher gathered themes and patterns that were significant from the data collection. It has also allowed the researcher to develop explanations, from the participants' point of view, without prior expectations, therefore, acquiring personalised understanding of the researched issue.

3.3.5 Research Setting

In this research study the participants have been afforded the opportunity to explore their experiences within a safe environment. The focus groups were conducted at a conference centre within the Durbanville area. The study was conducted within the Cape Metropole region.

The researcher recruited participants from the various support centres within the metropole region. These support centres accommodate children presenting with various special needs requirements including Autism Spectrum Disorder (ASD), DCD, Attention Hyperactivity Deficit Disorder (ADHD), Cerebral Palsy (CP), etc. Some of these centres provide basic foundation schooling, while others provide more intense one on one facilitation for these children in order to facilitate their routine and adaption to certain areas depending on their needs, based on an individual educational programs. These support centres often provide guidance to parents in order to assist them to understand their child's diagnosis and practical guidelines to manage the disorders within their home environment.

The support centres attract parents and children from low, middle and middle to upper socio-economic communities. Research has indicated that low socio-economic communities may consist of the environment characterised by high levels of poverty, unemployment, crime, substance abuse and low levels of education (Nowell & Boyd, 2010). Therefore, it is important to be mindful in acknowledging the diversities that exist in addition to the resources and services available to these communities. However, the researcher intended to recruit a diverse sample that is racially, culturally, and socio-economically diverse.

3.3.6 Participants

The participants for the current study were mothers of children presenting with DCD/Dyspraxia, thus the sample constituted only female participants. According to Santrock (2009), mothers are generally the primary caregiver of a child. Therefore, participants were recruited by means of purposive sampling, as only mothers who have children presenting with DCD/dyspraxia are regarded as a relevant source of information for this subject and only they were able to provide their experience and knowledge. The researcher recruited 16 participants in total who were part of three respective focus groups.

This study utilised a purposive sampling. Purposive sampling allows the researcher to recruit participants that are knowledgeable and who are able to provide the information and experiences the researcher is seeking (Visagie, 2010).

Table 1: Demographical presentation of participants (Group 1)

Focus group 1						
Participant	**Age**	**Gender**	**Population group[1]**	**Marital status**	**Age of child**	**Gender of child**
Participant A1	37	Female	Coloured	Married	4	Male
Participant A2	34	Female	White	Married	6	Male
Participant A3	38	Female	White	Married	3	Female
Participant A4	34	Female	White	Divorced	3	Female
Participant A5	40	Female	White	Married	12	Male
Participant A6	38	Female	Coloured	Married	5	Male

---

[1] The terms "African", "Coloured", "Indian" and "White" is used to refer to the racial categories constructed by the apartheid government of South Africa. However, although originally used as an apartheid racial designation, these categories are still used in South African (Green, Sonn, & Matsebula, 2007). Once again, my use of these terms are not intended to represent race as fixed or unchanging (Weedon, 1987).

Table 2: Demographical presentation of participants (Group 2)

Focus group 2						
Participant	**Age**	**Gender**	**Population group**[2]	**Marital status**	**Age of child**	**Gender of child**
Participant B1	36	Female	White	Married	8	Male
Participant B2	42	Female	White	Married	5	Male
Participant B3	48	Female	White	Separated	5	Male
Participant B4	39	Female	Coloured	Married	5	Male

---

[2] The terms “African”, “Coloured”, “Indian” and “White” is used to refer to the racial categories constructed by the apartheid government of South Africa. However, although originally used as an apartheid racial designation, these categories are still used in South African (Green, Sonn, & Matsebula, 2007). Once again, my use of these terms are not intended to represent race as fixed or unchanging (Weedon, 1987).

Table 3: Demographical presentation of participants (Group 3)

Focus group 3						
Participant	**Age**	**Gender**	**Population group**[3]	**Marital status**	**Age of child**	**Gender of child**
Participant C1	38	Female	White	Married	11	Male
Participant C2	34	Female	Indian	Married	4	Male
Participant C3	33	Female	African	Married	5	Male
Participant C4	40	Female	White	Married	7	Male
Participant C5	40	Female	Coloured	Married	5	Male
Participant C6	38	Female	Coloured	Married	5	Male

The three tables above illustrate the basic demographics of the participants who participated in the study. As mentioned, there were three focus groups which occurred over a period of ten months. The three tables demonstrate that the demographics of the mothers who participated in the study were not a representation of the general population of South Africa or the Western Cape. It should be noted that the aim of the study was to recruit a diverse sample and to explore the subjective experiences of mothers who parent a child presenting with dyspraxia and not to generalise the findings to the broader population of mothers in South Africa. Also, it was the researcher’s intentions to conduct four focus

---

[3] The terms “African”, “Coloured”, “Indian” and “White” is used to refer to the racial categories constructed by the apartheid government of South Africa. However, although originally used as an apartheid racial designation, these categories are still used in South African (Green, Sonn, & Matsebula, 2007). Once again, my use of these terms are not intended to represent race as fixed or unchanging (Weedon, 1987).

groups with eight to ten participants in each group, however, saturation point was reached with the third focus group and therefore the researcher did not continue with a fourth group.

3.3.7 Data Collection and Research Procedure

Firstly the researcher sought permission and ethical clearance from the Research Ethics Committee of the University of Western Cape. Furthermore, permission from the identified support centres was sought to recruit participants. The individuals that met the criteria for the study and who gave informed consent was briefed on what the study entailed (refer to Appendix A). Subsequently, participants indicated on a voluntary basis that they would like to proceed with the study (Appendix B), they also had to sign a confidentiality agreement (Appendix C). The data was then collected by means of three focus groups, prior to the focus group sessions, participants signed the consent forms and ethical considerations such as confidentiality were discussed.

The researcher transcribed that data verbatim, as the focus groups were audio-recorded. The transcriptions were then analysed from a thematic analysis perspective. With assistance from the researchers' supervisor the data was then coded and themes were gathered. Assistance from the supervisor allowed the researcher to analyse the data more objectively

According to Visagie (2010) the choice of data collection depends on the purpose of the study, the resources available and the skills of the researcher. In this study the researcher made use of primary data collection tools, which included methods in which new data is gathered. In addition, the researcher also made use of interactive data collection tools, which entails the human interactive and social-communication aspect of research (Visagie, 2010). Hence, this study is of a qualitative nature that seeks to describe and explore the data. Considering these criteria, the researcher proposed the following data collection tools:

- <u>Focus Group</u>

A focus group is a predetermined discussion where the researcher has an objective to obtain perspectives on a defined area of interest in a non-threatening environment. Laimputtong (2011) stated that focus group methodology to explore and examine what individuals think, how they feel and why they think the way they do about issues of importance to them without pressuring them into making decisions or reaching a consensus. Focus groups are beneficial to qualitative research since it allows an opportunity for the researcher to have an in-depth discussion on the given topic (Laimputtong, 2011). In addition focus groups allow the researcher to explore a range of feelings and experiences related to the topic of the research (Visagie, 2010). Therefore, the researcher deemed it fit to make use of focus groups, since it allowed the opportunity to have an in-depth discussion on the topic.

Even though the topic of this research study is of a sensitive nature and the participants are a vulnerable group, Laimputtong (2011) has found that focus groups allow peers support and reassurance. The current study was conducted within three focus groups with the mothers of children presenting with DCD/Dyspraxia. As cited in Visagie (2010) focus groups usually consist of 6 to 10 participants. Each of the focus group sessions of the study conducted consisted of between 6 to 9 individuals.

Focus group sessions took between one and two hours to complete. The amount of participants per group was a contributing factor on the amount of time which the focus groups took to gain all relevant information and gain insight on perspectives of mothers.

- Interview Schedule

The Interview Schedule had 2 sections: Section A collected demographic information and Section B contained about 8-9 questions. These key questions were exploratory in nature and formulated from literature but also based on the key research questions.

Subjective experiences in the focus groups was explored by means of both open-ended and semi-structured questions from a list of set questions with some deviation. These questions aids in building rapport and encouraging participation in addition to getting more detailed, factual information (Ballou, 2008). Therefore, the use of semi-structured questions facilitated an environment conducive to create an atmosphere for conversation where participants felt that they could contribute to the research topic as they felt the need to add to share their subjective experiences to the focus group discussion.

It is important to note that the interview schedule was not used as a questionnaire but rather as a guide to assist the researcher when the focus group was conducted. Therefore, the researcher was flexible with the use of the interview schedule when the focus group was conducted.

- Interview Techniques

While conducting the interviews, the researcher and facilitator made use of various interview techniques to augment the quality of the procedure and outcomes. In addition the interview techniques created a comfortable and contained environment for the participants. These interview techniques included: active listening, clarification, linking and reflection and encouragement. Ballou (2008), stated that interviewers should be exceptional at listening skills, question framing, clarification, personal interaction as well as gentle probing for elaboration. The participants eagerly participated in the study and displayed a relaxed demeanour while sharing their stories.

- Data Recording

Within this study the researcher made use of audio-recordings with the permission from participants as well as observational notes which were later used to transcribe, analyse and report on the data. Laimputtong (2011) stated that recording a focus group session is invaluable and recommended for all focus groups. The use of the voice recorder allowed the researcher to pay close attention to what the participants said and to observe the dynamics within the group. Recording the sessions gave the researcher the opportunity to observe not only what the participants said but how they said it. The participants were fully aware that the voice recorder was used and they understood why it had been used

3.3.8 Reflections of Data Collection

In order create a good milieu within the discussion groups, the researcher introduced ice-breaker activities at the beginning of the groups. The researcher's aim with the ice-breakers was to facilitate a comfortable environment conducive to the sensitive nature of the topic. Initially the participants came across to be nervous and hesitant, hence by implementing the ice-breaker, the researcher created a soothing and relaxing atmosphere to encourage participants to engage in discussions. The researcher also described the purpose of the discussion with participants involved.

Upon reflection, the researcher observed that at the beginning of the discussions, participants seemed anxious. However, as the discussion progressed – participants engaged more freely and eagerly and added to the conversation. Some mothers engaged more than others, while some seemed more reserved.as participants engaged within discussion, they were able to relate to other mothers and they became aware of the commonalities that other mothers experience such as their struggles, concerns and experiences. The participants established a good rapport amongst themselves thus creating a safe space to open up about their experiences as mothers and in that space created a supportive environment for each other as well. Some of the moms would say to each other 'you know I went through the same thing and I felt so alone……' then other moms would say 'you know what, at least now we have each other to talk to and to rely on, we should help each other through this because other people won't understand'. This supportive context allowed the participants to relax and feel comfortable and thus created an environment for the researcher to capture rich, authentic responses that were often deeply reflected upon.

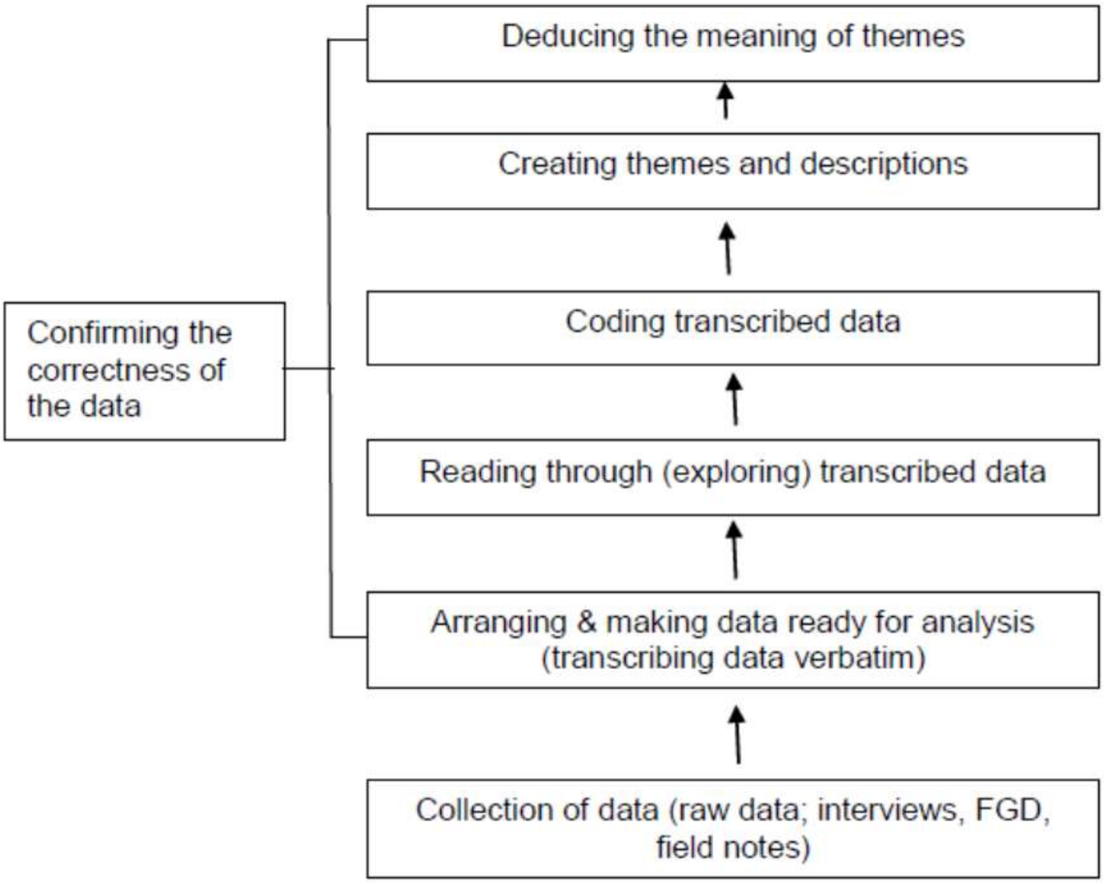
At the end of each focus group – the researcher reflected on the general feelings amongst participants. Most mothers reported that they had an enjoyable experience and that they would enjoy more frequent discussions within a group of mothers who are able to relate to their experiences and their journey with Dyspraxia.

The response by the participants showed that it was enjoyable, as they were able to express some of their feelings and opinions in a safe environment without the fear of being judged or offending someone. No further support was needed as the participants expressed that they were feeling so good after the discussion

3.3.9 Data Analysis

Upon completion of transcribing the collected data, data analysis commenced. The data collected in this study was analysed using thematic analysis. Visagie (2010) asserts that thematic analysis is analysis of the data by theme. Each theme was placed in a specific file once it had been contextualised. The first entry into analysis is to critically assess the data as it is collected, ascertain gaps in the information, and to commence with various concepts and establish a framework to assess if the data collected will provide more information on issues relating to the research topic.

Figure 3: Levels of data analysis



There are essentially five major steps that make up the levels of analysis (Braun & Clarke, 2006). The first step involves familiarising oneself with the data which can be achieved by engaging with the date during the collection process and looking for meaning by repeatedly reading the data from the transcripts. Step two is *initial coding* which involves the assignment of semantic codes to the raw data and it could be sentences or words. Step three involves creating themes by converting the codes in step 2 into themes. Step four is *reviewing and naming themes*, where the researcher reviews and finalises themes identified in step 3. The final step is *interpreting themes and producing a report.* The researcher places themes and sub-themes into a coherent system where the analysis provides an illustration of understanding. In addition to describing the data, the report also provides a reflexive stance of engaging with the data with regards to the research aims.

After the transcription the researcher compiled a table with the main questions with the relevant responses. Each response was coded, and due to prevalence or pattern that occurred that code became a theme. The researcher took into account not only the frequency of a code, but also took into account when certain codes re-emerged or not. The results of the qualitative study highlight the process of analysis. The researcher also consulted with an independent coder to ensure that her own bias was not reflected within the study, but instead the view of the mothers. The independent coder agreed upon the themes found by the researcher and found corresponding themes arising.

3.3.10 Trustworthiness

Lincoln and Guba (1985), claims that trustworthiness in a qualitative study is established by considering the use of credibility, confirmability, dependability and transferability. Terre Blanche, et al. (2011), avers that credibility is established while the process is being undertaken. Therefore, it can be stated that the present study maintained credibility while proceeding.

Trustworthiness was maintained as the analysis of the data was reported as it is and not manipulated in any way to ensure a positive outcome which the researcher may have been hoping for. Quotes from some participants were used to highlight some of the themes that arose within the study, and any excerpt or changes to the quotes was not taken out of context. Results are the responses of the participants and interpreted based on what they have said.

Through the continual use of engagement with participants during the focus groups, the researcher was able to obtain credibility. According to Lincoln and Guba (1985), the consistency of findings is related to dependability and is connected to credibility as the demonstration of the former confirms the latter. The researcher also made use of the services of an independent coder to enhance dependability.

Transferability seeks to confirm whether the results of the research could be transferred to other contexts or settings. The researcher achieved this by using purposive sampling to collect rich, detailed data and providing a background to study

The researcher clearly described the methodology employed during the study by indicating the instruments used during data collection and the type of participants, therefore, the results can be applied to other settings.

Confirmability was attained by providing objective findings as the result of the ideas and experiences of the participants and not the preferences of the researcher (Lincoln & Guba, 1985). By making use of an audit trial, dependability and confirmability was obtained (Terre Blanche, Durrheim, & Painter, 2011). The audit trial keeps account of all records and activities throughout the research process that aids in the advancement thereof, which the research supervisor then examined.

3.3.11 Reflexivity

When conducting a qualitative study, as a researcher it is vital that the researcher be aware of the role one plays in the research process and the way information is collected and conveyed. The researcher cannot be removed from the study. Therefore, a portion of the study and written report is dedicated to the researcher's bias and opinions so that the reader can know when, where and how the researcher's bias has or could have influenced the study.

