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Current Paediatric Auditory Processing Disorder Assessment and Management Practices Implemented by Speech-Language Therapists Working in Private Practices in Johannesburg, South Africa

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November 2014

In Loving Memory of My Father

Ralph Michael Lewis

This research project is dedicated in memory of Ralph Michael Lewis, my father who gave up his life to give me everything I have. His unconditional love and guidance has made me the person I am today. His humble, honorable way of living has been an inspiration to me and his wisdom, selflessness and gentle ways continue to be imprinted in my heart.

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Declaration

I declare that “Current Paediatric Auditory Processing Disorder Assessment and Management Practices Implemented by Speech-language Therapists working in Private Practices in Johannesburg, South Africa” is my own work. This research project is submitted for the partial fulfillment of the degree of Masters in Speech Pathology at the University of the Witwatersrand, Johannesburg. No part of the research project has been submitted for any other degree. The research project has not been presented to any other University for examination either in South Africa or overseas.

November 2014

Signed:

Liane Lewis

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Acronyms and Abbreviations

AAA:	American Academy of Audiology
ABR:	Auditory Brainstem Response
AIDS:	Acquired Immune Deficiency Syndrome
APD:	Auditory Processing Disorder
AP:	Auditory Processing
ASHA:	American Speech-Language Hearing Association
BSA:	British Society of Audiology
CANS:	Central Auditory Nervous System
CAP:	Central Auditory Processing
CAPD:	Central Auditory Processing Disorder
CELF:	Clinical Evaluation of Language Fundamentals
CISG:	Canadian Interorganizational Steering Group
CNS:	Central Nervous System
CPD:	Continuing Professional Development
HIV:	Human Immunodeficiency Virus
HPCSA:	Health Professions Council of South Africa
HREC:	Human Research Ethics Committee
MRI:	Magnetic Resonance Imaging
NHS:	National Health Service
OAE:	Otoacoustic Emissions
OT:	Occupational Therapist
PLS:	Preschool Language Scale
SAAA:	South African Association of Audiologists
SASLHA:	South African Speech, Language and Hearing Association
SLT:	Speech, Language Therapist
TAPS:	Test for Auditory Perception of Speech
UK:	United Kingdom

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Abstract:

The number of children being diagnosed with Auditory Processing Disorder (APD) is increasing and the lack of standardized assessment and management across speech-language therapists (SLT) in South Africa, as well as the lack of general consensus in defining and managing this disorder globally, leaves open the possibility of adverse effects on a child's education, self-esteem and future (Musiek & Chermak, 2007). Due to this lack of consensus in defining and implementing protocols in South Africa, assessment and management of children with APD is not being optimized. The following research aimed to investigate the practices used by SLTs regarding the assessment and management of children with APDs in Johannesburg, South Africa. In this qualitative, explorative study, data collection comprised of interviews with ten English speaking SLTs that worked within the private practice setting, with a minimum of one year's clinical experience in the area of APD assessment and management practices. Thematic analysis of the information did cast light on patterns and procedures being used across SLTs; to provide insight into the current assessment and management practices of SLTs working within a private practice setting in Johannesburg, so as to inform and guide the development of more standardized, culturally appropriate assessment and management practices and tools in South Africa. This research identified the paucity of knowledge regarding the APD practices being implemented by SLTs, internationally as well as within South Africa. Highlighted themes included that most SLTs obtained their APD assessment and management practical knowledge by observing other practicing SLTs and implementing self-learning, as there was little or no formal training on the topic of APD readily available on the completion of their degree. Another observed theme highlighted that the tools used for the APD assessment and management were not always appropriate for the South African population. There was also a lack of consensus regarding the referral pathway for a child presenting with APD. This research study provides insight into the assessment and management practices working within the private healthcare sector in Johannesburg, South Africa, for future research to be built upon.

Key Words: paediatric auditory processing disorder, universal guidelines, assessment, management, speech-language therapists.

1. Chapter One: Introduction and Rationale

"A major shortcoming in present research, diagnoses and interventions for APD is the lack of a 'gold standard': an agreed measure with which the sensitivity and specificity of other measures can be compared" (BSA, 2011, p. 6).

Literature on the topic of APD is contradictory as Jerger and Musiek (2002) reported that when assessing for APD, behavioural measures should be supplemented with electrophysiological and electroacoustic measures; however, Katz (2002) argues that there is no evidence that these additional measures are useful in identifying APD. Bamiou, Musiek & Luxon (2001) state that the diagnosis relies on the synthesis of information from the case history, behavioural and electrophysiological tests, as well as additional procedures and the careful consideration of the confounding topic of APD. It is sometimes argued that the only tests that can be validly used to infer the presence of an APD are those with known links to a physical lesion in a particular part of the brain (Dillon, Cameron, Glyde, Wilson, & Tomlin, 2012; AAA, 2012; American Speech-Language-Hearing Association, 2005). Having established that Dillon et al. (2012) suggests that the establishment of an anatomical lesion is required in order to diagnose APD, internationally, there are a vast number of tools and tests available to audiologists to assess this anatomical pathway, as suggested by authors such as Bellis (2003) and organizations such as ASHA (2005).

Such controversy in literature leads to SLTs and audiologists being uncertain of their role regarding APD and different authorities in this field have drawn different conclusions from the same data, which may be due to individual mindsets, experiences and roles (DeBonis & Moncrieff, 2008). On the basis of a recent survey of common practices among 53 audiologists in America, a survey of audiologists' APD diagnostic practices found that not one of the audiologists surveyed were using a protocol that met even the minimum guidelines recommended in the Consensus Conference Report (Emanuel, 2002; Jerger & Musiek, 2002). None of the respondents in the survey listed the usage of tests suggested in the APD consensus statement minimum test protocol (Jerger & Musiek, 2000). It is evident that clinicians even in first world countries seldom adhere to a shared assessment or treatment protocol thus reiterating the controversy related to this subject.

Therefore internationally, there is no ‘golden standard’ protocol to follow in the assessment and treatment of APD, similarly in South Africa it was found that in an information booklet listing audiologists in South Africa in private practice, compiled by the South African Association of Audiologists (SAAA, 2009), only 33 audiologists, out of approximately 150 members listed, provide services for APD. The inadequate research available in South Africa regarding APD only adds to the uncertainty of South African SLTs and audiologists when faced with their patients, which leads to ethical dilemmas in terms of beneficence and non-maleficence regarding one’s conduct with the patient. ASHA's Code of Ethics states clearly that “individuals may practice only in areas in which they are competent based on their education, training and experience” (ASHA, 2005a, p. 2). SASLHA’s code of ethics also clearly states that “members of the professions of Speech-Language Therapy shall act responsibly regarding their ongoing professional development and maintain competence in their fields of practice” (SASLHA, 2010, p.3). It is evident from the above research that assessment and management services for APD in South Africa are not readily available. The fact that so few audiologists offer assessment and management services for APD possibly suggests that few audiologists feel sufficiently competent to offer services in the area of APD. Therefore, if many audiologists feel inadequately prepared to offer services in APD, it is possible that SLTs in the South African context feel the same way.

The lack of confidence for SLTs to administer APD practices raises questions regarding the appropriateness of the APD assessment and management practices as well as the referrals, which SLTs in the South African context are conducting. Furthermore, this general lack of confidence in conducting APD assessment and treatment leads to questions such as: ‘Are these children being diagnosed and treated optimally by South African SLTs and would these APD practices for children presenting with APD be improved upon, if an accepted baseline on APD practices, that was applicable to the South African population was devised and made readily available to SLTs?’

In terms of referral for APD assessment and intervention, there is no definite hierarchical procedure regarding to whom one should refer (BSA, 2011). Should the SLT refer to an audiologist or vice versa? After the assessment, which professionals should be allocated to implement therapy for the child? Audiologists most often work with SLTs in the screening, assessment and intervention for APD, as SLTs are the professionals whose scope of practice

includes assessment of the cognitive-communicative and language abilities associated with APD (ASHA, 2005). SLTs are advised to refer children presenting with APD to audiologists for central auditory processing testing such as the Scan C test (AAA, 2012). Subsequent to a central auditory evaluation, a speech-language pathologist can explore the possible impact of auditory processing-related deficits on specific aspects of language processing. Research by DeBonis & Moncrieff (2008) states that an initial speech-language evaluation may suggest underlying APDs, subsequently will lead to a referral for a CAP evaluation conducted by an audiologist. According to Witton (2010), SLTs are best prepared to provide intervention for these children presenting with APD, including intervention such as central resource training. According to Ferguson, Hall, Riley, & Moore, (2011) SLTs are better equipped to manage children cope and learn with APD, in comparison to audiologists. In individuals with APD, due to neurological lesions, audiologists and neurologists work together in identifying the sites of CANS dysfunction, as well as their impact on the processing of listening and spoken language (AAA, 2012). Bellis (2003), in contrast, reports that APD can only be diagnosed by an audiologist, in a sound-proof booth. It is evident from the literature that there is little agreement on the referral process related to APDs; a goal not easy to obtain in the absence of consensus on the definition of the pathology. The current researcher is of the belief that the presence of an established referral hierarchy would make diagnosis and intervention for children with APD more predictable, more timeous and thus more effective.

In addition to these aforementioned difficulties facing SLTs and audiologists internationally, South African SLTs also need to consider the numerous context related challenges when working within the field of APD (Wilson & Campbell, 2000). Fourie (1998) suggests that SLTs are not equipped with sufficient knowledge on APD management and assessment for children within the South African context. Fourie (1998) conducted a survey with 164 SLTs and audiologists in the Gauteng region. It was reported that insufficient training was received in the area of APD for both SLTs and audiologists. Fourie (1998) revealed that although 76% of the respondents had received inside training in the area of APD, only 19% of the participants indicated that they had undergone comprehensive training, while 53% of the participants reported to have had very little training. The reported lack of training and knowledge in the area of APD for SLTs and audiologists in the Gauteng region maybe possibly attributed to the lack of international agreement on the topic of children presenting with APD.

A standardized multidisciplinary referral protocol would also play an important role in the "gold standard" foundation. A multidisciplinary approach for the assessment and remediation of APD in the literature has been repeatedly stressed (Witton, 2010; Ferre, 2006; ASHA, 2005; Bellis, 2003). Intervention focused entirely on AP may not be all that is required (Witton, 2010), as APD will often co-exist with attention, language and learning impairments as well as autism spectrum disorder (Witton, 2010; Bellis, 2003). A full understanding of the ramifications of APD for the individual requires at least a speech therapist and audiologist, but involving additional professionals (teachers, psychologists, occupational therapists, remedial therapists and neurologists) would better determine the functional impact of the diagnosis and guide treatment and management of the disorder and associated deficits (ASHA, 2005). Ascertaining whether APD is the primary disorder may be useful in determining the focus of the intervention and will help to prioritize the order of interventions being implemented Millett, Jutras, Noel, Pichora-Fuller, Watson, & Nelson (2012). Research by Jerger and Musiek (2002) stated that the referral process of children presenting with APD varies across countries as well as the recency of the research conducted. According to AAA (2012) physicians are an important referral source, as they are often the first professionals to whom parents turn to when their children experience "listening" and/or academic difficulties. The AAA (2012) also reports that a referral to another professional (e.g. psychologist, speech-language pathologist and/ or neuropsychologist) for behavioral, language learning or global assessments may be warranted before a central auditory assessment is undertaken. Even within the same country and recency of research findings, there are open-ended referral practices. In contrast Canadian Interorganizational Steering Group (CISG) (2012) reports that the use of behavioural checklists and questionnaires by speech-language pathologists, school professionals, parents/caregivers and others are a useful approach to determining whether a referral for auditory processing assessment is indicated. While the recommendation of CISG (2012) is an appropriate beginning step in the referral, assessment and management of a child presenting with APD, there is still much research to be done so as to develop suitable, standardized practices for these aspects.

To further add to the above mentioned difficulties, a study conducted by Khan in 2006 regarding the training of SLTs within the South African context revealed that there continues to be factors related to the lack of linguistically and culturally appropriate tools taught for

APD assessment and management. Contributing factors to the culturally inappropriate tools were observed primarily as poverty with all its social, economic and educational sequelae, and the effect of the HIV/AIDS pandemic, specifically on speech, language and hearing development (Khan, 2006). In accordance with Khan's (2006) findings, these factors need to be addressed in the development of a standardized assessment and management practice, to ensure that the unique needs of the South African population are fully addressed. There is an absence of a framework or list available regarding the APD materials used within South Africa. Saleh, Campbell and Wilson (2003), suggest that such a guideline is necessary for the development of APD assessment and management practices. Khan's (2006) research further reports that each University that offered a Speech, Language Therapy degree in the South Africa had very different curricula in terms of APD input for students, with minimal practical courses on children presenting with APD in the South African context. It is evident from Khan's study (2006) that SLTs in South Africa are not receiving standardized education in the area of APD, which is likely due to the international controversy on the definitions and practices regarding this topic. The "gold standard" foundation should be based on research and seeded within the Universities, so that SLTs are equipped with the equivalent knowledge to address APD.