Having tutored and facilitated children presenting with special needs including DCD at a centre providing the services, it was essential that the researcher be sensitive to and maintain critical self-reflection and be cognisant of one's own views and opinions. The researcher maintained an objective stance and ensured to keep a journal and consulted with supervisors. It was vital to ensure that it is the participants' views that are represented at all times throughout the research process in order to enhance trustworthiness, transparency, and accountability.

The researcher has shown respect to the participants' views and used the skills he has learnt so far, to allow the participants to speak openly and without judgement or much censorship. The researcher has kept close records of what the participants have said both by recording the focus groups as well as taking notes. The researcher has transcribed the conversation directly as it was said and nothing was changed. The researcher took notes of her biases and reframed from allowing it to influence any of the participants. Due to the researcher's awareness of biases, the researcher refrained from straying much from the interview schedule which could have affected the interaction and discussions within the focus group.

The researcher also consulted with an independent coder to ensure that her own bias was not reflected within the study, but instead the view of the mothers. The independent coder agreed upon the themes found by the researcher and found corresponding themes arising.

3.3.12 Ethical Considerations

Ethics can be defined as moral principles that are suggested by individuals or groups which are widely accepted and offer rules and behavioural expectations about the conduct towards experimental subjects (Shaughnessy et al., 2010). This research has been conducted in a professional and ethical manner. Since this study is qualitative and of a sensitive nature the researcher aimed to maintain high ethical standards. Prior to conducting the study, this study has been approved and ethically cleared (Appendix I) by the relevant committees which included the Higher Degree Committee and the Senate Research Committee.

Furthermore, permission from the identified support centres was sought to recruit participants. Prior to recruiting participants for the study, the researcher provided an information sheet explaining the benefits, rights and responsibilities of participants (Appendix A) to the potential participants. Once participants have indicated interest to participate, the researcher obtained written consent (Appendix B) from the participants; ensuring them that their identity would remain confidential and the information obtained would only be used for the purpose of the research project. The recording of the focus groups was done to accurately gather what the participants said and divulged within the group. The recordings, notes and any other material used to gather information was kept in a safe place. The participants were kept anonymous as they did not use their name and are either identified as Participant A1, A2, A3, etc. (group 1), Participant B1, B2, B3, etc. (group 2 students) and Participant C1, C2, C3, etc. (group 3). Demographics of the participants were used in the report however, no other personal or identifying information were released.

The participants' rights to privacy was respected. They were informed of the right to withdraw from the study at any time. They were also not forced to respond to any question they did not feel comfortable to answer. Minimal risk of harm was present during the research process and the participants were not deceived.

Debriefing participants at the end of the research session is vital as it benefits both the researcher and participants (Shaughnessy et al., 2010). An important goal of debriefing is that it educates participants about the research and leaves them with positive feelings about their participation (Fouka & Marianna, 2011). The debriefing process entailed a reflective discussion amongst participants. The discussion was focused on the emotions that the focus group evoked and what that was like for the participants. Each participant had an opportunity to share; what they expected it to be like to disclose and also what it was actually like to disclose. During the debriefing process the researcher made use of effective counselling skills such as; empathy, reflecting, mirroring, summarising and normalising the participants' feelings. In addition the researcher also made the participants aware of the possible referrals lest that the participants have become emotionally distressed due to the focus group.

3.4 Conclusion

This chapter provided the methodological design of the study. For phase 1 of the study, a systematic review design was used to achieve the aims and objectives of the study. Phase 2 took on a qualitative research design in order to achieve the aims and objectives.

Furthermore, the chapter provided operational steps that were undertaken in the systematic review, the methodological framework which included the inclusion and exclusion criteria, retrieval and assessment strategies in the review. The chapter additionally provided information about the instruments used in both phases of the study, the methodological quality appraisal process of phase 1 as well as the method for analysing the results of the systematic review.

The ethical considerations for each phase of the study was also presented in this chapter.

A qualitative research design was used to achieve the aims and objectives of phase 2 of the study. The research design, research setting, participants as well as the data collection and research procedure for phase 2 of the study is highlighted. Regarding phase 2, the following were also addressed: data analysis, trustworthiness, reflexivity, and finally the reflections of data collection.

The following chapter provides the findings of the systematic review, as well as the discussion of findings.

CHAPTER 4: FINDINGS - PHASE 1

(SYSTEMATIC REVIEW)

4.1 Introduction

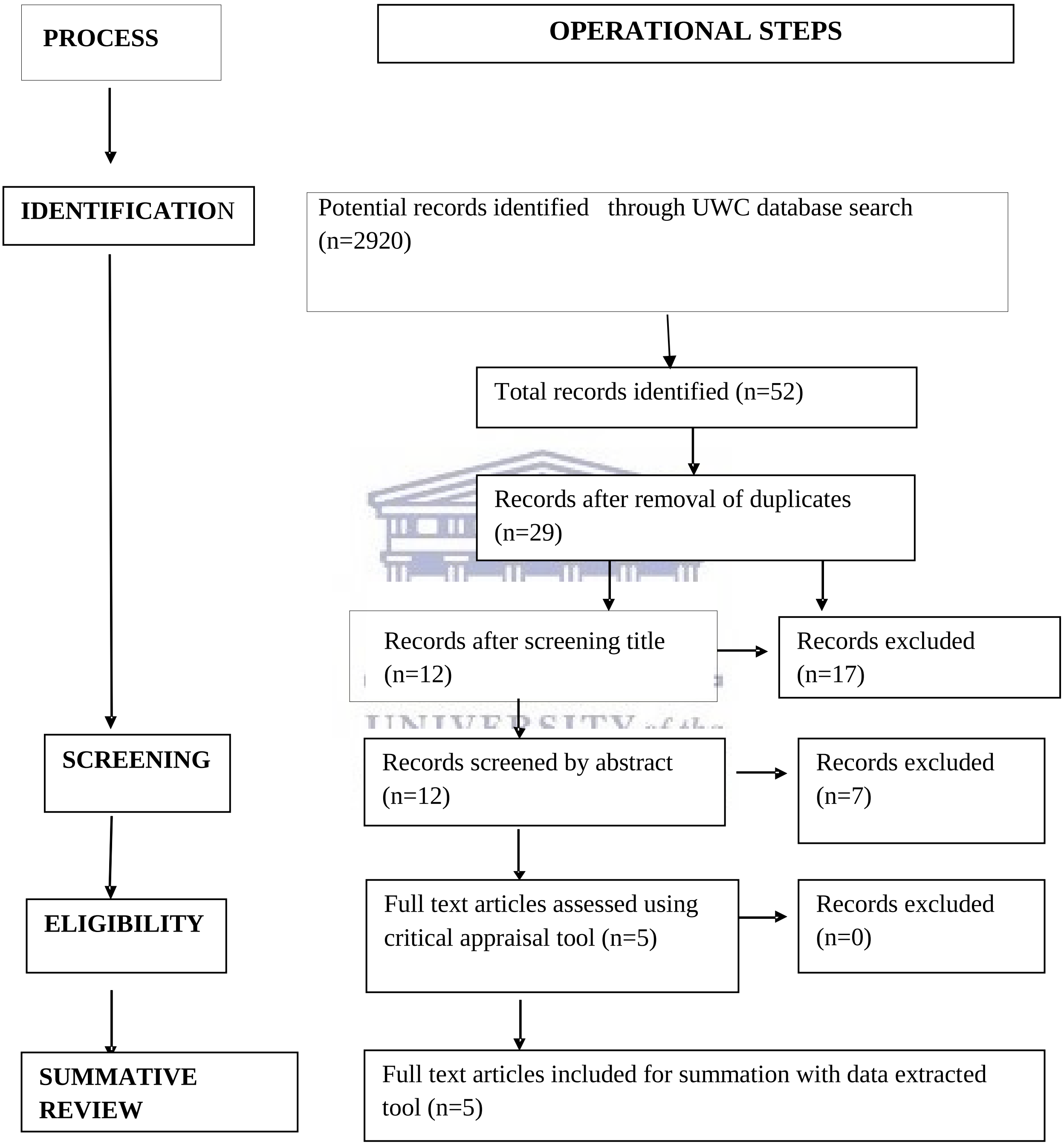
This chapter presents the findings of the systematic review which was essentially Phase 1 of the study. These findings provide an evidence base of filtered information assessed for methodological rigor and coherence on interventions for children presenting with Developmental Coordination Disorder. The chapter presents a detailed explanation on the process of results, and methods utilized in conducting the review. It further presents the results and provides a discussion of the results of the review.

4.2 Process of Results

The process of results and findings are presented by means of the levels of review adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) as discussed in Chapter Three (Moher, et al. 2009). The levels of review, namely *Identification, Screening,* and *Eligibility* are descriptively discussed and it outlines the research findings extracted at each level of review respectively.

Figure 3 below summarised the results of each step or level of the review process. The figure is repeated here in its second iteration including the results at each step so that the design or process of the review study is reinforced.

Figure 4: Completed Levels of Review



4.2.1 Level 1: Identification

The title search across all identified databases retained in the library of the University of the Western Cape yielded a search result of 52 titles. Duplications were removed from the total number of hits, resulting in a total of 29 prospective titles. From these, 12 titles were selected for possible inclusion.

From these, 12 titles were identified as possible inclusions for this study while consequently excluding a total of 17 titles from the next level of review. Boolean advanced searches were limited to a span of 10 years, ranging from 2003–2013, English medium, peer-reviewed and full-text articles.

4.2.2 Level 2: Screening

The abstracts of all 12 titles identified at the previous level were reviewed, resulting in the inclusion of 11 abstracts that were deemed appropriate for the purpose of the study. Reasons for exclusion were as follows: the study did not address the research question and purpose abstracts were inadequate and poorly written, failing to report on significant elements of the study's design or methodological process; the sample group or target population was inappropriate; the study's design was inappropriate, taking the form of either a literature or systematic review; and the full text of articles was inaccessible via open access and were required to be purchased.

4.2.3 Level 3: Eligibility

After the critical appraisal, no articles were excluded. Studies that were included in the systematic review are those with the quality of evidence rated from 60% to 100%. Of these five articles, two scored between 60-79% (Peters, Henderson, & Dookun, 2004; Sangster, Beninger, Polatajko, & Mandich, 2005), while three of them achieved a score between 80-100% (Niemeijer, Smits-Engelsman, Reynders, & Schoemaker, 2003; Peens, Pienaar, & Nienaber, 2007; Sugden & Chambers, 2003). Table 4 depicts the scoring sheet and threshold scores of the articles.

The studies that are included rated high as the purpose of the studies were clearly stated while providing the rationale and aim of the studies which were explicitly related to the problem statement.

Moreover, the theoretical orientation of the studies were also described in detail, while identifying the population and sampling frame as well as motivating the sampling choice. Nonetheless, these studies did not explicitly report on ethics consideration but they further reported on the instruments used, their psychometric properties and the type of data produced by these instruments. They overtly stated and motivated the method of analysis and the appropriateness of the method of analysis relative to the research question and lastly, they provided correct interpretation of results and drew a clear conclusion supported by the findings.

Table 4: Critical Appraisal Scoring Sheet

RE-AIM	REACH			Effectiveness				Adoption			Implementation			Maintenance		Score	%
Dimensions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15		
Niemeijer, Smits-Engelsman, Reynders & Schoemaker (2003)	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	13	86.7%
Peens, Pienaar & Nienaber (2007)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	100%
Peters, Henderson & Dookun (2004)	1	0	1	1	1	1	1	0	1	1	1	0	1	0	0	10	66.7%
Sangster, Beninger, Polatajko & Mandich (2005)	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	10	66.7%
Sugden & Chambers (2003)	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	12	80%

4.3 Results

This section of Chapter 4 provides a general description of the studies reviewed in the study. It further provides the aims of the studies reviewed; a full description of the sample, geographical locations and the design of the studies reviewed. The chapter also provides a detailed description of the measures/ instruments used in the reviewed studies

4.3.1 General Description

The first section was the general description which consisted of the title, geographical location, population/sample, instruments and data analysis. Table 5 below reflects the results of this section of the data extraction process.

This systematic review examined the quality of primary studies in order to minimise bias in drawing conclusions. Using the descriptive meta-synthesis which aims to provide a broad description of the research phenomenon as proposed by Sandelowski, Docherty and Emden (1997), the results of the review are structured according to the following aspects: the purpose/aims of the studies, the sampling, the geographical location in which they were conducted, the study designs, measure/instruments used as well as the interventions in the studies. See Table 5 for the synthesis table of the 5 studies that met the threshold of methodological quality which is inclusive of information on the title, geographical location, population, study designs, instruments as well as the data analysis that was used in the reviewed studies.

Purpose/aims of studies

In one of the studies, the researchers focused on developing a Motor Teaching Principles Taxonomy (MTPT) in order to investigate what teaching principles therapists trained in Neuromotor Task Training (NTT) used in daily practice (Niemeijer et al., 2003). Peens, et al (2007) aimed to determine which method was most effective in enhancing motor proficiency and self-concept amongst children with DCD aged between 7-9 years old.

One study aimed at conducting an audit of parent/carer satisfaction with the service provided for children presenting with movement difficulties (DCD)/dyspraxia) at the out-patient physiotherapy clinic of a specialist tertiary referral paediatric hospital (Peters et al., 2004), whereas the study of Sugden and Chambers (2003) examined the extent to which parents and teachers, with guidance, can assist in the management of children with DCD; whether children with DCD are helped in this way and how this may contribute to our understanding of the condition.

Sangster, et al. (2005) examined whether strategy use changes following participation in the Cognitive Orientation to daily Occupational Performance (CO-OP) program, as compared to traditional approaches to occupational therapy intervention for children with DCD. A summary of the findings of the purpose/aims of the studies included in the review are provided in Table 6.

Geographical location/setting

The studies included the review were conducted in various locations. Two studies were conducted in the United Kingdom(Peters et al., (2004), Sugden & Chambers, 2003), one in Netherlands (Niemeijer et al., 2003), one in Potchefstroom, South Africa ((Peens et al., 2007), and one in Canada (Sangster et al., 2005). A summary of the geographic location/setting of the intervention studies included in the review are provided in Table 4.

Sample/participants

In the study conducted by Niemeijer et al. (2003), the sample consisted of 23 children diagnosed with DCD and 13 paediatric physiotherapists. One study (Peens et al., 2007) had a sample of 58 children diagnosed with DCD, while another study conducted by Sangster et al (2005) had a sample of 9 children presenting with DCD and a control group sample of 9 typically developed children. The study of Peters et al. focused on a sample of parents/guardians of 45 children diagnosed with DCD, while Sugden and Chambers (2003) included 31 children with DCD and their parents and teachers.

Design of studies

Of these five studies, two were observational studies (Niemeijer et al., 2003; Sugden & Chambers, 2003), while one was a longitudinal observational study (Peens et al., 2007). One study used a cross-sectional survey (Peters et al., 2004), and one study was a pilot case control study (Sangster et al., 2005). A summary of the design of the intervention studies included in the review are provided in Table 4.

Measures/instruments used

A variety of measures were used within the included studies for various purposes – many of these studies used assessment measures to determine motor functioning and competence. A summary of the measures/instruments used in the intervention studies included in the review are provided in Table 5.

- **Video recordings.** Two of the studies included in the review made use of video recordings (Niemeijer et al., 2003; Sangster et al., 2005). Video recordings were used for the purposes to observe the interventions implemented and making observations of the process. In the study conducted by Niemeijer et al. (2003) – the purpose of the video recordings was to observe the verbal overt actions of the therapist during a 30 minute session, whereas Sangster et al. (2005) recorded one or two sessions and scored the observations to ascertain the skill of the children with DCD at producing cognitive strategies for motor performances.
- **Movement Assessment Battery for Children (M-ABC).** Three of the research studies included in the review incorporated the Movement Assessment Battery for Children (M-ABC) as a measure to screen whether children have DCD (Niemeijer et al., 2003; Peens et al., 2007; Sugden & Chambers, 2003). The M-ABC has been norm-referenced for children aged 4- to 12-years-old (Niemeijer et al., 2003; Peens et al., 2007). The measurement offers an indication of a child's motor functioning in daily life. It specifically evaluates manual dexterity, ball skills, and balance skills (Sugden & Chambers, 2003). A higher score represents poorer performance, while a lower score signifies a better performance. The test

can additionally be used as a measure to assess effectiveness of treatment as stated in Niemeijer et al. (2003). Sugden and Chambers (2003) adapted an intervention plan for the children based on the checklist from the M-ABC.

- **Test of Gross Motor Development – second edition (TGMD-2).** Niemeijer et al. (2003) made use of the Test of Gross Motor Development – second edition (TGMD-2). This measure assesses gross motor functioning of locomotor and object control. It is a norm-referenced test designed for assessing children aged 3- to 10-years-old. A higher score represents a better quality of movement patterns (Niemeijer et al., 2003). Niemeijer et al. (2003) included this measure as it assesses 12 gross motor skills that are typically acquired by children in pre-school and early elementary grades.
- **The Tennessee Self-Concept Scale (Child Form) (TSCS-CF).** Peens et al. (2007) used the Tennessee Self-Concept Scale (Child Form) (TSCS-CF) in their study. It is a questionnaire consisting of 76 self-descriptive statements permitting the child to portray their own self-picture. The Child Form can be administered to children aged 7- to 14-years-old who can read at a second grade level or higher. It evaluates the following self-concept scores: Physical, Moral, Personal, Family, Social and Academic/Work (Peens et al., 2007).
- **Child Anxiety Scale (CAS).** Peens et al. (2007) also made use of the Child Anxiety Scale (CAS), which is a self-report questionnaire for children aged 5- to 12-years-old. The measure focuses on determining the anxiety of young children – hence, a higher score is indicative of higher anxiety (Peens et al., 2007).
- **Case notes.** The researchers used case notes in the study of Peters et al. (2004) as an attempt to corroborate the perception of parents/carer's of the child's difficulties. These case notes included reports on the M-ABC, The Developmental Test of Visual Perception (VMI), a sample of the child's handwriting, IQ test results, and clinical observations during assessment, sensory profile, physical activity and a leisure interest (Peters et al., 2004).