Many SLTs and audiologists are implementing individualized APD assessments and providing management for children with APDs, due to the diverse cultures of South Africa. Due to the lack of standardized practices and protocols, in the area of APD in South Africa, children are not being treated optimally. As such, the researcher provides insight into the current APD assessment and management practices of SLTs in Johannesburg, so as to inform and guide the development of more standardized, culturally appropriate assessment and management practices and tools within South Africa. In addition the researcher answers the main aim 'What are the assessment and management practices being utilized by SLTs working with children, in private practice, presenting with APD in Johannesburg, South Africa?'

1.1 Chapter Outlines

The current research report will be presented in five chapters:

Chapter One details existing research, both internationally and locally, in the area of APD practices regarding assessment and management thereof. Furthermore this chapter highlights the absence of a universal guideline on APD practices.

Chapter Two provides a basic orientation to APD, definitions of this disorder and a rationale for the current study. In addition to the assessment and management practices of APD in South Africa, as seen in the literature, as well as the challenges of APD, is explored.

Chapter Three comprises of a detailed description of the current study's aims and sub-aims as well as a description of the research design. Details regarding the participants, the materials used, procedures and ethical considerations applied are also explained in Chapter Three. Furthermore, the pilot study, method of data collection and data analysis are discussed in this chapter.

Chapter Four provides details of the results obtained from the research conducted and a discussion of these results are included in this chapter. The results are presented within the sub-aims of this research and are further discussed within themes that resonated within each sub-aim.

In Chapter Five, the conclusions of this study are presented and the limitations of the current study are identified. The implications of this research and recommendations for future research, also appears in Chapter Five.

2. Chapter Two: Literature Review

2.1 Introduction

Rosen (2005, p.139) states that "there is little or no agreement about how to diagnose central auditory processing disorder, what to do about it, what its implications are, or even if it really exists."

APD is not only indefinable, but there are also no universal guidelines for the assessment and management of children with APDs, which have been agreed upon internationally. The lack of consensus in terms of the assessment and management of this disorder can lead to over or under diagnosing this pathology as well as inappropriate management thereof. Therefore, the researcher aimed to provide insight into the current assessment and management practices of SLTs working within a private practice setting in Johannesburg, so as to inform and guide the development of more standardized, culturally appropriate assessment and management practices and tools in South Africa.

2.2 Defining APD

APD cannot simply be defined in one sentence, but rather by a set of complex processes within different categories that fall under an umbrella paradigm. The terminology used to describe the disorder has been an area of controversy as "central" has been used to distinguish the VIII nerve, brainstem and cortical areas as the anatomical site of dysfunction in contrast to the cochlea as a "peripheral" site of lesion (Bellis, 2003). Central auditory processing is used interchangeably with central auditory function, central auditory perception, auditory language processing and auditory language learning (Hurley, 2004). Worldwide there is a dispute regarding the definition of Central Auditory Processing Disorder (CAPD) and this debate also occurs within the South African context. CAPD is now referred to as Auditory Processing Disorder (APD) since the year 2000. This change was due to a group of fourteen senior scientists and clinicians headed by Jerger and Musiek (2000), resolving to keep the definition operational to avoid the attribution of an anatomical location. Hence, they deemed it appropriate to refer to the disorder as an APD as it is broadly associated with processing of information that is specific to the auditory modality.

As previously mentioned, due to the lack of consensus internationally as a result of the complexity of and controversy related to APD regarding a definition used to describe this disorder, professionals have developed a satisfactory definition of APD. A general definition of central auditory processing is "what we do with what we hear" (Katz, Stecker & Henderson, 1992, p.5). According to ASHA (2005, p.2), APD "refers to the perceptual processing of auditory information in the central nervous system (CNS) and the neurobiological activity that underlies the processing and gives rise to electrophysiological auditory potentials." Consequently, if the true nature of the disorder is unknown, it is challenging to find effective standardization and consistency in assessing and managing this disorder Dillon et al. (2012, p.98) stated that "we deliberately do not attempt to define APD, rather, we choose to focus on the diagnosis and management of listening difficulties". Thus, establishing common and effective assessment and management techniques will lead to a recommended assessment and management practice when faced with a child presenting with APD (Dillon et al., 2012). However, statements made by American Speech-Language-Hearing Association (ASHA, 2005), American Academy of Audiology (AAA, 2012) and British Society of Audiology (BSA, 2011) suggests that APD arises from deficiencies in the central auditory nervous system (CANS), which leads to impaired performance on basic psychoacoustic tasks (e.g. temporal processing and binaural interaction). Conversely, in a study conducted by Dillon et al. (2012), it was established that non-speech psychoacoustic tests are not a good indicator of APD, as it is reported that non-speech sounds are easier to hear than to understand speech sounds in the presence of background noise. In contrast, BSA (2011) reports that APD is characterized by poor perception of both speech and non-speech sounds, as poor perception of speech alone is insufficient evidence of APD. For the purpose to provide a context for this research, a definition favored by the researcher includes 'the auditory-perceptual deficit in the processing of speech input' (Jerger & Musiek, 2002, p. 19).

2.3 Prevalence

The need for APD intervention is increasing as APD statistics show that in South Africa, (population 44.8 million) approximately 30,000-50,000 children may exhibit APD in Grade One alone (Musiek & Chermak, 2007). This correlates to roughly 3-5% of the total population (1,000,000) of school beginners. Therefore, the need for accurate and concise assessment protocols and treatment guidelines is essential for these children to be correctly diagnosed and managed.

2.4 Symptoms of APD

Possible processing difficulties of children with APD who are starting Grade One only, for instance, include: working memory disorder, speed of processing disorder, phonological processing disorder, phonological memory disorder, rapid serial naming disorder, word retrieval disorder, language processing disorder, syntactic processing disorder, morphological processing disorder, semantic processing disorder and pragmatic processing disorder (DeBonis & Moncrieff, 2008). These may occur in different groups i.e. some children presenting with APD may have more than one difficulty. According to ASHA (2005), such children with APD may have a number of other difficulties in conjunction with the primary auditory processing problems, such as spoken and written language difficulties, reading, spelling and social interaction impairments. Further complications of AP exist, for example, language comprehension problems can occur in the presence of normal central auditory processing, and APD does not always present with language problems. Different combinations of auditory deficits are likely to be associated with different functional symptoms, and the same auditory deficit may have an impact on different people in different ways (ASHA, 2005). With such a vast array of core symptoms, it can be understood why variations in assessment and management practices exist. Furthermore, with so many symptoms, undiagnosed and/or untreated, APDs may lead to difficulties in higher-order language, learning and communication function, which can have detrimental, long term consequences, dramatically affecting academic performance, self-esteem and future occupations. These possible processing disorders can manifest in several ways, including: difficulty listening in noisy environments, inability to localize sound sources, difficulty with reading and/or spelling, difficulty hearing on the telephone, difficulty discriminating between sounds, trouble listening in non-ideal listening situations, difficulty following long conversations, difficulty taking notes, difficulty with organizational skills, difficulty following multi-step directions, becoming easily fatigued when listening, and difficulty in directing, sustaining or dividing attention (ASHA, 2005). In contrast, several recent studies have found that some children with APD appear to perform equally in quiet as in at least some forms of noise (Ferguson et al. 2011). There are also further studies that report that there is no correlation between performance on auditory processing tasks and standardized measures of academic achievement (Watson & Kidd, 2009). Due to the lack of consensus as reported above it is important for professionals to focus on the core symptoms showing aspects of auditory perception which contribute to the clinical presentation of a child with listening difficulties (BSA, 2011).

2.5 Assessment of APD

Assessment involves the use of formal and informal procedures to collect data and gather evidence and this includes evaluation, i.e. the interpretation of assessment data, evidence and related information (ASHA, 2005). The term 'listening' has been used to imply an active process while 'hearing' implies a more passive process. It is possible to hear without listening attentively (BSA, 2011). The first step is therefore, to rule out any hearing concerns by implementing a full diagnostic hearing assessment. Assessment of auditory processing should not be conducted for children with peripheral hearing loss of any degree or type as a hearing loss will negatively affect the results of the APD test (AAA, 2012). Once a hearing problem is ruled out, the test battery to assess APD in children is not necessarily agreed upon. Opinions about which tests should be in the standard battery vary from country to country, laboratory to laboratory, and time to time, and the numbers of tests in these batteries are increasing as the topic of APD is growing with research (Dillon et al., 2012).

2.6 Role of the SLTs

A SLT's responsibility in the assessment of children presenting with APD according to Bellis (2003) includes the assessment of language and cognitive assessment (including tests for auditory memory and attention). In particular, children referred for suspected APD need to have, in addition to their audiometric assessment, a screening work-up, including assessments of nonverbal ability, language and literacy, because problems in these areas may contribute to difficulties experienced by the child (Rosen, 2009). A SLT assesses auditory-linguistic skills, which includes auditory memory, word discrimination, auditory conceptualization, auditory closure, auditory synthesis, auditory association, auditory comprehension, understanding and following directions as well as phonemic awareness. Tests such as the SCAN C (Screening Test for Auditory Processing Disorders in Children) (Keith, 1986), the SCAN–Revised (SCAN–C) (Keith, 2000), the Staggered Spondaic Word Test (SSW) (Arnst & Katz, 1982), and the Pediatric Speech Intelligibility Test (Jerger, Jerger, & Abrams, 1983) are core assessment tools to diagnose APD.

The language processing approach (Jerger, 2009), is another topic where SLTs view auditory processing as only one component in the overall processing of language (Kamhi, 2011). Conceptual and language knowledge clearly have an important role in language processing according to Jerger (2009). Medwetsky (2009) states that the spoken language processing model is an example of how to reflect on the intertwining effects of auditory processing,

cognition, and language. Medwetsky (2009) offered a comprehensive assessment battery that can be used to identify where breakdowns occur in the processing of spoken language. Consistent with his model, Medwetsky (2009) prefers the term 'spoken language processing disorder' to describe children who have deficits in spoken language processing. The significant differences in these views of APD help to explain why no universal practices have been established for APD in children. These studies have provided a foundation upon which our current understanding of APD has been built (Medwetsky, 2009). As previously mentioned, the additional culture and the diversities of languages, within the South African context, paired with limited resources in the public and private health sector further confound this already very complex disorder.

2.7 Role of the Audiologist

Jerger and Musiek (2000) have recommended the following minimum test battery for audiologists for the diagnosis of APDs in school-age children: pure-tone audiometry, performance-intensity functions for word recognition, a dichotic task, frequency or duration pattern sequence test, temporal gap detection, immittance audiometry, otoacoustic emissions, auditory brainstem response and auditory middle latency response.

As stated above there is little research defining an appropriate universal AP test battery. Musiek, Chermak, Weihing, Zappulla and Nagle (2011) note that "use of multiple tests can potentially reduce diagnostic error by improving efficiency, increasing the face validity of the battery as a whole by incorporating a broader range of auditory processes, and providing guidance in establishing the most appropriate intervention goals and program planning." (p. 343). However, they also note that increasing the number of tests in a battery also increases the potential for false positives and increased patient fatigue, where individuals are diagnosed with APD and costs increase as well.

These tests comprise a full test battery for an audiologist, and together with the SLT's tests, can take several hours to complete. South Africa is not only under-resourced in terms of diagnostic equipment in both the public and private sector, but also the above test batteries would not cater to the cultural or linguistic diversity of South Africa's population.

2.8 Multidisciplinary Involvement in the assessment and Management of APD

There is currently no general globally agreed upon "gold standard" method used or recorded to assess APD, but this appears to be essential to ensure consistency and agreeable advancements regarding this topic (BSA, 2011). There is also little agreement on which professionals should be involved in the assessment and management of children presenting with APD (Musiek & Chermak, 2007). BSA (2011) mentions that SLTs are important for the intervention and management of APD but do not mention the role of SLTs in the assessment of children presenting with APD, whereas (Millet et al., 201) have documented the Canadian guideline on APD and do not mention the role and responsibilities of SLTs in the assessment of CAP, but discuss the role of SLTs with the screening and management of children presenting with APD. ASHA (2005) and SASLHA (2010) report the importance of SLTs and audiologists in both the assessment and management of APD in children. If there is no agreement on which professionals play a role in the practices of APD, it is even more challenging to create a "gold standard" protocol for assessment and management of APD in children. Together with this challenge, a lack of agreement on a distinctive definition of APD, makes establishing a "gold standard" for assessment and management rather problematic. This has ramifications other than SLTs being hesitant to work in this field, as this vast lack of guidelines could result in SLTs over diagnosing or under diagnosing, thus leading to inappropriate management, which affects the child's over all development, leading to ethical implications (Rosen, 2005).

2.9 Challenges Associated With APD Assessment and Subsequent APD Management

Internationally the complexity of the APD system and its ambiguous nature leads to many SLTs and audiologists feeling uncomfortable in the assessment and management of APD (Katz, Stecker, & Henderson, 1992), where hesitation is seen to exist on the part of the SLTs and audiologists in participating in APD management (Chermak, Traynham, Seikel, & Musiek, 1998). A study by Khan (2006) revealed that the SLT's curriculum on the topic of children presenting with APD, in the South African context, did not provide any information about social or contextual issues that need to make allowance for, which raises concern of whether APD testing is appropriate and reliable in South Africa. Although there is ample research being undertaken internationally on the topic of APD, in terms of assessment practices, management guidelines, diagnosis and consequences in school performance, the

outcomes are not easily generalized to the South African context, due to the following challenges, as outlined by the HPCSA in 2001:

- The lack of standardized South African APD test materials in the country
- The poor quality of available recordings to be used in an assessment
- The presence of different recordings of the same test
- The challenge of 11 official languages, making English resources and assessment tools ineffective
- Poor training of the administration and interpretation of APD tests and their results
- Uncertainty about which APD tests to use, due to the lack of standardized assessment protocols and practices
- Uncertainty about which intervention procedures to use following the diagnosis

South African SLTs and audiologists are faced with the aforementioned challenges and difficulties of working within the field of APD, within the South African context (Wilson & Campbell, 2000), which contribute significantly to diversifying the assessment and management practices adopted. This emphasizes the absence as well as the need for a "gold standard" for APD assessments.