- **Survey.** A questionnaire was developed by the researchers of the study Peters et al. (2004) in collaboration with colleagues in the physiotherapy department. A mixture of closed and open-ended questions formed part of the 17 questions in the questionnaire. The closed questions sought factual information on details about appointment waiting time, source of referral and funding, etc. the closed questions required forced-choice responses which were simple to quantify. The open-ended questions strived to explore the satisfaction with particular aspects of services received and a Likert-like scale (Peters et al., 2004). Similarly, Sugden and Chambers (2003) used regular short questionnaires which they gave to the parents and teachers administering intervention to attain feedback concerning the amount of time spent on activities weekly, the appropriateness of the activities for each child and whether they found it beneficial for the child.

Table 5: General Description

Author	Title	Geographical location	Population/ sample	Study design	Instrument/measure	Data analysis
Niemeijer, Smits-Engelsman, Reynders & Schoemaker (2003)	Verbal actions of physiotherapists to enhance motor learning in children with DCD	Netherlands	**Sample:** 23 children diagnosed with DCD and 13 paediatric physiotherapists **Sample type:** Stratified sample **Final size:** 23	Observational study	Video recordings – for observation purposes of verbal and overt actions Movement Assessment Battery for Children (M-ABC) – assesses motor functioning of child Test of gross motor development – second edition (TGMD-2) – assesses gross motor functioning of locomotor and object control	Spearman correlations analysis undertaken
Peens, Pienaar & Nienaber (2007)	The effect of different intervention programmes on the self-concept and motor proficiency of 7- to 9-year-old children with DCD	Potchefstroom (South Africa)	**Sample:** 58 children diagnosed with DCD **Sample type:** Stratified sampling **Final size:** 58	Longitudinal observational study	Movement Assessment Battery for Children (M-ABC) – assesses motor functioning of child The Tennessee Self-Concept Scale - Child Form (TSCS-CF) – self-descriptive instrument of self-picture Child Anxiety Scale (CAS) – self report	Statistical software Statistica 5.5 used; two-way (ANOVA), Bonferroni post hoc analysis, one-way ANOVA and Tukey post hoc analysis undertaken, respectively

					questionnaire determining the anxiety of young children	
Peters, Henderson & Dookun (2004)	Cognitive Strategy Generation in children with Developmental Coordination Disorder	London (United Kingdom)	**Sample:** Parents/guardians of 45 children diagnosed with DCD **Sample type:** Stratified sampling **Final size:** 45	Cross-sectional survey	Case notes - which included reports on M-ABC, The Developmental Test of Visual Perception (VMI), a sample of the child's handwriting, IQ test results, and clinical observations during assessment, sensory profile, physical activity and a leisure interest Survey - Parent/guardians' perception of the presenting problem, parent/guardians' satisfaction with; the waiting time and information provided prior to the first appointment, physiotherapy identification of the problem, and intervention options. Parent/guardians' satisfaction with one-to-	Statistical software SPSS v. 11 used

					one intervention and home programme.	
Sangster, Beninger, Polatajko & Mandich (2005)	Provision for children with developmental co-ordination disorder (DCD): audit of the service provider	Canada	**Sample:** 9 children diagnosed with DCD, 9 typically developing children **Sample type:** Stratified sampling **Final size:** 18	Pilot case-control study	Video recordings - observations	Statistical software SPSS used
Sugden & Chambers (2003)	Intervention in children with Developmental Coordination Disorder: The role of parents and teachers	United Kingdom	**Sample:** 31 children diagnosed with DCD and their parents and teachers **Sample type:** Stratified/ convenience sample **Final size:** 31	Observational study	Movement Assessment Battery for Children (M-ABC) – assesses motor functioning of child Parent & Teacher Interviews	Statistical software SPSS v. 9 used; ANOVA undertaken

4.3.2 Descriptive meta-synthesis

This section of Chapter 4 provides a descriptive meta-synthesis of the studies reviewed in this systematic review. The section provides a detailed description of the interventions of the studies reviewed in the study. It further provides a table (Table 6) that indicates the aims of the studies, the interventions as well as well as the intervention/program descriptions of the reviewed studies.

Interventions

This Systematic Review assessed intervention studies. The RE-AIM Appraisal Tool assessed interventions based on the theoretical orientation of the interventions, the development of the interventions as well as the implementation of the programs. However, this section of Chapter 4 presents the interventions reported in the studies reviews, the scope and nature of the reviewed intervention studies.

- **Neuromotor Task Training (NTT).** In the study conducted by Niemeijer et al. (2003), Neuromotor Task Training was used as a task-oriented treatment programme for children with DCD in order to treat functional motor skills. It was developed for paediatric therapists in the Netherlands. Niemeijer et al. (2003) report that it is a skill-based, or task specific approach that focuses on teaching the tasks that has to be learned directly. It has been stated that the tasks are determined by the individual needs of the child, in addition to the capabilities, expectation and motivation of the child and their parents. The level of difficulty of tasks gets increased within the same functional task, as it is expected that this form of training will have a higher transfer to daily activities. Through implementing NTT, specific motor control processes that are thought to be involved are tapped by training functional skills. With this intervention, attention is paid to the most successful ways to instruct and provide feedback. When implementing NTT, therapists should provide the child with an image or idea of the task to be learned – i.e. demonstrations, verbal instructions and/or videotapes. Clear instructions should be stated about the task to be performed, how to do it and what to attempt to achieve a score, as it is deemed imperative for motor learning. In addition, instructions could also remind the individual on ways to recognise their own errors. In this approach, when a motor task is performed, it is imperative for skill learning to provide feedback about the task done.

- **Psychological intervention programme.** Peens et al. (2007) study implemented the psychological intervention programme which was focused enhancing the self-concept and discovering the self, hence self-acceptance was involved. The enhancing and enriching of the self-concept through awareness, uniqueness, individuality, competence, virtue (enriching self-esteem), belonging, interpersonal relations, handling anxiety, as well as a session for the parents on parenting skills, was also involved in the programme. The different dimensions that were addressed in the programme were the global self-concept, physical self, emotional self, thinking self, behaviour and social self. In the study conducted by Peens et al. (2007), each individual had to answer questions regarding themselves in writing. The concept of acceptance of shortcomings were also taught, while addressing acceptance of their appearances or feelings of shame regarding their physical abilities. This measure also enables identification, exploration and seeking the origin of emotions by means of making allowance for group activities. The psychologist responsible for this part of the study conducted the programme.
- **Motor-based intervention programme.** Peens et al. (2007) also implemented a motor-based intervention programme which incorporated the integration of task-specific kinesthetic and sensory integration treatment methods. A detailed programme (8 weeks, twice a week for 30 min) was implemented and was based on the age appropriate motor developmental characteristics for children in the age group 7–9 years. Each session started with fundamental locomotor activities combined with activities for improvement of vestibular stimulation and kinesthesis (e.g. rolling, skipping, hopping, jumping, galloping, and animal walks). Fine motor co-ordination and eye control also formed part of this approach. In the study of Peens et al. (2007), all of the activities were done in a group, except for the eye control activities

which were done individually. The primary researcher compiled and conducted the programme which was progressively adapted, once weekly. **Psycho-motor intervention programme.** This programme involved the integration of both the psychological and motor-based intervention programmes and was implemented in the study conducted by Peens et al. (2007). The children had two 30 minute weekly motor-based intervention sessions in addition to one psychological intervention session of 45 minutes. These intervention sessions were done over a period of 8 weeks.

- **Physiotherapy package.** In their research, Peters et al. (2004) incorporated a physiotherapy package which comprised of a comprehensive assessment conducted by a health care professional such as a specialist paediatric physiotherapist, a written report, hospital based one-on-one sessions and/or a home-school programme. It is an eclectic approach which is administered by a physiotherapist with formal qualifications in sensory integration (SI) and neurodevelopmental therapy (NDT); both of these focus attention on the sensory-motor foundation of movement competence. These approaches identify that the child's and family's views of the issue should form a central part of intervention planning and setting targets. The child and family are helped to identify, with the physiotherapist, the strengths and specific difficulties of the child to aim for setting and achieving realistic goals, reviewed at follow up. The families are advised to perform exercises in order to help to promote a healthy lifestyle. Stress management through developing awareness of muscle tension and use of breathing and relaxation is emphasised. The approach taken to helping the child achieve his/her targets is also similar regardless of the mode of delivery. Ideas for achieving these targets are offered either in the form of activities to do at home, or in the form of written advice which is passed on to the school educators via the parent/carer. In addition, most families are provided with advice on how to help the child acquire keyboarding skills (Peters, et al., 2004).
- **Cognitive Orientation to daily Occupational Performance (CO-OP).** Sangster et al. (2005) implemented the Cognitive Orientation to daily Occupational Performance (CO-OP) in their

study in addition to current occupational therapy treatment approaches (CTA) – discussion follows below. CO-OP is a verbally-based, individualised approach that focuses on guiding children to learn and discover cognitive strategies to solve motor problems. The aim is to teach the child self-talk and problem solving techniques to solve performance difficulties. Through intervention, the CO-OP therapist guides the child in the learning of a global problem solving strategy and the discovery of domain specific cognitive strategies that improve motor performance. The global cognitive strategy is a problem-solving strategy, which provides a structure within which the child can learn to talk through occupational performance problems. Domain specific strategies are used in specific tasks or situations to help achieve specific occupational performance goals. In their study, the children participated in 10 individualised CO-OP sessions. In CO-OP sessions, verbal interaction between the individual and the therapist takes place, and children are regarded as active participants in their therapy.

- **Current occupational therapy treatment approach (CTA).** Sangster et al. (2005) also implemented current occupational therapy treatment approaches (CTA). CTA activities integrate and are derived from a combination of neurodevelopmental, multi-sensory, biomechanical, and functional approaches. The techniques most commonly utilised by CTA therapists were sensory-integrative, fine and gross motor activities as well as direct skill teaching by the therapist, consisting of corrective instructions and directions. 10 individualised sessions of CTA were administered to children in the study. CTA is therapist-directed where the therapist provides more corrective instruction rather than suggestive guidance.
- **Task-oriented cognitive-motor approach.** In their study, Sugden and Chambers (2003) implemented an eclectic intervention approach for children with coordination difficulties – it is a task-oriented cognitive-motor approach. This approach provides practical guidelines which are drawn from various sources of academic and clinical literature. The basic components of the approach build upon the idea that the cognitive, affective, and motor

competencies of the child interact in a dynamic manner with the environment in which action takes place, and the manner in which the activities are presented. The intervention places emphasis on the child to perform functional tasks in settings which are similar to daily life – therefore it is a task-oriented intervention. The approach conceptualises the acquisition of movement competence as a problem solving exercise that involves action planning, action execution, and action evaluation. The professional, parent, or teacher's role is to identify the applicable skill and locate it in an appropriate setting. The task should be difficult enough so that the child is challenge, however it should not be too hard as it may lead to unobtainable objectives. Tasks include manipulation skills where objects are moved within the fingers – puzzle manipulation, peg turning, bead threading, coin juggling within the fingers may form one group whereas reaching and grasping and placing objects in different locations may form another group. In the study conducted by Sugden and Chambers (2003), the participants participated in a 40 week programme where there would be periods of 7 weeks where no intervention would happen, followed by 7 weeks of intervention implemented by either teachers or parents. The purpose of implementing intervention in these intervals were to isolate the effects of possible maturational/developmental effects and to investigate the relative permanence of possible changes following the intervention. Weekly guidelines and instructions were provided to parents and teachers.

Table 6: Aims and Interventions

Author	**Study Aims**	**Intervention**	**Programme description**
Niemeijer, Smits-Engelsman, Reynders & Schoemaker (2003)	The aim was to develop a motor teaching principles taxonomy (MTPT) in order to investigate what teaching principles therapists trained in NTT used in daily practise	Neuromotor Task Training (NTT)	The Neuromotor Task Training treatment programme mainly task-specific or skill-based – focus on direct teaching of the tasks to be learned. The choice of tasks depends on the individual needs of the child as well as on the expectations, capabilities and motivation of the child and the parents. In goal directed movements, this could be speed or accuracy in relation to distance and target size. Through NTT, functional skills are trained in such a way that they tap the specific motor control processes that are thought to be involved.
Peens, Pienaar & Nienaber (2007)	The aim was to determine the most effective method in enhancing motor proficiency and self-concept of 7-9 year old children with DCD	Psychological intervention programme	Psychological intervention programme: The self-concept enhancing intervention programme was centred around the discovering of the self – 'Who am I?' In this part, the issue of self-acceptance was also involved. The different dimensions that were addressed in the programme were the global self-concept, physical self, emotional self, thinking self, behaviour and social self. Individual exercises were conducted where each member had to respond in writing to questions regarding themselves.

		Motor-based intervention programme Psycho-motor intervention programme	The motor-based intervention programme involved the integration of the task specific, kinesthetic and sensory integration treatment methods. A detailed programme (8 weeks, twice a week for 30 min) was implemented and was based on the age appropriate motor developmental characteristics for children in the age group 7–9 years. All the activities were done in a group, except for the eye control activities which were done on an individual basis with each child. Psycho-motor intervention programme: Combination of the motor-based and the psychological intervention programmes. During each week, the children had two motor-based intervention sessions (30 min each) as well as one psychological intervention session (45 min).
Peters, Henderson & Dookun (2004)	The aim of this study was to conduct an audit of parent/carer satisfaction with the service provided for children presenting with movement difficulties [developmental co-ordination disorder (DCD)/dyspraxia] at	Physiotherapy package	A physiotherapy package comprising a comprehensive assessment, conducted by a specialist, a written report, hospital based one-on-one sessions and/or a home–school programme. Eclectic approach.

	the out-patient physiotherapy clinic of a specialist tertiary referral paediatric hospital.		
Sangster, Beninger, Polatajko & Mandich (2005)	It examined whether strategy use changes following participation in the CO-OP program, as compared to traditional approaches to occupational therapy intervention for children with DCD.	Cognitive Orientation to daily Occupational Performance (CO-OP)	CO-OP is a verbally-based, individualized approach focused on guiding children to learn and discover cognitive strategies to solve motor problems. Through intervention, the CO-OP therapist guides the child in the learning of a global problem solving strategy and the discovery of domain specific cognitive strategies that improve motor performance. The global cognitive strategy is a problem-solving strategy, which provides a structure within which the child can learn to talk through occupational performance problems. Domain specific strategies (DSS) are used in specific tasks or situations to help achieve specific occupational performance goals.
		Current occupational therapy treatment approach (CTA)	CTA - treatment activities derived from a combination of neurodevelopmental, multi-sensory, biomechanical, and functional approaches. The techniques most commonly utilised by CTA therapists were sensory-integrative, fine and gross motor activities as well as direct skill teaching by the therapist, consisting of corrective instructions and directions.

Sugden & Chambers (2003)	The study aimed to determine the extent to which parents and teachers, with guidance, can assist in the management of children with DCD; whether children with DCD are helped in this way and how this may contribute to our understanding of the condition.	Task-oriented cognitive-motor approach	The Task-oriented cognitive-motor approach is an eclectic approach to intervention for children with coordination difficulties. The basic components of the approach build upon the idea that the cognitive, affective, and motor competencies of the child interact in a dynamic manner with the environment in which action takes place, and the manner in which the activities are presented. The emphasis is on children performing functional tasks in settings which are as near as possible to everyday life; the approach is therefore task oriented. These are not discrete and separate entities but interact dynamically with one another according to the environmental circumstances and manner of presentation. The role of the professional, parent/teacher is to choose the relevant skill and locate it in an appropriate setting.

4.3.3 Findings according to RE-AIM framework

The RE-AIM framework proposed by Dzewaltowski et al. (2004) structures the results of the study in terms of the Reach, Efficacy, Adoption, Implementation and Maintenance of the studies in the review. This is a useful tool to facilitate as well as translate research into practise by promoting the development, delivery and evaluation of interventions (Matthews et al., 2014). A summary of the findings is provided in Table 6.

REACH

This systematic review reports on the examination of the reach of the interventions in the included studies. In doing so, it considered the percentage of potentially eligible participants that took part in the studies and their representativeness to the entire population. The study further considered the characteristics of participants. Findings by Niemeijer et al. (2003), Peens et al. (2007), Peters et al. (2004), Sangster et al. (2005), and Sugden and Chambers (2003) can be generalised to the whole population as the studies used a considerable sample size of study. The samples in all these studies contained both gender groups. Furthermore, these studies were conducted in different settings.