2.10 Management of APD

The definition of management refers to intervention to prevent or remediate a disorder or disease, as well as compensatory approaches; e.g.: strategies and technologies to reduce the impact of deficits resistant to remediation (Chermak & Musiek, 1997). Management for APD involves direct treatment to improve specific auditory and related skills. Management should be separated from diagnosis in the area of APD as the diagnosis needs to first be established, so the management can be planned accordingly (Jerger & Musiek, 2002). Bottom-up training programs are designed to improve auditory skills, including auditory discrimination, dichotic listening and temporal processing (Ferre, 2006). Top-down therapy programs focus on improving metalinguistic and metacognitive skills, important for minimizing the impact of APD on functional communication (Ferre, 2006). Once again, it should be emphasized that there is no one treatment approach that is appropriate for all children with APD. The type, frequency and intensity of therapy, like all aspects of APD intervention, should be highly individualized and planned for the specific type of auditory disorder that is present, especially when considering the South African context. Each child will progress at different rates, depending on the auditory deficits that need to be improved, thus the duration of therapy

cannot be predetermined (Rosen, 2009). Some children progress rapidly and require limited intervention, some children 'grow out' of their disorders and others exhibit some residual degree of deficit forever (Bellis, 2003). Although all management requires a certain degree of individualisation, it is easy to see how it would be beneficial to have a national standardized management framework to help guide SLTs through the process of treating a child with APD, thus increasing the SLT's confidence, ensures consistency across therapists and optimizes a child's development from nationalizing the "golden standard" practices. It is for this reason that the current researcher has aimed to explore assessment and management practices of paediatric APD in South Africa, in order to provide insight into the current assessment and management practices of SLTs working within a private practice setting in Johannesburg.

2.11 Rationale

Within the South African context, both SLTs and audiologists are diagnosing and managing APDs (HPCSA, 2004). However, according to Bellis (2003), the diagnosis of APDs should be implemented only by a certified audiologist, working in an insulated sound booth. This leads to further discrepancies in assessment and management practices internationally, as SLTs and audiologists have been taught very different methods in the management of children presenting with APD (Bellis, 2003). Although audiologists and SLTs may screen for, and treat APD, only an audiologist can diagnose APD according to the American Speech-Language Association (2005). In such incidences ASHA (2005) and the Academy of Audiology (AAA, 2012) have indicated that an audiologist must proceed with a full test battery for APD. However, evidence suggests that the processing of incoming information through the auditory modality engages, and is dependent upon, other systems within the central nervous system (Musiek & Chermak, 2007). These systems include attention, language and cognition, which are primarily assessed by a SLT. A deficit in auditory processing makes sense only if one can rule out the influence of language knowledge, basic cognitive processes like attention and memory, and other possibilities for poor performance, such as fatigue, anxiety, or lack of motivation (Cacace & McFarland, 2005). Therefore, SLTs are essential in the assessment of children with APDs (DeBonis & Moncrieff, 2008).

Due to the multicultural context and the diversity of languages within South Africa, there are many SLTs and audiologists conducting informal APD assessments and providing management for children with APDs, because the existing assessment and management tools

are often not culturally appropriate for the population. Furthermore, formal assessments for this disorder are not available in most of the official languages of South Africa. It is thus arguably impossible for the SLTs and audiologists practicing within South Africa to adhere to an existing practice, which is suitable for the population and professionals alike, for the complex topic of APD. Due to the lack of accord in composing national guidelines for South Africa, children with APD are not being diagnosed and treated with standardized, optimized protocols, which may result in long term negative effects on a child such as delayed learning, low self-esteem and the inability to learn new information (Bellis, 2003). Different assessment protocols will ultimately lead to different management techniques, raising the question of which method is appropriate for which child. As such, the researcher provides insight into the current APD assessment and management practices of SLTs in Johannesburg, so as to inform and guide the development of more standardized, culturally appropriate assessment and management practices and tools within South Africa. In addition the researcher answers the main aim 'What are the assessment and management practices being utilized by SLTs working with children, in private practice, presenting with APD in Johannesburg, South Africa?'

Although all these findings adds much insight into the lack of consensus internationally and locally on a "gold standard" for the assessment and management practices of APD as well as a definition thereof, this paucity of a "golden standard" in the area of APD assessment and management is exacerbated within the South Africa context. As reported by Khan (2006), the tools used for APD assessment and management in South Africa lack linguistically and culturally appropriate stimuli. Due to the limited availability of information on APD practices in South Africa, this research is necessary to examine what APD practices SLTs are currently using in South Africa, what adaptations SLTs are making to their tests and materials to propose what seems to be the common practice, to form a starting point for further research to be built upon for more standardized, culturally appropriate assessment and management practices and tools for children presenting with APD, to be developed. In order to devise these practices it is imperative to know what practices are currently in use, thus necessitating the current study, which will aim to cast light on patterns and procedures being used by SLTs for the assessment and management of children presenting with APD, within a private practice setting in Johannesburg, South Africa.

3. Chapter Three: Methodology

This chapter details the methodology of the current research. It provides the primary and sub-aims and sub-aims of the study as well as an overview of the research design, participants and materials used. Data collection and analysis procedures, ethical considerations and the way in which trustworthiness of the findings was ensured are also included in Chapter Three.

3.1. Research Aims

3.1.1. Primary Aims

The primary aim of the proposed research is to describe the experience and current practices of SLTs working in private practices in the assessment, management and referral of children presenting with APD in Johannesburg, South Africa.

3.1.2. Sub-Aims

The following sub-aims operationalize the main aim of the study and include the following:

3.1.2.1 Sub-aim One: To explore the experience that SLTs have in working with children with APD in Johannesburg, and to describe the training that SLTs underwent in the field of APD.

3.1.2.2. Sub-aim Two: To describe the assessment practices and tools being used by SLTs for children suspected of presenting with APD, in the Johannesburg area.

3.1.2.3. Sub-aim Three: To describe the management practices and tools being used by SLTs for children suspected of presenting with APD, in the Johannesburg area.

3.1.2.4. Sub-aim Four: To identify the referral resources SLTs use when working with children presenting with APD.

3.2. Research Design

The current researcher employed a qualitative, exploratory, descriptive research design to achieve the aims of the study.

Qualitative research is essentially an inductive process of organizing the data into categories and identifying patterns or relationships among the categories (McMillan & Schumacher, 2001). There are advantages and disadvantages to using a qualitative method. The advantage is that qualitative research is not limited to numerical results; it can, therefore, explore topics in great depth and detail. This allowed the researcher to gather much information regarding the APD assessment and management practices of SLTs in Johannesburg. The methods used within this qualitative framework; interviews, were unobtrusive, and allowed the researcher to observe the natural responses of the participants (McMillan & Schumacher, 2001). The disadvantage of using only qualitative research is that qualitative research cannot be approached statistically and results cannot be repeated as easily.

Qualitative research was favored for the current study as the researcher wished to explore the devised questions in depth, to find patterns within the data.

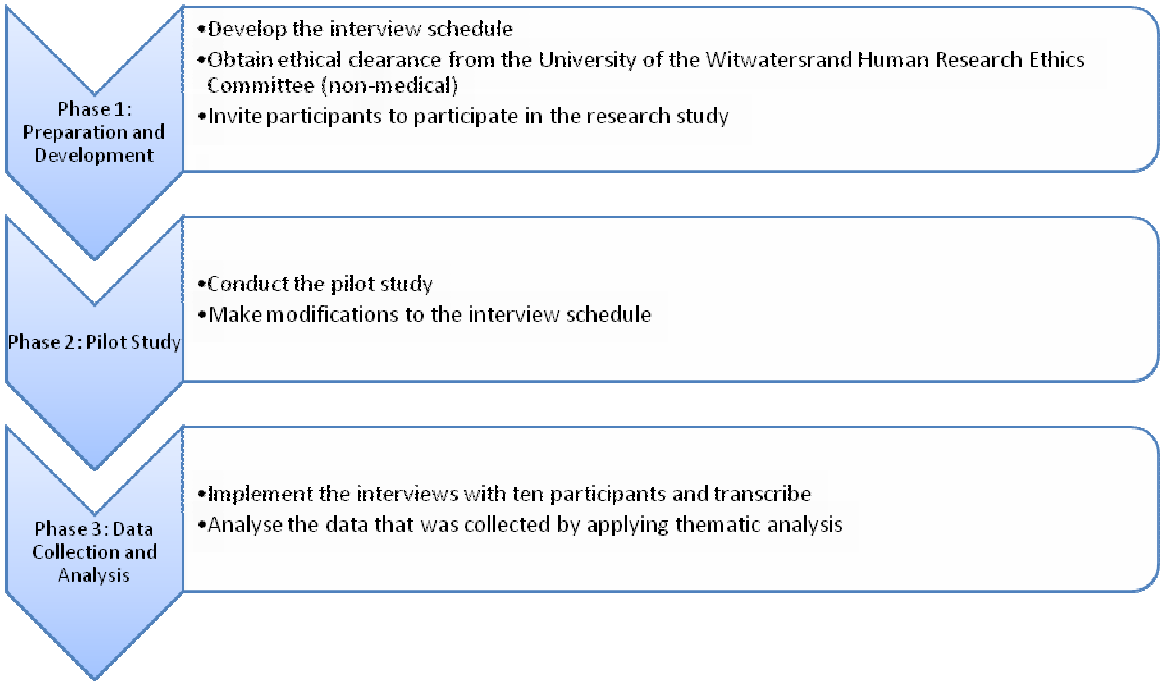
To achieve the main aim of the study an exploratory, descriptive framework was implemented for this research study. Neuman (1997) states that the research may be organized into three categories, i.e. to explore a new topic (exploratory), describe a social phenomenon (descriptive) or explain why something occurs (explanatory). The current study utilized a combination of two of the three categories. A description of the practices used regarding the management and assessment of APD, by SLTs within the Johannesburg area was the primary aim of the study thus necessitating a descriptive approach to the current research. Descriptive studies have additional applications. These are to attempt to identify problems in practice, justify current practice and for developing theory (Drummond, 1996). Exploratory research addresses a new topic or issue in order to learn about it and it answers the ‘what’ question (Neuman, 1997). The present study was exploratory because it served as a preliminary investigation into what practices SLTs in the Johannesburg area are using, when assessing and managing APD. Exploratory research allowed the researcher to become familiar with the practices being used by SLTs for APDs. The researcher was able to develop a clear picture of what practices were in place thus allowing thematic analysis to be applied

(Neuman, 1997). Hence, this study consisted of exploring existing practices, which led to the outcome of the study, which comprised the compilation of practices used for assessment and management of APDs within the Johannesburg area as a starting point by examining what APD practices SLT's are currently following in private practice in Johannesburg, South Africa.

3.3. Research Phases

The research process involved three phases, which were carried out over a period of eleven months as shown in Figure 1. The first phase, the preparation and development phase, was used to compile the interview schedule by immersing oneself in the literature, obtaining ethical clearance (appendix 5) and identifying potential participants for inclusion in the main study. The second phase, the pilot study, was essential in refining the interview schedule. The final phase comprised of the conduction of the main study and its subsequent data analysis and report writing.

Figure 1. The phases of the current study



3.4. Pilot Study

A pilot study may be defined as a study conducted prior to the main study, on a smaller sample, so as to assist the researcher in identifying any potential problems with the research design or methods. A pilot study also allows for the restructuring of questions appearing on the interview schedule to obtain applicable and valid data (Cresswell, 2003).

3.4.1 Aim of Pilot Study

Together with the importance of dependability of qualitative research according to Cresswell (2003) a pilot study was undertaken to establish the feasibility of the interview questions. Another aim of the pilot study was to determine the content validity (i.e. how accurately the instrument/interview measures the information needed) (Leedy, 1997). The objectives of the pilot study included:

- To determine the approximate time taken to complete the interview and to ensure that the time taken is realistic and fair to be requested from participants.
- To practice the interview questions, making sure that the questions can be easily comprehended by the participants.
- To establish whether the questions appearing in the interview schedule elicit the types of responses required for the main study by the researcher.

3.4.2 Pilot Study Participant

The participant in the pilot study was identified via the HPCSA website and met all the inclusion criteria stipulated in the main study. The participant was dually qualified in speech-language pathology and audiology. The participant had four years experience in working with patients diagnosed with APDs. The pilot study participant's interview responses were not included in the main study as the results obtained from the pilot study served the researcher in establishing the feasibility of the main study and in refining the interview schedule (Patton, 1990; Maxwell & Satake, 2006).