Efficacy

This section reports on the effectiveness of the intervention based on the findings in the studies in achieving the desired positive outcomes. The efficacy of the interventions implemented in each study (Niemeijer et al., 2007; Peens et al., 2007; Peters et al., 2004; Sangster et al., 2005; Sugden & Chambers, 2003) is presented below:

- **Niemeijer et al. (2003).** In their study, the ***Neuromotor Task Training (NTT)*** has been implemented as an intervention. It was deduced that treatment according to NTT has positive effects on handwriting and on fine and gross motor skills that were measured with the M-ABC tasks. Motor learning in children with DCD were enhanced.
- **Peens et al. (2007).** These researchers implemented the following interventions among three groups: ***Psychological Intervention Programme***, ***Motor-based Intervention Programme***,

and ***Psycho-motor Intervention Programme***. Motor ability; improved significantly in 3 groups (including control group) but did not improve in self-concept group. Self-concept; improved significantly in psychological group and psycho-motor group and showed no change in other groups. Significant increase of motor proficiency as well as self-esteem amongst children who received the combination of the psycho-motor intervention approach. A decrease in anxiety was noted among individuals who received psychological intervention and motor intervention.

- **Peters et al. (2004).** These researchers made use of a ***Physiotherapy Package*** as an intervention method – this consisted of one-to-one sessions as well as a home school programme. Outcomes indicated that the greater the amount of one-to-one sessions attended - the higher the perceived effectiveness of the programme. Higher frequency of a child practicing at home related to a higher perceived effectiveness in the home programme.
- **Sangster et al. (2005).** ***Cognitive Orientation to daily Occupational Performance (CO-OP)*** and ***Current occupational therapy treatment approach (CTA)*** were implemented in this study. The amount of cognitive strategies used increased development of skills in children with DCD who participated in Cognitive Orientation to daily Occupational Performance (CO-OP), which in turn lead to improvement in occupational performance. The researchers reported that the results support the use of cognitive strategies when solving occupational performance problems.
- **Sugden and Chambers (2003).** The ***Task-oriented Cognitive-motor approach*** was the intervention used in this study. It was reported that the intervention was successful in 93.5% of children. Parents and teachers observed an improvement in motor skills, as well as increased confidence and self-esteem.

Adoption

This review further assessed the adoption of the interventions in the studies which reports the proportion and representativeness of settings. Furthermore, for assessing intervention adoption, the number of partners who were engaged in the intervention was also used as the indicator. In the study conducted by Niemeijer et al. (200 3), it was reported that the NTT programme was delivered by 13 physiotherapists. Programmes were delivered by one psychologist and one kineticist in the study of Peens et al. (2007). Additionally, 78 class teachers from 9 schools participated to identify potential candidates for the study (Peens et al., 2007). The study conducted by Peters, et al. (2004) report that one paediatric physiotherapist was responsible for the assessment and implementation of intervention with the children, while the primary researchers were responsible for drawing up the questionnaires. In Sangster et al. (2005) study, therapists experienced and trained in CTA performed CTA intervention, while therapists trained in CO-OP intervention performed this intervention. The primary researchers were involved in making observations based on video-recordings. In the study by Sugden and Chambers (2003), parents and teachers were involved in delivering the intervention techniques of the therapeutic programme. The settings of all these intervention studies were clearly stated and described.

Implementation

The review also assessed the implementation of the programs. Hence this section reports on the on the consistency as well as whether an intervention was delivered as intended.

In the study of Niemeijer et al. (2003), physiotherapists vary in the frequency of giving instructions or information to, or asking feedback from children with DCD. 6 sessions of NTT intervention were received before the researchers observed a 30 minute video recorded session.

Peens et al. (2007) reported that a psychologist conducted the self-concept programme. It was also reported that the frequency of motor-based intervention programme involved a detailed programme

(8 weeks, twice a week for 30 min) which was implemented and was based on the age appropriate motor developmental characteristics for children in the age group 7–9 years. The primary researcher compiled and conducted the programme which was progressively adapted, once a week (Peens et al., 2007). The psycho-motor intervention-programme included two 30 minute weekly motor-based intervention sessions in addition to one psychological intervention session of 45 minutes. These intervention sessions were done over a period of 8 weeks (Peens et al., 2007).

Peters et al. (2004) recounted that the physiotherapy package comprised of a comprehensive assessment, conducted by a specialist paediatric physiotherapist, a written report, hospital based one-to-one sessions and/or a home-school programme. Interventions were perceived by parents to be successful with a greater number of sessions attended or greater frequency of the child practicing exercises at home (Peters et al., 2004). The approach taken to helping the child achieve his/her targets is also similar regardless of the mode of delivery. The physiotherapist responsible for implementing and designing the physiotherapy package has obtained formal qualifications in neurodevelopmental therapy (NDT) and sensory integrative therapy (SI). Guidelines were also provided to parents and educators to implement in order for children to achieve their goals.

In Sangster et al.'s (2005) study, intervention was implemented but motor skills were not measured. CO-OP therapist guides the child in the learning of a global problem solving strategy and the discovery of domain specific cognitive strategies that improve motor performance. 10 individualised CO-OP sessions were implemented. In CO-OP sessions, verbal interaction between the individual and the therapist takes place, and children are regarded as active participants in their therapy. 10 individualised sessions of CTA were administered to children in the study. CTA is therapist-directed where the therapist provides more corrective instruction rather than suggestive guidance.

Interventions were implemented as intended for 40 weeks with 7 week intervals of intervention or no intervention in the study conducted by Sugden and Chambers (2003). Parents and teachers were both responsible for implementing this approach based on weekly guidelines and instructions which were provided.

However, there was no information in the included studies provided regarding the cost of intervention implementation.

Maintenance

This section reports on the extent to which individual participants maintain behaviour change long term and, at the setting level, the degree to which the program is sustained over time within the organisations delivering it.

Three of the five studies that were included in the review (Niemeijer et al., 2007; Peters et al., 2004; Sangster et al., 2005) did not report on the maintenance of the interventions both at the setting level as well as at the maintenance of behaviour change. However, the study by Peens et al. (2007) indicates that the results of the follow-up assessment of self-concept after a year showed significant improvement, while the psychological group's motor proficiency stayed more or less on the same level. Peens et al. (2007) re-tested participants after a two-month period and again after a one year period. Although Sugden and Chambers (2003) implemented a short-term intervention, and conducted a follow up in a separate study.

Table 7: RE-AIM Results

Authors	Reach	Efficacy	Adoption	Implementation	Maintenance
Niemeijer, Smits-Engelsman, Reynders & Schoemaker (2003)	18 Boys, 5 girls; Ages 5-10; attended mainstream schools	Treatment according to NTT has positive effects on handwriting and on fine and gross motor skills that were measured with the M-ABC tasks. Motor learning in children with DCD were enhanced.	Programme delivered by 13 physiotherapists	Physiotherapists vary in the frequency of giving instructions or information to, or asking feedback from children with DCD. 6 sessions before 30 minute video recording session	No follow-up to the study
Peens, Pienaar & Nienaber (2008)	81.7% of children eligible for the study; 36 boys, 22 girls; ages 7-9	Motor ability; improved significantly in 3 groups (including control group) but did not improve in self-concept group. Self-concept; improved significantly in psychological group and psycho-motor group and showed no change in other groups. Significant increase of motor proficiency as well as self-esteem amongst children who received the combination of the psycho-motor intervention approach. A decrease in anxiety was noted among individuals who received psychological intervention and motor intervention.	Programme delivered by one psychologist and one kineticist. 78 class teachers from 9 schools participated to identify potential candidates for the study.	Interventions implemented successfully. Psychologist conducted self-concept programme. Motor –based intervention programme: A detailed programme (8 weeks, twice a week for 30 min). Programme designed by primary researcher. Psycho-motor intervention programme: two 30 minute weekly motor-based intervention sessions in addition to one psychological intervention session	Re-tests done after 2 months and 1 year

				of 45 minutes. Done over a period of 8 weeks.	
Peters, Henderson & Dookun (2004)	50% response rate from parents of eligible children; 36 boys, 9 girls; mean age 9.7	The greater the number of one-to-one sessions attended - the higher the perceived effectiveness of the programme. Higher frequency of a child practicing at home related to a higher perceived effectiveness in the home programme	One paediatric physiotherapist conducted the assessment. Researchers were responsible for drawing up the questionnaire	Interventions perceived by parents to be successful with a greater number of sessions attended or greater frequency of the child practicing exercises at home Physiotherapist has trained in neurodevelopmental therapy (NDT) and sensory integrative therapy (SI)	No follow-up to the study
Sangster, Beninger, Polatajko & Mandich (2005)	18 children from The Cloverleaf Research and Treatment Clinic at The University of Western Ontario; 12 boys, 6 girls; ages 7-11	Number of cognitive strategies used increased development of skills in children with DCD who participated in Cognitive Orientation to daily Occupational Performance (CO-OP), lead to improvement in occupational performance.	Therapists trained in CTA Therapists trained in CO-OP intervention Researchers made observations from video-recordings	Intervention implemented but motor skills not measured in the study 10 CO-OP intervention sessions 10 CTA sessions	No follow-up to the study
Sugden & Chambers (2003)	22 boys, 9 girls; ages 7-9; attended mainstream schools	Intervention successful in 93.5% of children. Parents and teachers observed an improvement in motor skills, as well as increased confidence and self-esteem.	Parents and teachers delivered the intervention techniques of the therapeutic programme	Interventions implemented as intended for 40 weeks with 7 week intervals of intervention or no intervention Parents and teachers implemented intervention	Short duration with follow-up in a separate study

4.4 Discussion on findings of Systematic Review

The aim of the systematic review was to provide an evidence base of filtered information assessed for methodological quality on interventions for children presenting with Developmental Coordination Disorder. These interventions are bound to be effective at addressing and improving motor functions of children presenting with DCD.

Neuromotor Task Training (NTT) was one of the interventions which were implemented, findings indicated that this intervention yielded improvement with regards to handwriting and enhancement of motor learning in children presenting with DCD. *Psychological Intervention Programme, Motor-based Intervention Programme,* and *Psycho-motor Intervention Programme* were three intervention programmes which were implemented in the one study which was systematically reviewed. An improvement in motor abilities were observed in three groups (including the control group), but not in the self-concept group. Children receiving a combination of the psycho-motor intervention approach presented with a significant increase of motor-proficiency as well as self-esteem.

The outcomes for children receiving the *Physiotherapy Package* (which consisted of a home school programme as well as one-to-one sessions) indicated a higher perceived effectiveness for learners attending more one-to-one sessions. *Cognitive Orientation to daily Occupational Performance (CO-OP)* and *Current occupational therapy treatment approach (CTA)* were other intervention methods which were implemented in one of the studies which were systematically reviewed. Results indicated that the amount of cognitive strategies used increased development of skills in children with DCD who participated in Cognitive Orientation to daily Occupational Performance (CO-OP), which in turn lead to improvement in occupational performance.

In the study exploring *Task-oriented Cognitive-motor approach* – a 93.5% success rate has been reported with the approach. Parents and teachers observed an improvement in motor skills, as well as increased confidence and self-esteem.

4.5 Conclusion

The review provided an evidence base of filtered information assessed for methodological quality using the quality appraisal tool on interventions for children presenting with Developmental Coordination Disorders. Studies were comprehensively located and synthesized using organized, transparent procedures through a process of identification, screening for eligibility and inclusiveness of articles in order to minimize bias in drawing conclusions. It is in this regard that articles included at the final stage of the review have been thoroughly assessed for methodological quality on interventions for children presenting with dyscalculia in primary schools. The findings in the studies provide a base of effective interventions that can be used for children presenting with DCD.

The following chapter, Chapter 5 presents the findings and discussion of the second phase of the study, the qualitative study.

CHAPTER 5: FINDINGS - PHASE 2

(QUALITATIVE STUDY)

5.1 Introduction

This chapter is dedicated to the results of the qualitative study (Phase 2), and highlights the themes and sub-themes that have been identified by the analysis of the data. The results are presented in terms of themes due to the type of analysis that was employed by the researcher; namely thematic analysis. The study aimed to uncover and explore the perceptions of mothers who have children presenting with DCD/Dyspraxia and how they manage the disorder within the home environment.

5.2 Participant Information

The following three tables provide the demographical information of the three focus groups respectively. All of the participants were mothers of children presenting with Dyspraxia.

In the first focus group, the mothers' ages ranged between 34 years and 40 years old. Five of the six participants were married women, while one of them were divorced. Two of the participants belonged to the coloured denomination, while four participants were from the white population group. The ages of the mothers' child presenting with DCD were between three years and twelve years old. Two mothers were caregivers of girls, whereas four mothers were caregivers of boys.

Focus group 1						
Participant	**Age**	**Gender**	**Population group**[4]	**Marital status**	**Age of child**	**Gender of child**
Participant A1	37	Female	Coloured	Married	4	Male
Participant A2	34	Female	White	Married	6	Male
Participant A3	38	Female	White	Married	3	Female
Participant A4	34	Female	White	Divorced	3	Female
Participant A5	40	Female	White	Married	12	Male
Participant A6	38	Female	Coloured	Married	5	Male

Four mothers aged between 36 years and 48 years old partook in the second focus group. Three mothers were married, while one was separated. There were three white denomination participants, and one coloured participant. Three of the children presenting with Dyspraxia were five years old and one child was eight years old. The entire group were mothers of boys.

---

[4] The terms “African”, “Coloured”, “Indian” and “White” is used to refer to the racial categories constructed by the apartheid government of South Africa. However, although originally used as an apartheid racial designation, these categories are still used in South African (Green, Sonn, & Matsebula, 2007). Once again, my use of these terms are not intended to represent race as fixed or unchanging (Weedon, 1987).

Focus group 2						
Participant	**Age**	**Gender**	**Population group**[5]	**Marital status**	**Age of child**	**Gender of child**
Participant B1	36	Female	White	Married	8	Male
Participant B2	42	Female	White	Married	5	Male
Participant B3	48	Female	White	Separated	5	Male
Participant B4	39	Female	Coloured	Married	5	Male

The third focus group consisted of six mothers, who were between the ages of 33 and 40 years old. A variety of ethnicity groups were represented within this focus group – one Indian lady, one African lady, two Coloured ladies and two white ladies. The entire group were married mothers with boys presenting with DCD. The children's ages ranged between four years and eleven years old.

---

[5] The terms "African", "Coloured", "Indian" and "White" is used to refer to the racial categories constructed by the apartheid government of South Africa. However, although originally used as an apartheid racial designation, these categories are still used in South African (Green, Sonn, & Matsebula, 2007). Once again, my use of these terms are not intended to represent race as fixed or unchanging (Weedon, 1987).

Focus group 3						
Participant	**Age**	**Gender**	**Population group**[6]	**Marital status**	**Age of child**	**Gender of child**
Participant C1	38	Female	White	Married	11	Male
Participant C2	34	Female	Indian	Married	4	Male
Participant C3	33	Female	African	Married	5	Male
Participant C4	40	Female	White	Married	7	Male
Participant C5	40	Female	Coloured	Married	5	Male
Participant C6	38	Female	Coloured	Married	5	Male

5.3 Themes

The following table presents the themes and subthemes that were gathered from the discussions within the focus groups. The four main themes were around typical daily life, diagnosis related, required support and interventions.

---

[6] The terms “African”, “Coloured”, “Indian” and “White” is used to refer to the racial categories constructed by the apartheid government of South Africa. However, although originally used as an apartheid racial designation, these categories are still used in South African (Green, Sonn, & Matsebula, 2007). Once again, my use of these terms are not intended to represent race as fixed or unchanging (Weedon, 1987).

Themes	**Sub-themes**
Typical daily life	- Routine - Psychosocial interventions - Self-sufficiency
Diagnosis related	- Awareness - Developmental comparison - Assessment - Comorbid diagnosis/misdiagnosis
Required support	- Informational support - Financial support - Social support - Concerns for future
Interventions	- Occupational Therapy (OT) - Speech Therapy - Behaviour Therapy - Tutoring - Social Skills Training - Multidisciplinary team - Medications - Diet - Trial of approaches - Challenges - Observed improvements with the implementation of techniques

5.3.1 Theme 1: Typical household day

Routine

Various aspects are involved in routine. The mothers have to get the children ready for the day, often having to help them get dressed, prepare breakfast and getting to school on time. Many mothers reported that sticking to routine and schedule helps to reduce behaviour in their children. Not sticking to routine can cause anxiety and difficult behaviour for the child.

> *"My child is also at Tierberg* Hospital School so we need to drive and then I have a younger son as well."* (Participant A2)

> *"In the morning. I wake him up and he's quite good, porridge, he's vitamin, he takes he's tablet at home already because he's now on three a day. So he takes one at home, two at school. He showers and he does his thing but I have to monitor him."* (Participant B1)

> *"He is always an early riser. He is better now. He used to wake up at five but only when he was four years and three months when he first took -- wake up and he use to wake up at three -- and I'm too scared to go into the room to check, what if he wakes up and he would have a lot of behaviour issues."* (Participant C4)

When the school day has finished, the children attend their intervention therapies or go to aftercare. In the evenings after dinner it is important to ensure that the children stick to their bath and bed routine. Sticking to a schedule can often be frustrating for the mothers when they are in a rush or when difficult behaviour is presented by children.

> *"And then at home when I'm alone with her and she's not tired because you now they work hard at school so it's difficult to sort of sit with her and ask her to concentrate so that we can do, you know some speech stuff, because sometimes she just wants to like chill."* (Participant A1)

> *"We spend a little bit of time coaching him or yah, getting him to do it kind of thing. I also don't specifically sit down with him to do things. That's why I think I asked Tala* to do tutoring with him because we found it difficult to come home and to then do things with him. It's been working wonderfully for us."* (Participant A4)

> *"I think every day is a... you start with a clean slate but it builds up by six o'clock at night, luckily just eat and go sleep already. So, that's the thing...yah. That's how I experience it from an emotional side. Things are just holistic things, you know."* (Participant B2)

Psychosocial interventions

Part of the children's daily or weekly routine entails attending their psycho-social intervention therapies. Some mothers have to ensure that their children get to their therapies on time while other mothers arranged for some of these therapies to be during school time or the therapist/health care professional to come to their house and perform these services in the comfort of their home.

> *"Uhm, Yah, then it's basically school, fetch him at 13h00, then he has speech therapy once a week and OT (Occupational Therapy)."* (Participant A2)

> *"He goes from 09h00 – 12h00 for tutoring. Then he has lunch, which is good because they teach them."* (Participant B2)

> *"Yah, they're doing OT and speech therapy now in one session. It really has worked for Ben* and then of course Annie* (one on one tutoring), Ben* is currently blossoming."* (Participant B4)

Self-sufficiency

Some mothers reported that their children are independent in the sense that they can get dressed by themselves and also prepare their own meals such as breakfast and they attempt to do many activities by themselves. In contrast some mothers stated that their children are less independent and need more assistance with regards to routine and doing things for themselves. Some mothers also said that their children are able to do certain things but they prefer others to help them.

> *"He's got issues dressing himself. So, he's starting to do all those things but it still takes time and planning and all of those things."* (Participant A3)

> *"Emma* started to eat her own food. Very messy still, very... she doesn't want to do what you want her to do."* (Participant A5)

> *"He showers and he does his thing but I have to monitor him. You can't leave him too long because he'll just stand there naked and I tell him, Wash this, wash that. And then I leave the shower so I can just watch him and he says, go away! And I say, No, I can't. You must finish up."* (Participant B3)

> *"Because in the beginning we didn't have any routine and now that we've got a routine I never have to fight with him to go to bed, we brush our teeth, we read a story, say a prayer and he sleeps. He knows now where in the beginning we just use to let him eat anywhere, he only eats by the table."* (Participant C1)

5.3.2 Theme 2: Diagnosis related

Awareness

Often parents became aware that their children were somewhat different and they suspected that something could be wrong, but they were not sure. The mothers would also be ambivalent about this situation, especially with the opinions of others making comments about boys developing later than girls. The delay or struggle with speech would also be justified by the fact that some children are brought up in a bilingual setting. Another explanation that came up was a sudden change in routine and daily life. A few mothers started doing their own research when they suspected a problem. The first interaction with a health care professional would usually be a speech therapist as the presenting problem would be related to struggle with speech.

> *"We're also a bilingual home, English/ Afrikaans so we both and we talk and you know just by hearing the same one or two words and then boy, you know, they a bit slow, you know, trust your gut. There's something there."* (Participant A6)

> *"I continuously thought it's the big move and this and that that's keeping her a little bit behind but she didn't sit really in time and she didn't walk until eighteen months so she has motor issues as well. As well, everyone in your family is telling you, Moenie worrie nie. Alles gaan okay wees. Almal ontwikkel laat. Hierdie een se dit het daai ene."* (Participant A5)

*Translation of Participant A5: " don't worry, everything will be fine. Everyone develops late. This one says this, that one say that"

> *"But even at his school there is not a lot of knowledge about Apraxia so it was only with his speech therapist really where with speech therapy she would help him actually form the words and then we were also taught to do that a little bit but because the speech therapy was effective."* (Participant C3)

Frequently educators do not suspect a problem due to large class sizes, or not being aware.

> *"But now you can imagine at the other schools, primary schools, the mainstream, where the parents don't know, they're children have apraxia of Dyspraxia. The teachers don't know. They only discover this in grade 4, grade 5, "Oh, your child can't do this, your child can't do that." And then it's way past its early years. And that is happening. There are children sitting in mainstream classrooms that are not diagnosed."* (Participant A3)

> *"So, ja I'm telling you now there are lots of children out there who are not diagnosed. And again the child suffers because they have to catch up on all that, all that foundation blocks are missing."* (Participant A6)

When educators recognise a speech delay they would recommend speech therapy or occupational therapy to the parents.

> *"His playschool teacher then said that she suggests speech therapy. And I took her up on this and she said, "Yes, speech therapy but there's definitely more going on." So we took him for OT uhm, she said to me, "Uh, there's even more going on." I was thinking, "Oh sherbet, okay."* (Participant A6)

There is a sense of ambivalence around disclosing the diagnosis to educators. Many parents stated that if they disclose the diagnosis they fear that their child would be judged. In contrast, some parents commented that this was an opportunity to create awareness and for others to have more of an understanding.

> *"I've got a file at home. Beginning of the year, any new a teacher I said, "Do you know what Dyspraxia is? Do you have any experience with this? Nope? Educate yourself. This is my child." and the teachers sort of go, "Oh hell, one of those moms."* (Participant A4)

> *"But you know why, because they want to medicate the kids. To control the classroom setting better. Because if they can diagnose you, they can medicate you and that makes the teacher's job better and easier. And the child suffers."* (Participant A6)

> *"But it takes a while to get there so I mean now even -- but you get to a point where you take him to a special needs school and then I realise surprised myself but the minute he went to the school every day -- very upfront front from the beginning I just say Zac's* got special needs, he has got a severe speech disorder because they don't know Apraxia and he says very few words and it's okay, I'm okay saying it now."* (Participant C3)

Developmental Comparison

When the parents have other children, whether older or younger they would compare the children's development with each other. They would often become aware that the younger child is doing certain things that their older child has not mastered and it would raise a concern. If the child is younger they would compare the child to the older child at that age and recognise that there is some kind of delay.

Furthermore, parents and educators compare children to their peers and when the child struggles in certain aspects it would raise a red flag.

> *"Well, I always knew, like she said now, that there was something up Emma* because just, not like, not that I like comparing her with other kids and stuff but she was in a mainstream school and it was really evident that she was very much behind, especially with her speech compared to all the other children and stuff."* (Participant A1)

> *"My second one showed me, "hhmm, Mommy, there's something wrong with the first one."* (Participant A4)

Assessment

To obtain an official diagnosis, the parents consulted paediatricians or educational psychologists.

> *"But we eventually took her to an educational psychologist, which formally diagnosed, who formally diagnosed her I think after two and a half months with Dyspraxia of speech."* (Participant A1)

> *"I knew something was wrong from two-years but you know, but if I ever hear the word 'boys are late developers' again. I think I'm just going to explode. And eventually at three I think I, we took Cole*, I took Cole* to have his hearing tested and then to a speech therapist for evaluation. So then they worked on the speech you know that's going to your lessons that are unproductive. Trying to get Cole* to say more than one word at the speech therapy was considered a success. For the end of that year, yah, at the end of the year he had his third epileptic attack. And it happened at school. So we were referred to Adele* van der Walt and*

> *an hour with her and she's like, "Your child's got apraxia. Has he ever been tested?" I said, "No." So I went back to the speech therapist and they then tested him."* (Participant B3)

Educators, speech therapists and occupational therapists would recommend seeing a health care practitioner.

> *"And then she recommended me to someone and she saw him one session and she said to me, "Looks like classic Dyspraxia."* (Participant A4)

> *"Yah, and he was at a day mother with babies and he was the eldest. But, she also said, "Tiaan* is so quiet. He's such a sweet baby." And I thought, "Oh okay?" because he was. He was really a quiet baby. I thought, "blessed." You know. But then I went over when he was about two-and-a-half, three, he went over to a crèche and he wasn't even there for a few weeks and there was a lady that came round and just you know, looked at the kids and then she actually said to the principal, "You should check him out." And I thought, "Check him out for what? What's wrong with my child? He's quiet?" And then I took him to a lady here in Sonstraal. I can't remember her name but she's like a opvoedkundige sielkundige?"* (Participant B2)

> *"My son had low muscle tone but from here until here so the fine motor skills and that so it is better to go to a neuropaed to have that assessed because the speech therapist is not a medical practitioner."* (Participant C2)

Comorbid diagnosis/misdiagnosis

Attention Deficit Disorder (ADD), Attention Deficit Hyperactivity (ADHD), sensory processing disorder and Autism Spectrum Disorder (ASD) was commonly co-existing diagnoses among the children of whose mothers were interviewed.

> *"ADD."* (Participant A4)

> *"Autism."* (Participant A6)

> *"But my son he has also got a sensory processing disorder."* (Participant C1)

A few mothers also commented that the initial diagnosis would be ASD, but after further exploration it would be ruled out when it became apparent that they do not fall into that category.

> *"Took him to Adele van der Walt* she said to me that she thinks he's on the Autism spectrum but let's tests him. Everything came back fine but she said, "Apraxia".* (Participant A2)

> *"But from there it just escalated because everyone, as he went from one person to another, it was like the autism and then he's got the ADHD whatever and then he's got Dyspraxia and then it's a learning problem, so it just added yah..."* (Participant B2)

5.3.3 Theme 3: Support required

Informational support

Initially it is a struggle for the parents to get into contact with the correct health care professionals and get referrals. They usually suspect that something is problematic with their child but they are not sure what it is and they experience a sense of confusion as they do not know where to seek assistance. When they finally get a diagnosis they are even more confused as they have no idea what the diagnosis means and often health care professionals do not provide constructive information - they describe it briefly and recommend that the parents look on the internet for more information. The mothers reported that the internet does not provide them with relevant or enlightening information either and that it is not appropriate within the South African context. Parents are not aware of appropriate professionals, therapists and tutors that specialises in Dyspraxia.

> *"There's not a one. Daar is, how to actually find out about, I don't know, this and where to go. Everyone will send you to an OT."* (Participant A1)

> *"Google is only good for America, not for something here. Because I tried Google, it didn't work."* (Participant A6)

> *"When I had Adam* assessed - she also said to me Apraxia, but I didn't have any information about it. There was no one I could phone to ask for information, there was nothing, no resources*." (Participant C6)

A general consensus was found that often the support that is available (such as education, support groups, information) was developed and promoted by other mothers with children presenting with Dyspraxia who had a similar frustration with lack of support and information.

> *"Daar's net niks. I don't know and if you find someone by luck we heard about a lady that works only with six kids. By luck, it's not... it is as if God guided me to phone at this day and that day and then suddenly it actually happened so my only guidance is God. Google doesn't work."* (Participant A5)

> *"We go onto Google we get hold of all of the information so it's becoming a bit better but I still think that the moms out there need the support and definitely from our side we're going to be having some psycho-educational workshops where we're going to be explaining to moms exactly what Dyspraxia is to identify symptoms, what to do once you have the symptoms, the different assessments and so on. We've just started an NGO now and we're trying to raise some funds and get some bookings out going to visit schools we trying to -- it's specifically for children with Apraxia, something like the Tierberg* Hospital School. We also trying to get some medical aid, we want government to subsidise some of the parents for speech therapy for OT for behavioural therapy and all of those things."* (Participant C5)

Financial support

Having to cope with daily expenses can be very stressful, a visit to a health care professional, therapies and schooling can be costly. Performing assessments can be very expensive too. Medical aids do not cover all treatments and the medical bills are often very high.

> *"So it's also a lot of driving up and down and it's costly. It's really expensive for us. So that's my experience."* (Participant A3)

> *"Financial. Everything costs and all the doctors, "Wait two months for your comments." It's like, "I need a diagnosis now, not in two months' time" umm, you know, that whole frustration*

to deal with you like, "There's something wrong but oh no, you can only get an appointment in three months." (Participant A4)

"So, it takes money to help them. So I feel actually privileged because I'm thinking of people in the rural areas. Because, I went from one place to another and they don't just take you, it's R150 if you come in the door. Half an hour, this therapist to see if we can assist them, another whatever, come back in two weeks' time. We need three days for him so you make plan, you make due but then they say, "Oh, I don't think this is a patient." Because I was in Parow and then they say, "Well, let's try this place, I mean PANS, they are extremely expensive. Everyone said, that's the place for him so, are you willing to move downgrade just so he can go to that school to help him. So that's another thing is the funds to go everywhere, let everyone see him. You see. It does... I don't know where I would have been if I wasn't able to like have the money... So what do you do then?"* (Participant B2)

"I looked at my medical aid because it was, OT and speech was covered under the section that said auxiliary services and my son is on my husband's medical aid so it's my son, my daughter and my husband so what they get is R1 000 per person for the year. So at least he gets my daughter's part and my husband's part, so he gets R3 000 for the year. The rest we have to cover. So I contacted my medical aid and I said, "Well, he's been diagnosed with a condition because they say there are, there's a list of 270 conditions that the medical will cover if your child is, if you or your child is diagnosed with it." So I said, "Okay, where is this list? Give me this list of 270 conditions so I can look through it and I can find it." I ended up phoning a couple of medical schemes and a said to them, "Am I reading this correctly because I'm not a medical expert or whatever, doctor. Am I missing it? Tell me am I missing apraxia or Dyspraxia?" and they said, "No, you not missing it. It's not one of the 270

> *conditions." So I said, "Okay, next step. How do I get on your list?" "Oh well, it takes four years for them to review the list and then if they going to renew the list, you need a panel of experts to motivate this thing for you." Where at that time was I supposed to get a panel of experts? That's why I'm also going to push for a NGO type of thing or a NPO type of thing, called Apraxia South Africa. So that we can get our experts on board to do this kind of thing because in ten years' time the medical aid must pay for it. You can't we pay thousands of Rands."* (Participant C3)

Social support

Friends and family lack the understanding of the diagnosis and often their comments can be hurtful or offending to the mothers. Explaining to other people that their child is different is also exhausting for some mothers.

> *"Because it hasn't been made aware of. I have family members that if we don't, and haven't seen in a long time and then they say, "what?" and I say, "No, it's Dyspraxia."* (Participant A2)

> *"But I think I find that the hardest. People judge you, they do and it's really hard when you've got one of those temper tantrums happening in the shop."* (Participant B2)

> *"And the flipside is that now you have some other moms again, unfortunately they compare their children to XYZ, someone in your family as a puzzle or whatever and they only four but they can do this, your child -- so what happens is you kind of focusing what your child can't do whereas I always say to moms rather use time to develop your child optimally to their full potential, it's not about what XYZ is doing."* (Participant C1)

> *"Because I'll die to tell you that my son is doing ten times more whatever and it's so insensitive, they have no idea what they're doing to your heart, how hurtful it is."* (Participant C2)

> *"A friend of mine - I find Facebook terrible and all these social media things I have a friend whose daughter is exactly Matt's* age, she was born 1 December that year and Matt* was born 28 December and she would put on Facebook how mature her child is and the teacher says how clever her child is, I'm going like now what am I supposed to respond, what am I supposed to say to that, I can't say anything. And how mature can a four year old be."* (Participant C5)

The fathers are also often in denial as they do not understand the disorder or refuse to accept that their child has a problem that has to be addressed. The fathers expect the treatments to work overnight.

> *"His father was in total denial, there's nothing wrong with the child."* (Participant A2)

> *"My husband also said, "Are you sure these people know what they talking about?" He says, "There's nothing wrong with my son."* (Participant B1)

> *"And I guess that's what this is about. Even my husband, jisso, ek wil, then you know I'm not allowed, just answer because he's over there so he doesn't, I have to understand that he doesn't, but then he'll suggest something and I'll think, "But no, you don't understand." He's in denial."* (Participant B4)

It also became apparent that among the siblings they notice a difference, the child would often express their thoughts by asking why they have to attend therapies, but their sibling does not. Furthermore, the siblings would ask when they are starting therapies.

> *"My little one is six and now he's going, "But when do I start taking medicine and when do I start going to class?"* (Participant A2)

> *"My four-year-old says, "But when am I going to therapy" and now the older one's listening and I need to tell him you don't need therapy, but I don't want, how do I now judge, because they're both listening to me and I don't mind it but I mean in the case I also don't want the four-year-old to be like, "Well my brother has a problem."* (Participant B4)

The mothers indicated that talking to other mothers with similar issues is therapeutic and they would prefer to attend support groups where they can talk openly in an accepting, understanding environment.

> *"A setup like this is support. We need this. This is therapy for us."* (Participant A5)

> *"I think, that's what I actually wanted to say is there should be more support."* (Participant B2)

> *"Parents need to support each other also matter, and find out is your child doing this? What happened and you just exchange it, be aware of each other... those kinds of things."* (Participant B3)

Concerns for future

The participants stated that they are anxious whether their children comprehends certain information or whether they are conditioned to respond in a certain way.

> *"I don't know how much he understands. Sometimes I think it's just like a parrot. You know it's like that Pavlov dog."* (Participant B2)

> *"But I also felt like that when my son younger. Does he really understand? Because you say, "Kar" and then he says, "Kar". You know what it is and that's what Romy* said to me, "As hy nie begrip het wat hy sê nie, is dit maar net..."* (Participant C4)

Anxiety about society accepting their children was also a predominant concern for the parents due to their struggle with language and effective communication as this can impact their ability to express themselves. The mothers are also concerned with their struggle at school as they learn better in an environment with visual support.

> *"But I mean it's hard to think that because their problem is language. And it's always going to be a problem, so from a school point of view, yes I'm worried. And I found writing down homework is an issue and it's getting to the age now where up until now they kind of spoon fed them. They were writing down homework. The last five minutes of school, write down all your homework. It's getting past that stage now where he, the teacher mentions in class that you've got an oral next week and it's on this. There's nothing on paper and it's just going to get worse from here on in. Oh yeah, high school, there's nothing like that."* (Participant A6)

The mothers expressed concern with regards to their children's education and career life. The general concern was whether their child would cope with tertiary education and what would they do for a living. The participants are uneasy with the thought of what would happen when they are no longer alive and the well-being of their children with regards to who will take care of them and will they be able to cope.