3.4.3 Procedure of Pilot Study

The pilot study was conducted with a single participant. The information sheet outlining the aim of the study and the consent form were hand delivered to the participant, at the

participant's place of work. The interview took place at the participants' place of work, using the interview schedule originally composed by the researcher. The participant was interviewed on 5 June 2013 and the administration of the questionnaire was timed. Timing was interrupted when the researcher and participant discussed possible changes to and recommendations for the interview schedule. The completed interview took 32 minutes.

3.4.4 Results of and Recommendations For Change From the Pilot Study

The pilot study assisted the researcher in refining the interview schedule, which was deemed by the researcher to be a valid research tool. Overall, the participant was satisfied with the interview questions and only alterations to three questions were required, in order for clarification and accuracy of answers and data to be collected. The adjustments were made to the interview questions and the final version used in data collection is shown in Appendix 4.

3.5 Participant Selection and Description

Ten SLTs in the Johannesburg area working within the private practice setting participated in the current research. Information letters (Appendix 2) and consent forms (Appendix 3) were hand delivered to each of the participants, where they could read what would be expected of them should they wish to participate in the study. Participants would then complete the consent form (Appendix 3), thus agreeing to participate in the research study, which comprised of an interview (Appendix 4) in the presence of an audio recorder, regarding the topic of APD. In this study, ten willing participants were interviewed separately on different days, in the Johannesburg area. All the participants that were approached accepted to partake in this study, no participant declined

3.5.1 Sampling Strategy

Participants were selected by applying two methods. Firstly, a criterion based selection method was used: participants who had at least one year's clinical experience in the field of APD were identified by searching the Health Professions Council of South Africa website (HPCSA) (http://isystems.hpcsa.co.za/iregister/). The second method was the application of snowball sampling, which can be defined as a technique for gathering participants through identification of an initial participant, who is used to provide the contact details of other participants with similar

knowledge (Drummond, 1996). Snowball sampling in the current research occurs when a participant who had been interviewed recommends another SLT currently practicing in the field of APD, as these practitioners are aware of others through the shared topic of APD services being offered (Drummond, 1996). This method was chosen by selecting a representative group to provide information regarding the needed population as it is not feasible to interview all SLTs to find the appropriate population. The recommended SLTs from the snowball sampling method were initially contacted telephonically.

3.5.2 Participant Inclusion Criteria

- Participants could be either dually qualified, therefore, possessing a degree in speech-language therapy as well as a degree in audiology, or qualified in only speech-language therapy. The researcher chose dually qualified participants as an option as they have more knowledge in both speech as well as audiology practices and can therefore give more information on complete assessment and management practices.
- Participants had to have at least one year's clinical experience in assessing and managing children suspected of having APD, such that the questions proposed could be answered in detail based on experience.
- Participants had to be currently practicing in the area of APD to ensure that the responses collected from the questionnaire schedule were more relevant.
- All participants had to be a member of the HPCSA to make sure that the participants had a valid license to practice in the area of APD, where a valid HPCSA certificate was requested to be observed in the interview.
- All participants had to be proficient in the English language, as the questions were asked in English because this is the language of the researcher. The researcher ensured that the participants were proficient in English by observing the participant's English interaction with the researcher and recognizing that the participant had no concerns in understanding and expressing in the English language.
- All participants had to be working in private practice, to get comparable responses from the participants working in the area of APD.

3.5.3 Participant Exclusion Criteria

- Participant's one years experience that was not within the last ten years, so that the responses were relevant and this excluded all SLTs with experience in APD that does not fall within this time frame.
- Participants not practicing in the field of APD.

- Participants working in the government sector.
- Participants qualified as only an Audiologist.

3.5.4 Participant Description

Participants were listed in order of the date of the interview. The participants' years of experience in practicing with APDs varied from one year to seven years (n=10, mean = 4.95, SD= 2, 18) (See Table 2). The participant's years of experience in practicing with general speech therapy was recorded as being the same. The participants worked with APD children from graduation. There were only two participants from Pretoria, working in Johannesburg and only two Universities were reported as where the participants attained their degree from. There is vast difference between years experience and all participants are dually qualified.

Table 2. Participant Demographics

Participant	University where Speech-language Therapy and Audiology Degree was obtained	APD practice years' experience	Degree obtained	Year of graduation
1	Pretoria	4.5	Dually qualified	2008
2	Witwatersrand	3	Dually qualified	2010
3	Witwatersrand	1	Dually qualified	2010
4	Witwatersrand	7	Dually qualified	2006
5	Pretoria	6.5	Dually qualified	2002
6	Witwatersrand	7	Dually qualified	2005
7	Witwatersrand	6	Dually qualified	2006
8	Witwatersrand	3	Dually qualified	2010
9	Witwatersrand	4	Dually qualified	2005
10	Witwatersrand	7.5	Dually qualified	2005

3.6 Materials

A self compiled interview schedule (Appendix 4) was used and based on literature pertaining to the definition, assessment, management and referral systems of children presenting with APD. The interview schedule included three separate sections, which were further divided into 6 separate themes. The interview questions were open-ended questions so that detailed information could be gathered and further analysed, for themes and patterns to be explored (Drummond, 1996).

The first section was comprised of demographic information, pertaining to the participants such as: year of graduation and years of experience in APD. Theme one was demographic information, which was elicited from questions 1-6 as well as question 12 (Appendix 4). The rationale for these questions was to give the researcher insight on the demographic information of the participants to ensure they coincided with the inclusion and exclusion criteria.

The second section comprised of questions related to the participant understanding of the term APD as well as requested information regarding APD practices, procedures and tools being used for the diagnosis and management of this disorder. This section is further divided into theme two, three, four and five. Theme two was the APD experience of the participants, which was elicited from questions 7, 9, 10 and 19 (Appendix 4). The rationales behind asking these questions were to obtain information to achieve sub-aim one. The third theme that was elicited from question 8 (Appendix 4), was what training did the participants received in the area of APDs? The rationale behind this question, was to gain information to add to achieving sub-aim one. The fourth theme that was illustrated was the assessment practices used by the participants, obtained from questions 11, 13, 14, 15, 16, 18, 20 (Appendix 4). These questions were asked to elicit information to achieve sub-aim two. The fifth theme that was illustrated was the management practices for children presenting with APD from question 17, 18, 20 in (Appendix 4). The rationale behind these questions gave the researcher further information to achieve sub-aim three of this research.

The third section comprised of questions related to the referral process practices made for children suspected of presenting with APD, by the participants. Theme six was referral practices, elicited from questions 21, 22, 23 (Appendix 4). The rationale for these questions

was to give the researcher insight into the referral process of participants to provide information to achieve sub-aim four of this research.