> *"And it took me a bit of a mindset change also to kind of think that, "Okay, he might never go to university? He is clever. He's clever enough to do it."* (Participant A2)

> *"And of course their futures. What will become of them when we know, we one day no longer here."* (Participant B1)

> *"But then, you also you get the older people who say, "Sal hy kan werk?" You know because they, hulle het nie daai sagte grip nie. Dan sê hulle, "Hy kan seker met sy hande iets doen, né?"* (Participant B3)

There is a general consensus amongst participants that more people need to be trained to help these children and create greater awareness about Dyspraxia.

> *"Ja, dis hoekom ek sê vir haar ek wonder of daar nie 'n rerige need is om mense the train nie?"* (Participant B2)

5.3.4 Theme 4: Interventions

Occupational Therapy (OT)

Most mothers stated that their child attends occupation therapy sessions and that often it has been their primary exposure to intervention with regards to the difficulties their child experiences. Specific

OT techniques include sensory stimulation such as the Wilbarger brushing protocol, rolling in a blanket, rocking motions, and desensitisation to textures, foods and tactile. Other techniques implemented by OT's included fine motor skills development and gross motor skills development.

> *"That brushing was amazing. Shane*, after a week he used to bring the brush to me and he was tiny still, he brought the brush and he said, "Mommy, brush, brush." I thought well, you know if you feeling the difference."* (Participant A4)

> *"But then the regressions were very small, then I always chat to my OT and she says, "Okay, now do this." So we're always on it all the time. It's like now with the rain and stuff, he doesn't want his feet to touch wet ground, even his... shoes he doesn't want that to touch so all my day is carrying around this child in the car or into the place where we go for OT. But then I just made him do it the other day, "You need to walk."* (Participant A6)

> *"I also looked at the brush thinking, "Ah, what is this going to do?" Afterwards he keeps coming and asking for it so it does, for him it certainly works."* (Participant B3)

Speech Therapy

Due to the difficulties children with Dyspraxia experience with regards to speech development, most mothers reported that their child receives speech therapy sessions as often as once per week to a few days weekly. The speech therapy aids the children to improve their speech development in terms of verbal and non-verbal communication, improvement in pronunciation, expressing themselves and clearer understanding.

> *"We had speech therapy twice a week. My child id speaking in more than three sentences or three words sort of, my child started five, six words in sentences this year. And in the last two weeks."* (Participant B3)

> *"I cry when he talks to me because it's the first time in 11 years my boy can talk to me, it's like amazing, I just want to sit there and just talk to him, it's amazing to hear him talk and he is so calm now, he is not upset when he gets up anymore, he is the happiest child ever."* (Participant C6)

Behaviour Therapy

Applied Behavioural Analysis (ABA) has been a behavioural technique that has been implemented over the years in certain cases where children have been diagnosed with ASD. A number of participants in the current study described that their children have benefited from receiving ABA as means of a behavioural technique. ABA is a teaching technique which is the application of behavioural principles to daily situations which will increase or decrease targeted behaviours over time.

> *"They use ABA and ABA is very rigid and highly structured. It helped for the behaviour."* (Participant B2)

> *"I had to go to PANS* to get behaviour therapist in twice a week to come to our home, because he was what people would call rude. You know. He'll sommer take food from your plate and I say, "You can't do that." Then he says, "But I want it." So, people get the impression that you're not doing your job because... but that's how he is, you know. He's just, "The world's mine and I can do whatever I want."* (Participant B4)

> *"That's where ABA has really helped us and I think ABA to me is almost just like a way of discipline it's almost no you have to do what you're told to do, you have to do it in this sequence and so that's what helped us the most."* (Participant C3)

Tutoring

One-to-one tutoring, where a tutor facilitates the learning process in targeted areas of challenges on an individual level have been found to be effective for mothers of children presenting with developmental difficulties. In instances where mothers find it challenging to implement techniques with their child due to various reasons, ranging from working full-time, having other family responsibilities and resistance from the child when implementing methods themselves - one-to-one tutoring has been essential as a strategy to help their child with certain difficulties. Mothers also found that they were able to learn from tutors in terms of getting new ways and means of teaching and implementing strategies.

> *"We actually started interview chilled tutoring and I'm now at a stage where I don't want to stay at home, I don't want to think the home environment is where she will actually learn. I'm not spending a lot of time with her, I work weekends as well so it is my fault partly. Then I realised, people I'm not an educator, I'm a mother. So, this is a very sadistic idea."* (Participant A5)

> *"So his in PANS* now but in the tutoring, not in the class. He's getting the tutoring and at least yah, you see the tutor regularly. They have little books. I put a communication book in his bag also."* (Participant B2)

Social Skills Training

Often encountering certain situations, such as parties, a visit to the doctor or going on a holiday trip have been found to be overwhelming for many children, therefore a general agreement has been observed that preparing children for these events have been helpful in reducing the child's anxiety. Social stories and role-playing have been a method used to aid for preparation for these events, where the situation is described in addition to providing structure on possibilities of what to expect and potential ways to behave or react in these events. Frequently social stories are accommodated with pictures and photos in order to make it more visually relatable for a child – especially since many children are stimulated with visual support. By means of preparing these children for situations, it has been observed that they behave in a more socially appropriate manner and there is a sense of reduction of anxiety amongst these individuals.

> *"Like in the evenings as well. I could say, "Okay guys, it's quarter past eight. It's almost bedtime." And then they kind of know that. And Shane* especially knows, "Right, now I've got to get into the..." When I say half past eight it's bedtime, "Okay, I knew it was coming, now it's time." But don't say, "Right guys, bed now!"* (Participant A4)

> *"And also timer, especially for that planning."* (Participant A6)

> *"I found sometimes role playing that in preparation with your pictures and everything also helps them to calmly understand okay this is what is going to happen."* (Participant C1)

> *"So it's like with Zac* when we went overseas last year we went with Zac* for a month and he was four years old and we've gone when he was a year old but we didn't know what to expect because now it's for a whole month and 26 hour flights and things like that and they actually role played then I had the suitcase there and we all walked and we had little tickets and they did that for days with him and wrote out a little story and every day they would read the story about Zac* and you're going to visit your niece and mommy loves you more than you -- all those little things that they addressed."* (Participant C3)

Preparation can also occur in a less formal manner – simply by verbally preparing a child for a circumstance which neuro-typical individuals often take for granted such as bedtime routine can help a child presenting with Dyspraxia by reminding them about a situation. Verbal reminders, calendars and countdown timers are essential tools to aid with preparation as well.

> *"Where she specifically spoke about sensory integration and how to manage it and the one point she mentioned is if you're going to a party go early, arrive their first so that he can see the people coming one by one instead of bringing him into a room full of people when it's like -- I specifically mentioned the camping thing and she said oh but that's because you arrived later he didn't have time to get use to this."* (Participant C2)

Multidisciplinary team

The participants expressed that having a multidisciplinary team work together has been a successful strategy with regards to noticing improvement in their children's behaviour and motor abilities. It has also been stated that having a consensus amongst the team regarding regular feedback and discussion between the team is important.

> *"Also our speech therapist and the tutor and the school, they sort of work together and it's almost like a, they individualise the programme for Emma* you know, based on her needs, which works. But I really found that having people, therapists, and facilitators or whatever, work together does work."* (Participant A1)

> *"Once a term we were getting teacher, speech therapist, OT and parents in the same room. Saying, "Okay, this is what we all experiencing. How are we going to handle it?"* (Participant A3)

> *"I call it my, our team. That's what I call it. You don't, you can't work as one person, you need to have a team."* (Participant B1)

> *"I find that working with the teachers so you always have to be a team with the teachers."* (Participant C3)

> *"And the health practitioners but specifically in the class because he is with the teach every single day and you want him to work with her so if Matt* doesn't want to get up in the morning I say well then I'm calling Lily* and then I make as if I'm calling her and then he is up immediately and when I get to school I'm going to tell Lily* listen he did this, that and the other don't let him - so those lines of communication needs to be open so he needs to know that it's not acceptable at home, it's also not acceptable at school."* (Participant C5)

Medications

A few participants indicated that their child is taking medications for various reasons such as dealing with behavioural situations, improving concentration or reducing anxiety. Some of the medications that were mentioned included Ritalin, Concerta, Epilem, Risperdal, Strattera and supplements such as vitamin B and Omega 3 essential oils.

> *"He's on Ritalin, 30mg a day and it's only recently, when he was younger he was quite active."* (Participant A5)

> *I think the other thing also is the medication helps because on weekends I don't give him any and then he needs to eat and then he says, "Why can't we go there?" and I say, "No, because they're not home. Why, why they're not home? I don't know. They're not home." And by the fifth time I said, "Please stop asking me." And then he's like, "But why can't we go there?"* (Participant B2)

> *"He hasn't been on antibiotic, just routine and behaviour but the recital helps, the Strattera helps…"* (Participant C4)

> *"He is on Strattera for the ADHD but he is on Risperdal for his sensory integration because of his behaviour."* (Participant C5)

Diet

Some mothers also found that introducing their child to a gluten-free diet has been effective for their child.

> *"Taking him off gluten as well, not everybody believes in the gluten thing but because he is -- it does help, I can see an immediate, immediate change within the first 48 hours that I gave him or took away the gluten it helped within -- in December this year after three years I did a -- I gave him pizza and while he was still swollen the stuff I could already see you know, you can see it in the eyes, the eyes is like, it's all over and I just thought no and I mean he has been healthy for three years, he hasn't seen a GP in three years."* (Participant C4)

Trial of approaches

A number of mothers stated that each child is different and that often one will have to try various approaches when implementing strategies and observing what seems to be efficient and what simply does not work and continuously improving and changing interventions as the needs of the child changes and develops. Some participants stated that a combination of approaches seems to be working for their child.

> *"And also like and constantly evaluating her so we're constantly getting feedback on how she's progressing and stuff."* (Participant A1)

> *"But I must say the OT and speech therapy I saw the speech therapy starting to work when the OT kicked in. Speech therapy alone did not work. The OT, because it helps him deal with all the sensory issues as well and then he's okay to do the speech."* (Participant A3)

> *"Changing your approach as the child's needs change. They don't, they not always going to need OT or the same kind of OT or the same kind of speech therapy as they develop as well. You kind of got to give yourself permission to get out of the box as well. The diagnosis, or a set of um, symptoms it will change because we don't stay the same either so they don't and as they get older there are different challenges and you kind of got to judge, "Oh, what worked today is not going to work tomorrow," because they're developing too."* (Participant A6)

> *"We've been at occupational therapy, speech therapy, music therapy we've done everything, we've been under a psychologist, psychiatrist we've done everything and we've just kept going each year crying, praying done everything."* (Participant C6)

Mothers expressed their concern that they also have to find the correct practitioner to work with their child regarding compatibility.

> *"But, you also have to find the person that suits your child. That's why I'm on my third speech therapist and I've stuck with her in a sense because yah, your child also has to, and they are human, we don't like everybody. So, it's the same thing."* (Participant A5)

> *"We actually realised more words are coming out with his tutor actually better than his speech therapist, -- thinking now like maybe it was a mistake so we stopped the speech therapy."* (Participant C3)

Challenges

The participants described that disciplining their child presenting with Dyspraxia have also been a challenging area – they feel guilty because they are uncertain whether it is the correct method of discipline and they also feel sorry for the child due to the challenges the child is already enduring. The child would often also find a way to manipulate a situation.

> *"I think one of the most frustrating thing for me is how to tell everyone else doesn't discipline is quite difficult."* (Participant A5)

> *"His hand would just drop and then he'd start coughing like he can't eat because he is coughing, then he'll start laughing, he can't eat he is laughing, he'll pretend he is sleeping like every little thing this child tried to like manipulate me until the fifth day we eventually did it and then I've realised but now all this stuff is not developmental because now you've overcompensated for three years but I've applied different rules to him and when he goes to different environments."* (Participant C3)

> *"You see they're all masters of manipulation because they know you're going to be happy, they just going to say something."* (Participant C6)

Observed improvements with the implementation of techniques

A major improvement the mothers reported on during focus group discussions, was the development of speech and communication. The children were able to express themselves more clearly and in an understandable manner.

> *"Starting to communicate with other kids and understanding him."* (Participant A2)

> *"He's got to a stage now where he can communicate freely with his friends and teachers where they can understand him."* (Participant A4)

> *"And it's brilliant. You know the temper tantrums are more or less down to a, you they still happen and it's fine, but it's reasonable now. You know, this last week he's even dressed himself once."* (Participant B3)

5.4 Discussion on findings of qualitative research

The discussion presents the synthesis of aims/objectives and themes that have emerged from the results.

- **Aim 1: explore the subjective experience of mothers who have children presenting with DCD/Dyspraxia.**

The first objective of the study was to explore the subjective experience of mothers who have children presenting with DCD/Dyspraxia. As the mothers participating in the focus groups described their experiences with having a child presenting with DCD/Dyspraxia, it was evident that two main themes could be identified – *typical daily life* and *diagnosis related* discussion.

In relation to typical daily living; routine, psychological interventions and level of self-sufficiency played a significant role. Routine included preparing for the day and also the importance of sticking to a certain routine helped both the mother and the child function effectively. Dervishaliaj (2013) mentioned that the experience of being a parent is often accompanied by high levels of stress due to daily challenges, difficulties, and frustrations parents face in daily life. Therefore, it can be noted that a typical daily routine within a household where a child presents with DCD can cause high stress levels amongst mothers. All of the mothers reported that their child was receiving one or more psychosocial intervention(s) – mainly speech therapy and occupational therapy.

In terms of diagnosis related experiences – there was a general consensus that a lack of awareness of the disorder created many frustrations ranging from mothers not being aware of difficulties their child is experiencing or what it means to family members and the general public making insensitive comments. There seemed to be a general consensus that a lack of awareness consists within the academic and education system. It was also noteworthy to identify that most mothers observed a difference in their child by comparing their child to siblings and other children from the same peer group on a developmental level and becoming aware that they are not on par with other children of the same developmental age. This falls in line with what the current literature present, regarding that initial recognition is frequently noted with a delay in motor milestones, or when the child attempts activities such as playing ball games, etc., (American Psychiatric Association, 2013).

Formal diagnoses were obtained from various health care professionals such as Educational Psychologists and paediatricians. Many times Educators, Speech Therapists and Occupational Therapists would recognise difficulties and delays presented by children and refer the children to see a health care professional for an official diagnosis.

A few mothers within the discussion groups reported that their child had accompanying diagnoses along with the diagnosis of Dyspraxia; ASD, ADD, ADHD, and sensory processing disorder were the diagnoses reported on within the focus groups. Similarly, it has been reported in literature that frequent co-occurring disorders include problems of inattention, such as ADHD, specific learning disorders, speech- and language disorder, autism spectrum disorder (ASD), and disruptive and emotional behavioural problems (American Psychiatric Association, 2013). Brien et al. (2008) also indicated that children with DCD may experience difficulty with processing auditory, visual, and vibro-tactile information, which may account for why some children also have a diagnosis of sensory processing disorder. The researcher also noted that several mothers recounted how their child was initially misdiagnosed with a different developmental disorder initially – ASD most commonly. Later they would obtain the diagnosis of Dyspraxia.

- **Aim 2: identify the various psychosocial interventions used in the home environment by mothers of children presenting with DCD in managing the disorder.**

The second aim of the qualitative study was to identify the psychological interventions used in the home environment by mothers to manage DCD in the home environment. A variety of interventions implemented were mentioned within the focus groups. The children received Occupational Therapy (OT) as an intervention to address sensory issues as well as to improve fine- and gross-motor skills. Smits-Engelsman et al. (2012) reported in their study that physical and occupational therapies as a task-oriented intervention have yielded positive effects. Likewise, Kirby and Sugden (2007) have also indicated that task-oriented approaches are preferred as an intervention for children presenting with motor difficulties.

Speech therapy is another intervention that is implemented as it encourages improvement in their speech development in terms of verbal and non-verbal communication, improvement in pronunciation, expressing themselves and clearer understanding. A major improvement the mothers reported on during focus group discussions, was the development of speech and communication. The children were able to express themselves more clearly and in an understandable manner.

Some children received Applied Behavioural Analysis (ABA), which is a behavioural technique that is often used for children on the autism spectrum. A number of participants in the current study described that their children have benefited from receiving ABA as means of a behavioural technique.

Another intervention which was reported on was individualised one-to-one tutoring - the tutor facilitates the learning process in targeted areas. There was a consensus amongst mothers whose children received tutoring that they find this intervention technique to be effective for their child struggling with developmental and motor difficulties. Many mothers agreed that this method has also been essential especially in the instance where they could not implement techniques themselves due to reasons ranging from full-time employment, addressing other family responsibilities, and in instances where children were resistant to receiving treatment when the mother implements techniques. Tan (2007) regarded “remedies” that specifically address the child’s unique needs to be an effective method. Therefore, it can be deduced that one-on-one tutoring can be deemed as an effective method when related to the statement of Tan (2007) as well as the agreement among mothers that they find tutoring to work effectively for their child.

Mothers also reported on their perceived effectiveness of social-skills training. Role-playing, social stories and preparation for situation has been techniques used in this approach which guide the children on expected outcomes and behaviour in certain situations and in turn it reduces anxiety among children with Developmental Coordination Disorder. These findings are supported by the similarities in recommendations suggested in the study of Carslaw (2011) who claim that having a routine is essential and that it is essential to assist the child to form ideas, plan actions and carry them out. Verbal reminders, calendars and countdown timers are less formal instruments used as preparation guides and they are essential tools to aid with preparation as well. Correspondingly, Carslaw (2011) stated that practical tools that are helpful for children include timetables and kitchen timers.

It has also been reported that observed improvements in children's behaviour and motor abilities could be accounted for by having a multidisciplinary team work together. It was perceived to be a successful strategy. Regular feedback and discussion between the team about the intervention plan and progress is deemed vital in this approach.

Administering medication to children with Developmental Coordination Disorders have not yielded significant observed improvements in motor capabilities, however the mothers reported that it has been helpful in addressing behavioural difficulty as well as improving concentration capability and reducing anxiety among children.

It has also been found that often a combination of intervention approaches yield more positive outcomes than isolated strategies. It has also been reported that trying different approaches and finding which approach works with the child is essential – as the child develops and their needs changes, so does the need for adapting interventions. This deduction can be related to the views of Ayyash and Preece (2003), who speculated that the required evidence for choosing a treatment approach in the case of a child presenting with DCD, is the effect of the intervention on improving functional performance and motor skills.

- **Aim 3: explore some of the support available as well as the support needed by mothers of children presenting with DCD.**

The third objective was to explore the support available as well as the support needed by mothers of children presenting with Developmental Coordination Disorder.

One of the main disputes with regards to their child's diagnosis, is the lack of informational support that mothers received. Ertem et al. (2007) claimed that knowledge by mothers about child development is important as it has vast implications on the developing child. Hence, when linking these results to the statement of Ertem et al. (2007) above, it can be deduced that the lack of knowledge could influence the perception of mothers. Often mothers experience a sense of confusion as they become aware of the developmental and motor difficulties presented by their child and they are uncertain about who or where to go to find assistance. Similarly, Missiuna and Gaines, et al. (2006) reported that it is common for parents to seek information and express concern about their child's movement difficulties and seek the causes of their child's lack of coordination.

Once a diagnosis has been obtained, a further supportive issue lacking is the lack of awareness about the diagnosis and what it entails. Novak et al. (2011) reported that parents were frustrated by the lack of knowledge and expertise of health and educational professionals working with children presenting with DCD. There was also a perceived lack of good quality accessible information and support services available. These results can be linked to a similar frustration experienced among mothers of the present study. The mothers also reported that the internet does not provide them with relevant or enlightening information either and that it is not appropriate within the South African context.

In the current study, it was found that financial costs involved in interventions and health care professionals are very high and this cost is additional on top of daily living costs which must be maintained. Another financial issue that arose was that often times the costs of therapies rest upon the parents as medical aids do not cover certain therapies. In the study conducted by Meral (2012), it was found that support can be monetary, instrumental, informative, physical, and emotional; the negative effects of a crisis can be overcome if this support is provided by allowing the individual to feel cared for, loved and valued. Hence the gap in financial support may lead to stressful experiences amongst mothers.

Many mothers experienced a perceived lack of awareness amongst their friends and family members when it came to understanding their child’s diagnosis. Missiuna and Moll et al. (2006) found similar results, and stated that families of children with DCD find the lack of knowledge, recognition and understanding of others are challenging to them. Often additional strain is placed on the mother in the case where the father is in denial of their child’s diagnosis and the fathers expect miracles to happen overnight. Furthermore, mothers also expressed that siblings became aware of their brother/sister’s difficulties and the fact that the sibling presenting with DCD received intervention while they did not.

A noteworthy area of where support was sought, was a safe space such as a support group where they can openly discuss with others who can relate to their situation in a setting which is accepting and empathic. This became very clear in the focus group discussions where these mothers embraced this platform to find motherhood kingship and valued the reciprocal support shown.

The mothers in the study also expressed their concerns for the future of their child. The biggest concern was whether society would accept their children with the diagnosis of Dyspraxia. Another predominant concern was whether their child would get to the stage where they could communicate and express themselves successfully. Mothers also stated that their child may struggle academically in school due to being primarily visual learners. A further concern regarded the future of the child and their well-being as well as their ability to cope once the mother was no longer alive, or unable to take care of their child.

- **Applying Bronfenbrenner’s Ecological Systems theory to the findings**

Viewing how mothers experience parenting a child presenting with Developmental Coordination Disorder through the lens of Brofenbrenner's ecological theory illustrates how the physical environment and social context are linked in dynamic, interacting and interdependent relationships. Each system is therefore part of a complex whole which is connected to other systems directly or indirectly.

Bronfenbrenner's ecological systems theory, as discussed in Chapter 2 speaks to this study, which states that the systems interrelate with each other, for example, the relationship between child and the mother in the micro-system is affected by the macro-system which inform culture, belief and certain values which is then transferred onto the child through the parents.

It can be deduced that the micro-system refers to the system of each individual mother and child in this study. As mentioned – their immediate environment involves direct interpersonal relationships with their family, the teachers at the schools which the children attend, and the therapists who implement interventions. Mental health practitioners who were seen to provide diagnoses, and extended family could be regarded to form part of the exo-system in Bronfenbrenner's theory. As mentioned, there was great difficulty with regards to obtaining information from health care practitioners on the diagnosis and management of DCD, and mothers were also troubled by family and friends lack of awareness of the disorder and their hurtful comments. As discussed in the theoretical framework, the mesosystem involves the relations between the micro-system and the exo-system. Therefore, the faulty systems within the exo-system have an impact on the micro-system.

5.5 Conclusion

This chapter presented the findings and discussion according to the results of the qualitative study (Phase 2). The four main themes were presented and discussed based on the findings of the study, followed by a discussion linking the findings to the aims and objectives of the qualitative study and to the literature reviewed in chapter 2.

Chapter 6 of this research study will conclude the study, provide a collective summary of the findings presented in both Phase 1 (Chapter 4) and Phase 2 (Chapter 5), as well as discuss the limitations of each of the two phases of the study. The chapter also convey recommendations for future research.

CHAPTER 6: CONCLUSION

> *A mother's love is so unconditional that you're able to out your feelings aside and focus on what the benefit is for the child. It's unfortunate that sometimes you do that at the expense of yourself because now you're not worried about your own self-esteem, other people cope different ways, they drink, they smoke, they take anti-depressants, take pain killers whatever to cope with it because mothers are so selfless, it's all about your child and what your child needs and sometimes unfortunately it's to our detriment, what is the best for the child, I must go to this party, I must show up and show my face but I'm doing it for my child's benefit then you put your own self at risk but sometimes we're human , need to take a break and we just say you know what he doesn't have to go to every party, I don't have to put myself though this all the time.* (Participant C4)

6.1 Introduction

This chapter is dedicated to the discussion of the results, to illustrate the collective findings of the study. The discussion summarises the aims and themes that have emerged from the results. Lastly, this chapter will also look at the limitations of the study as well as attempt to make recommendation for future studies.

6.2 Collective Summary

The aims and objectives for both phases of the present study were obtained. The aim of the systematic review was to provide an evidence base of filtered information assessed for methodological quality on interventions for children presenting with Developmental Coordination Disorder. The following interventions were found to be effective (as discussed in Chapter 4) especially with regards to improving motor functioning: *Neuromotor Task Training (NTT), Psychological Intervention Programme, Motor-based Intervention Programme,* and *Psycho-motor Intervention Programme,* *Physiotherapy Package* (which consisted of a home school programme as well as one-to-one sessions), *Cognitive Orientation to daily Occupational Performance (CO-OP)* and *Current occupational therapy treatment approach (CTA)*, and *Task-oriented Cognitive-motor approach.*

The three aims for the Qualitative study (Phase 2) were to: explore the subjective experience of mothers who have children presenting with DCD/Dyspraxia, identify the various psychosocial interventions used in the home environment by mothers of children presenting with DCD in managing the disorder, and lastly explore some of the support available as well as the support needed by mothers of children presenting with DCD.

The first objective of the study was to explore the subjective experience of mothers who have children presenting with DCD/Dyspraxia. As the mothers participating in the focus groups described their experiences with having a child presenting with DCD/Dyspraxia, it was evident that two main themes could be identified – *typical daily life* and *diagnosis related* discussion.

Routine, psychological interventions and level of self-sufficiency played a significant role regarding typical daily life. Routine included preparing for the day and also the importance of sticking to a certain routine helped both the mother and the child function effectively. Mothers of children with Dyspraxia face higher levels of stress in their daily routine. Speech Therapy and Occupational Therapy were the most common approaches which these mothers implemented.

Due to the lack of awareness of the disorder – it places additional stress on mothers as they often did not recognise the complications experienced by the child, in addition to not knowing what the diagnosis means. Insensitive comments from extended family members and the general public were also found to be stressful. A general lack of awareness consists within the academic and education system. Through comparing their child to siblings and other children from the same peer group on a developmental level, many mothers became aware that their child is not on par with other children of the same developmental age. This falls in line with what the current literature present regarding that initial recognition is frequently noted with a delay in motor milestones, or when the child attempts activities such as playing ball games, etc., (American Psychiatric Association, 2013).

Formal diagnoses were obtained from various health care professionals such as Educational Psychologists and Paediatricians. Educators, Speech Therapists and Occupational Therapists were other sources who recognised difficulties and delays presented by children and would refer the child to see a health care professional for an official diagnosis.

Accompanying diagnoses along with the diagnosis of Dyspraxia included ASD, ADD, ADHD, and sensory processing disorder. Similarly, it has been reported in literature that frequent co-occurring disorders include problems of inattention, such as ADHD, specific learning disorders, speech- and language disorder, autism spectrum disorder (ASD), and disruptive and emotional behavioural problems (American Psychiatric Association, 2013).

The second aim of the qualitative study was to identify the psychological interventions used in the home environment by mothers to manage DCD in the home environment. A variety of interventions implemented were mentioned within the focus groups. The children received Occupational Therapy (OT) as an intervention to address sensory issues as well as to improve fine- and gross-motor skills. Speech therapy is another intervention that is implemented as it encourages improvement in their speech development in terms of verbal and non-verbal communication, improvement in pronunciation, expressing themselves and clearer understanding. A major improvement the mothers reported on during focus group discussions, was the development of speech and communication. Some children received Applied Behavioural Analysis (ABA), which is a behavioural technique that is often used for children on the autism spectrum. A number of participants in the current study described that their children have benefited from receiving ABA as means of a behavioural technique. Individualised one-to-one tutoring where the tutor facilitates the learning process in targeted areas were also found to be effective. Many mothers found this method to be essential especially in the instance where they could not implement techniques themselves due to reasons ranging from full-time employment, addressing other family responsibilities, and in instances where children were resistant to receiving treatment when the mother implements techniques.

Social-skills training is another intervention which have been perceived to be effective and positive. Role-playing, social stories and preparation for situation has been techniques used in this approach which guide the children on expected outcomes and behaviour in certain situations and in turn it reduces anxiety among children with Developmental Coordination Disorder.

Having a multidisciplinary team work together has provided observed improvements in children's behaviour and motor abilities. It was perceived to be a successful strategy. Regular feedback and discussion between the team about the intervention plan and progress is deemed vital in this approach.

Administering medication to children with Developmental Coordination Disorders have not yielded significant observed improvements in motor capabilities, however the mothers reported that it has been helpful in addressing behavioural difficulty as well as improving concentration capability and reducing anxiety among children.

It has also been found that often a combination of intervention approaches yield more positive outcomes than isolated strategies. It has also been reported that trying different approaches and finding which approach works with the child is essential – as the child develops and their needs changes, so does the need for adapting interventions.

The third objective was to explore the support available as well as the support needed by mothers of children presenting with Developmental Coordination Disorder.

The lack of informational support that mothers received were one of the main concerns. Often mothers experience a sense of confusion as they become aware of the developmental and motor difficulties presented by their child and they are uncertain about who or where to go to find assistance. Once a diagnosis has been obtained, a further supportive issue lacking is the lack of awareness about the diagnosis and what it entails. There was also a perceived lack of good quality accessible information and support services available. The mothers also reported that the internet does not provide them with relevant or enlightening information either and that it is not appropriate within the South African context.

In the current study, it was found that financial costs involved in interventions and health care professionals are very high and this cost is additional on top of daily living costs which must be maintained. Another financial issue that arose was that often times the costs of therapies rest upon the parents as medical aids do not cover certain therapies.

Many mothers experienced a perceived lack of awareness amongst their friends and family members when it came to understanding their child's diagnosis. Often additional strain is placed on the mother in the case where the father is in denial of their child's diagnosis and the fathers expect miracles to happen overnight. Furthermore, mothers also expressed that siblings became aware of their brother/sister's difficulties and the fact that the sibling presenting with DCD received intervention while they did not.

6.3 Limitations

This study has a few limitations which will be mentioned and discussed below.

Systematic review

- Often it was impossible to gain full access to certain articles contained within the databases.
- Many articles are limited in the sense that they do not contain comprehensive information such as in a full thesis but instead a summary on the topic (publication bias). The lack of methodological data might have resulted in the exclusion of relevant studies.
- Language bias was present as database searches for eligible studies were limited to English-medium studies. Relevant studies presented in other languages were omitted, limiting the sampling frame of relevant studies for inclusion, resulting in language bias within the present studies.
- A further drawback was the study's failure to evaluate grey literature and conduct a process of reference mining. The study's lack of considering grey literature omits unpublished studies that may valuably contribute to the pragmatic body of knowledge compiled in this study.

- The lack of reference mining omits studies that are not available in the library of the University of the Western Cape's databases. The lack of both reference mining and grey literature limits the sample frame of eligible studies for inclusion.
- Additionally, studies not deemed open access were excluded, limiting the pool of eligible studies for inclusion.

Qualitative Study

- The researcher did not do a pilot-study for the current study as it was planned to do a number of focus groups and the instrument cannot be tested.
- The true definition of DCD and its diagnostic criteria are still poorly understood and is a relatively new concept in the South African realm of practice. Therefore, it is difficult to ascertain whether the DCD group of children had a true diagnosis of DCD.
- An additional limitation was that the number of participants were not equally distributed between the three groups
- Excluding the level of education from participants might be another drawback.

6.4 Recommendation for Future Research

Due to the limited studies in South Africa relating to managing Dyspraxia/DCD, it is highly recommended that future research shift their attention to the psychosocial interventions utilised in managing the disorder.

The research was conducted only within the Cape Metropole region, therefore it is recommended that future studies seeking to replicate this dissertation in part or in its entity, be conducted in other regions of South Africa.

It is important for us to establish how many practitioners use the DSM-V criteria for diagnosing DCD and how widely the concept or definition is used in practice, be it public or private.

Due to the general concern of lack of awareness of the disorder – it is clear that there is a need to create greater awareness thereof amongst the general population, health care professionals, academic staff and parents.

A further recommendation the researcher would endorse is to initiate more support groups for parents who have children with special needs, particularly DCD/Dyspraxia.

Due to the current study focusing on mothers of children with Dyspraxia and their experiences, the researcher recommends that future research explore the experience of fathers with children presenting with Dyspraxia.

It would be valuable if more educators could be trained to recognise deviances and struggles experienced by children in order to be able to refer them appropriately as early as possible so that they could receive efficient input.

To conclude, another recommendation is that educators should be trained and attend courses on dealing with children who have different needs and struggles as this will provide a more convenient learning environment for the children.

REFERENCE LIST

APA. (2013). *Diagnostic and Statistical Manual of mental disorders* (Fifth ed). Arlington: American Psychiatric Publishing.

Archibald, L. M. D., & Alloway, T. P. (2008). Comparing language profiles: children with specific language impairment and developmental coordination disorder. *International Journal of Language and Communication Disorders*, *43*(2), 165–180. http://doi.org/10.1080/13682820701422809

Ayyash, H. F., & Preece, P. M. (2003). Evidence-based treatment of motor co-ordination disorder. *Current Paediatrics*, *13*, 360–364. http://doi.org/10.1016/S0957-5839(03)00058

Benjamin, N. (2010). *A comparison of exercise endurance levels between children diagnosed with developmental coordination disorder and endurance of normal children*. University of Witwatersand. Retrieved from http://wiredspace.wits.ac.za/bitstream/handle/10539/8846/0717667A - MSc research report.pdf?sequence=1

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Brien, J. C. O., Lyons, J., Williams, H. G., Mittal, A., & Bundy, A. (2008). Mechanisms that underlie coordination in children with developmental coordination disorder. *Journal of Motor Behavior*, *40*(1), 43–61.

Bronfenbrenner, U. (1994). Ecological models of human development. In *International Encyclopedia of Education* (Second ed, pp. 37–43). Elsevier: Oxford.

Carslaw, H. (2011). Developmental Coordination Disorder. *InnovAit: The RCGP Journal for Associates in Training*, *4*(2), 87–90. http://doi.org/10.1093/innovait/inq184

Christensen, J. (2010). Proposed enhancement of Bronfenbrenner’s development ecology model. *Education Inquiry*, *1*(2), 101–110.

Curtin, M., Baker, D., Staines, A., & Perry, I. J. (2014). Are the special educational needs of children in their first year in primary school in Ireland being identified: a cross-sectional study. *BMC Pediatrics*, *14*(52), 1–9. http://doi.org/10.1186/1471-2431-14-52

Dantas, L. E. B. P. T., & Manoel, E. J. (2009). Children with coordination difficulties: issues on conceptualising the developmental coordination disorder. *Movimento*, *15*(3), 293–313.

Dervishaliaj, E. (2013). Parental stress in families of children with disabilities: A literature review. *Journal of Educational and Social Research*, *3*(7), 579–584. http://doi.org/10.5901/jesr.2013.v3n7p579

Dewey, D., Cantell, M., & Crawford, S. G. (2007). Motor and gestural performance in children with autism spectrum disorders , developmental coordination disorder, and/or attention deficit hyperactivity disorder. *Journal of the International Neuropsychological Society*, *13*, 246–256.

Dewey, D., Kaplan, B. J., Crawford, S. G., & Wilson, B. N. (2002). Developmental coordination disorder: Associated problems in attention, learning, and psychosocial adjustment. *Human Movement Science*, *21*(5–6), 905–918. http://doi.org/10.1016/S0167-9457(02)00163-X

du Plessis, C. (2013, May). Wanneer woorde ontbreek. *Baba & Kleuter*, 78–80.

Duncan, N., Bowman, B., Naidoo, A., Pillay, J., & Roos, V. (2012). *Community psychology: analysis*. Cape Town: UCT Press.

Fouka, G., & Marianna, M. (2011). What are the major ethical issues in conducting research?Is there a conflict between the research ethics and the nature of nursing? *Health Science Journal*, *5*(1), 3–14.

Hillier, S. (2007). Intervention for children with Developmental Coordination Disorder: A systematic review. *The International Journal of Allied Health Sciences and Practice*, *5*(3).

Kirby, A., & Sugden, D. A. (2007). Journal of the royal society of medicine, *100*(182).

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.

Meral, B. F. (2012). A study on social support perception of parents who have children with Autism. *International Journal on New Trends in Education and Their Implications, 3*(13), 124–135.

Missiuna, C., Gaines, R., Soucie, H., & McLean, J. (2006). Parental questions about developmental coordination disorder: A synopsis of current evidence. *Paediatrics & Child Health, 11*(8), 507–12. Retrieved from http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2528644&tool=pmcentrez&rendertype=abstract

Missiuna, C., Moll, S., Law, M., King, S., & King, G. (2006). Mysteries and mazes: Parents' experiences of children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, (C), 7–17. http://doi.org/10.2182/cjot.05.0010.This

Missiuna, C., Rivard, L., & Pollock, N. (2011). Children with Developmental Coordination Disorder: At home, at school, and in the community. Retrieved from http://dcd.canchild.ca/en/dcdfaqs/resources/dcdrevised.pdf

Nadkarni, N. A., & Deshmukh, S. S. (2012). Mirror Movements. *Annals of Indian Acadamy of Neurology*, *15*(1), 13–14. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3299062/

Niemeijer, A. S., Smits-Engelsman, B. C. M., Reynders, K., & Schoemaker, M. M. (2003). Verbal actions of physiotherapists to enhance motor learning in children with DCD. *Human Movement Science, 22*(4–5), 567–581. http://doi.org/10.1016/j.humov.2003.09.010

Niemeijer, A. S., Smits-Engelsman, B. C. M., & Schoemaker, M. M. (2007). Neuromotor task training for children with developmental coordination disorder: a controlled trial. *Developmental Medicine & Child Neurology, 49,* 406–411.

Novak, C., Lingam, R., Coad, J., & Emond, A. (2011). "Providing more scaffolding" parenting a child with developmental co-ordination disorder, a hidden disability. *Child: Care, Health and*

Development, *38*(6), 829–836. http://doi.org/10.1111/j.1365-2214.2011.01302.x

Nowell, B., & Boyd, N. (2010). Viewing community as responsibility as well as resource: deconstructing the theoretical roots of psychological sense of community. *Journal of Community Psychology*, *38*(7), 828–841. http://doi.org/10.1002/jcop

Peens, A., Pienaar, A. E., & Nienaber, A. W. (2007). The effect of different intervention programmes on the self-concept and motor proficiency of 7- to 9-year-old children with DCD. *Child: Care, Health and Development*, *34*(3), 316–328. http://doi.org/10.1111/j.1365-2214.2007.00803.x

Peters, J. M., Henderson, S. E., & Dookun, D. (2004). Provision for children with developmental co-ordination disorder (DCD): audit of the service provider. *Child: Care, Health and Development*, *30*(5), 463–480.

Sadock, B. J., & Sadock, V. A. (2007). *Kaplan and Sadock's synopsis of psychiatry* (Tenth edit). New York: Lippincot Williams & Wilkins.

Sangster, C. A., Beninger, C., Polatajko, H., & Mandich, A. (2005). Cognitive strategy generation in children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, *72*(2), 67–77. http://doi.org/10.1177/000841740507200201

Santrock, J. W. (2009). *Life-span development* (Twelth ed). New York: McGraw-Hill.

Shaughnessy, J. J., Zechmeister, E. B., & Zechmeister, J. S. (2010). *Research methods in Psychology* (Eighth ed). Singapore: McGraw-Hill.

Simpson, R. D. (2011). The "ecosystem service framework": A critical assessment. *UNEP*, *4*.

Smits-Engelsman, B. C. M., Blank, R., van der Kaay, A., Mosterd-van Der Meijs, R., Vlugt-van Den Brand, E., Polatajko, H. J., & Wilson, P. H. (2012). Efficacy of interventions to improve motor performance in children with developmental coordination disorder: a combined systematic review and meta-analysis. *Developmental Medicine & Child Neurology*, *55*, 229–237. http://doi.org/10.1111/dmcn.12008

Stansell, D. J. (2007). Giving a face to a hidden disorder: The impact of dyspraxia. *TEACHING Exceptional Children Plus*, *4*(1), 1–8.

Sugden, D. A., & Chambers, M. E. (2003). Intervention in children with Developmental Coordination Disorder: the role of parents and teachers. *The British Journal of Educational Psychology*, *73*, 545–561. http://doi.org/10.1348/000709903322591235

Sugden, D. A., & Chambers, M. E. (2006). Stability and change in children with Developmental Coordination Disorder. *Child: Care, Health and Development*, *33*(5), 520–529. http://doi.org/10.1111/j.1365-2214.2006.00707.x

Tan, Y. (2007). Dyspraxia: Beyond the clumsy child syndrome. *Metta*, *16*(2), 22–23.

Terre Blanche, M., Durrheim, K., & Painter, D. (2011). *Research in practice* (Second ed). Cape Town: UCT Press.

van Staden, C. (2013). *Parents, educators and children: Perceptions on dyspraxia*. University of South Africa. Retrieved from http://etd.uovs.ac.za/ETD-db/theses/available/etd-06142013-151211/unrestricted/VanStadenC.pdf

Visagie, A. (2010). *Research methodology study guide: SRSM211* (Second ed). Midrand: Midrand Graduate Institute.

Zoia, S., Barnett, A., Wilson, P., & Hill, E. (2006). Developmental coordination disorder: Current issues. *Child: Care, Health and Development*, *32*(6), 613–618. http://doi.org/10.1111/j.1365-2214.2006.00697.x

APPENDICES

APPENDIX A: Information sheet

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-9592819, Fax: 27 21-9593515

E-mail: gancilorenza@gmail.com

INFORMATION SHEET

Project Title: Exploring the subjective experience and the psychosocial interventions mothers utilise in managing a child presenting with Developmental Coordination Disorder (DCD)/Dyspraxia.

What is this study about?

This is a research project being conducted by Lorenza Ganci from the University of the Western Cape and I'm inviting you to participate in this research project. The purpose of this study is to gain more insight into the experiences of mothers raising a child presenting with Developmental Coordination Disorder (DCD)/Dyspraxia.

What will I be asked to do if I agree to participate?

You will be part of a focus group and you will be asked to discuss certain questions posed. The questions that will be addressed will be related to your experiences raising a child presenting with Developmental Coordination Disorder (DCD)/Dyspraxia. The interview will be done within an hour.

Would my participation in this study be kept confidential?

Your personal information will be kept confidential. To protect your confidentiality, the information you provide will be private; no names will be used so there is no way you can be identified for participating in this study. Your information will be anonymous and treated confidentially. All participants will sign a confidentiality form, providing consent that the information in the focus group discussion will remain confidential. If we write a report or article about this research project, your identity will be protected to the maximum extent possible.

What are the risks of this research?

There are no known risks associated with participating in this research project.

What are the benefits of this research?

This research is not designed to help you personally, but the results may assist the researcher to learn more about the experiences of mothers raising a child presenting with DCD/Dyspraxia and the interventions they use. We hope that, in the future, other people might benefit from this study in order to understand the experiences of a mother raising a child presenting with DCD/Dyspraxia. The findings will provide greater insight into how they cope with the challenges and the interventions they prefer.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalised or lose any benefits to which you otherwise qualify. Participation in the research is not a course requirement.

Is any assistance available if I am negatively affected by participating in this study?

Every effort has been taken to *protect you from any harm* in this study. If however, you may feel affected in any way by the questions asked within the focus group, you will be provided with information to seek help such as counselling.

What if I have questions?

This research is being conducted by *Miss Lorenza Ganci* at the University of the Western Cape. If you have any questions about the research study itself, please contact Miss Lorenza Ganci, email: gancilorenza@gmail.com.

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Dean of the Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.

APPENDIX B: Participant consent form

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-9592819, Fax: 27 21-9593515

E-mail: gancilorenza@gmail.com

CONSENT FORM FOR PARTICIPANTS

Title of Research Project:

Exploring the subjective experience and the psychosocial interventions parents utilise in managing a child presenting with Developmental Coordination Disorder (DCD)/Dyspraxia.

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way. I agree to have the interview audio recorded and kept confidential.

Participant's name………………………..

Participant's signature……………………………….

Date………………………

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact me:

Study Coordinator's Name: Miss Lorenza Ganci

University of the Western Cape

Private Bag X17, Bellville 7535

Telephone: (021) 959-2819

Fax: (021) 959-3515

APPENDIX C: Focus group confidentiality binding form

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-9592819, Fax: 27 21-9593515

E-mail: gancilorenza@gmail.com

FOCUS GROUP CONFIDENTIALITY BINDING FORM

Title of Research Project: Exploring the subjective experience and the psychosocial interventions parents utilise in managing a child presenting with Developmental Coordination Disorder (DCD)/Dyspraxia.

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way. I agree to be audio-taped during my participation in the study. I also agree not to disclose any information that was discussed during the group discussion.

Participant’s name………………………………………..

Participant’s signature…………………………………..

Date………………………

APPENDIX D: Interview guide

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-9592819, Fax: 27 21-9593515

E-mail: gancilorenza@gmail.com

INTERVIEW GUIDE

1. Describe a typical day in your household?
2. How did you find out that your child has Developmental Coordination Disorder/Dyspraxia?
3. Did you get a diagnosis for your child?
4. Were you informed well on the diagnosis? What was said to you?
5. Where did you go for help? Who sent you? Who told you where to go
6. Has your child been diagnosed with any accompanying disorders, such as ADHD, autism, etc.?
7. What was your initial experience/reaction to the diagnosis?
8. When did you initially become aware of the challenges with your child?
9. Were you aware of any support available regarding facilitation of your child?
10. What support, if any, did you require? (for example: financial, informational, social)
11. Did you receive the support you needed at the given time?
12. What motivated you to seek support/intervention for your child?
13. Before receiving any assistance, what strategies did you use to manage your child's behaviour?
14. Which intervention strategies have you been exposed to in aiding the management of your child at home?

15. Which intervention strategy do you find most successful with your child?

16. What improvements have you observed since starting intervention with your child?

17. What regressions have you observed since starting intervention with your child?

18. What challenges do you experience when implementing these interventions?

19. What do you find rewarding about implementing these interventions?

20. What concerns do you currently have for your child?

APPENDIX E: Title summary sheet

Author	Date	Title and source	Database	Location where stored	Outcome: exclude/include

APPENDIX F: Abstract reading extraction tool

Type of design	Study population	Instrument used	Outcomes	Quality/result of study analyses

APPENDIX G: RE-AIM Quality Assessment Tool

Bibliographic details	**Author**	**Title**	**Source**

Description of interventions		**Year**

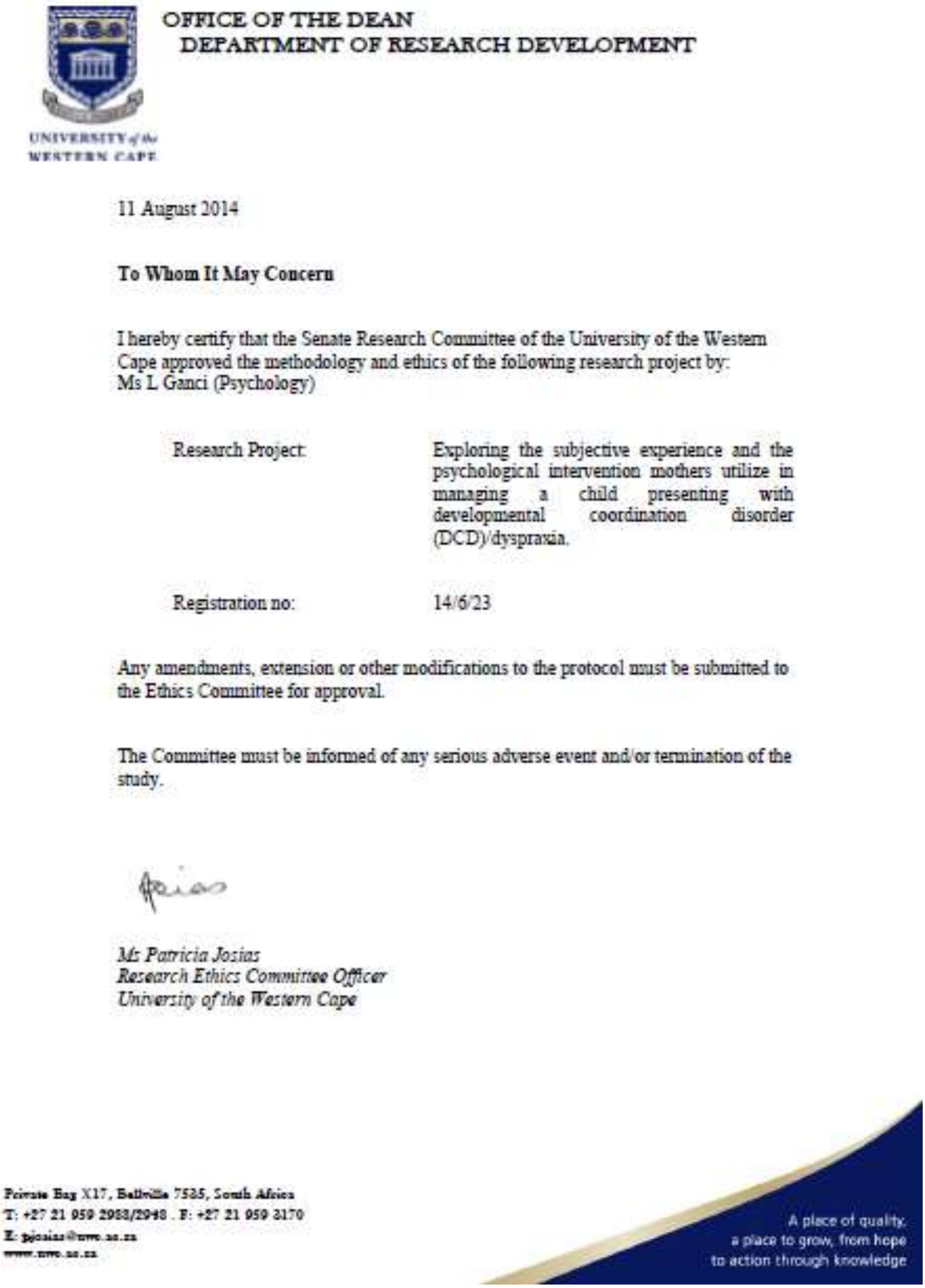
RE-AIM Dimensions	Questions	Scoring
REACH	Does the article indicate who the program is intended for (Inclusion and exclusion criteria) Does the article report on the representativeness of the target population? Does the article report on participation rate?	Y= 1 / N=0 Y=1 / N=0 Y=1 / N=0
Effectiveness	Did the program achieve the intended objectives? Do they report on the limitations of the intervention? Reports on at least one outcome of the intervention Reports on attrition	Y=1 / N=0 Y=1 / N=0 Y=1 / N=0 Y=1 / N=0
Adoption	Is the setting clearly described? Does the evaluation report on the adoption of the intervention by the participants or the organization? Reports on who delivered the program	Y=1 / N=0 Y=1 / N= 0 Y=1 / N=0
Implementation	Describes the duration and frequency of the intervention Has the staff / participants of the organization/intervention been involved in delivering the program (cost implications) Reports on intended and delivered interventions	Y = 1 / N=0 Y = 1 / N=0 Y=1 / N=0
Maintenance	Does the article report on long term effects of the intervention (after 6 months) DO they report on the indicators used for intervention follow-up?	Y=1 / N=0 Y=1 / N=0

APPENDIX H: Synthesis Tool

Authors	**Methodological appraisal**					**Programme/intervention content**		
	Design	Participants	Sample type	Sample size	Outcome measures	Data analysis	Empirical evidence/results	Conclusions

Author/Title/ Journal/Source	Intervention	Study aims	Study design	Population/ sample	Setting and context	Program/ intervention description	Duration	Outcome measures	Reach	Efficacy	Adoption	Implementation	Maintenance

APPENDIX I: Ethical Clearance



UNIVERSITY of the
WESTERN CAPE

OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH DEVELOPMENT

11 August 2014

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:
Ms L Ganci (Psychology)

Research Project:	Exploring the subjective experience and the psychological intervention mothers utilize in managing a child presenting with developmental coordination disorder (DCD)/dyspraxia.
Registration no:	14/6/23

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Private Bag X17, Bellville 7535, South Africa
T: +27 21 959 2988/2948 . F: +27 21 959 3170
E: pjosias@uwc.ac.za
www.uwc.ac.za

A place of quality,
a place to grow, from hope
to action through knowledge