During the interviews for the main study, all questions were presented in a sequential manner. Explicit instructions were given to each participant prior to the beginning of the interview, explaining the three sections of the interview so that the participant had a clear understanding of what was expected of them.

3.7 Procedures

Once consent had been obtained from a participant, an interview was arranged to take place at either the researcher's office or the participant's office; whichever was more convenient for the participant. An interview was conducted by the researcher in English and audio recorded via an application called TinyVox on an iPhone, so that the data could be transcribed verbatim to allow for detailed analysis at a later stage. All recorded information was stored on a password encrypted iPhone and then transferred to a password encrypted computer at the researcher's office. Transcriptions were stored in a locked cabinet in one of the researcher's supervisor's office. The interviews required only a single session with each participant and took no longer than 45 minutes per participant.

3.8 Ethical Considerations

Under all circumstances a researcher has a moral and professional obligation to be ethical when conducting research (Neuman, 1997). Ethical behaviour with regards to research may be defined as a behaviour characterized by fairness, honesty and equity in interpersonal, professional and academic relationships in research and respects the rights of participants (Babbie, 2004).

Specific ethical considerations relating to the current study included:

- Voluntary participation

  It is essential that participation in a research project is voluntary, and no respondent should be forced or coerced into participating (Babbie, 2004). Participants in this research study were invited to participate in the current

study and the purpose of the study was explained to the potential participants and their respective employers in detail prior to inviting the participants.

- Informed consent

  Informed consent can be defined as receiving consent from a participant to participate in a research study after achieving an understanding of what the research is about and their role in participating (Babbie, 2004). Information sheets (Appendices 1 and 2) and consent forms (Appendix 3) were hand delivered to the potential participants. Each participant signed an informed consent form, providing proof of his/her willingness to participate in the study. Consent for employees to participate in this study was also obtained from the various owners of the practices at which the participants were employed. Employers were required to provide written permission, on the practice's letterhead, for the employee to partake in the study, after reading the information sheet (Appendix 1) provided.

- Open communication

  The researchers contact details appear on the information letter, so that the potential participants and/ or their employers could contact the researcher directly, should they have had any further questions. This is important so that any questions that the participant may have had could be answered directly, to ensure open communication between the researcher and the participants (Babbie, 2004).

- Confidentiality

  The right to privacy, anonymity and confidentiality was ensured by stating this in the information letter (Neuman, 1997). Participant confidentially was guaranteed and the identity of the practices at which the participants worked, were not included in the research report. Confidentiality was maintained by the use of participant numbers in the data analysis as opposed to participant names.

- Non-obligatory

  It was made clear to the participants that they could withdraw from the project at any stage and participants were informed that they could refuse to answer any of the interview questions without any negative consequences for themselves.

- Ethical Committee permission

  An ethical clearance certificate from the Human Research Ethics Committee (HREC Non-Medical) (protocol number: H13/06/35) (Appendix 5) was obtained prior to the commencement of data collection for the main study.

3.9 Trustworthiness of the Study

Just as there is a need to look at the accuracy and trustworthiness of various kinds of quantitative data in different ways, there is also a need to look at qualitative methods for the different ways in which to ensure the quality and trustworthiness of the findings (Krefting, 1991). In qualitative research, the credibility of a study is heavily reliant on the meticulous techniques and methods instituted to gather high quality data as well as the way in which it is analysed (Patton, 1990, p. 461). The data collected, was not only recorded verbatim but was transcribed verbatim to ensure credibility of the study. Cresswell (2003) refers to *honesty* from the participant as aiding credibility of qualitative research. The researcher aimed to interview the participants in a manner that allowed them the free will to withdraw at any time during the interview or refuse any questions they did not want to answer. Furthermore, each participant who was approached was given opportunities to refuse to participate in the project so as to ensure that the data collection sessions involved only those who were genuinely willing to take part and prepared to offer data freely, reinforcing credibility (Patton, 1990; Cresswell, 2003).

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Reliability of the current research involves addressing the consistency of measures and in an attempt to minimize the Hawthorne effect, the researcher made it clear to participants that there were no correct or incorrect answers to the questions (Maxwell & Satake, 2006). Participants were also made aware that their individual experiences is what mattered the most, encouraging the participants to provide reliable, honest information. To ensure consistency of the data, the interview was implemented in a rigorous was, ensuring interview

questions were consistent and repeated in the same way to each participant (Maxwell & Satake, 2006). Conducting an interview questionnaire schedule assists with response reliability, as participants are required to provide responses during the interview rather than consult another source before responding, which may occur with self-administered questionnaires (Maxwell & Satake, 2006). Participants were provided opportunity to discuss or elaborate on their responses to questions.

Cresswell (2003) align the reliability of a qualitative study to its dependability. In order to ensure that the findings of the current study were dependable, a pilot study was conducted prior to the main study.

3.10 Data Collection

Data was collected over a six week period, between 30 July and 12 September 2013. Data was compiled from the self-developed interview schedule (Appendix 4), composed by the researcher. Each participant was interviewed individually by the researcher, face to face on different days. The interviews took place at the office of the participant, at the participant's request for convenience. The researcher undertook the administration of each interview. The interview began by the researcher explaining in detail the aims of the research. The researcher re stated that the interview will be recorded and that they could answer at their own pace. It was reiterated that they could refuse to answer any questions at any point and that the answers would remain anonymous at all times. Open questions ended questions were asked, to necessitate a long answer to a question as opposed to a 'yes' or 'no' response (Stroh, 2000).

There were ten separate interviews and each interview took no longer than 40 minutes. Each interview was recorded with a voice-recording iPhone application called TinyVox and was later transcribed verbatim by the researcher. The researcher asked each participant all the questions appearing within the interview schedule. Questions were clarified for the participants by the researcher, if required, and any clarification requested was included in the transcriptions of the data.

3.11 Data Analysis

Analysis involved thematic analysis. This resulted in the data being organized to identify patterns and categories (McMillan & Schumacher, 2001). Descriptive analysis involved calculating the number of participants, the mean as well as the standard deviation of the participants APD experience in years. The data collected by the interview was analysed qualitatively in the following manner:

> Thematic analysis is, essentially, an inductive process of organizing the data into categories and identifying patterns or relationships among the categories (McMillan & Schumacher, 2001). Thematic analysis was the method used to identify patterns and themes within the data (Braun & Clarke, 2006). There are six phases of analysis in thematic analysis, namely becoming familiar with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and producing a report (Braun & Clarke, 2006). Analysis is not linear, but rather recursive, moving from one phase to another and then back again (Neuman, 1997).

> Descriptive analysis allowed the researcher to look at frequency patterns and assisted in organizing and summarizing information (Gravetter & Forzano, 2003). The number of participants, the average number of years experience and standard deviation was calculated using a calculator.

4. Chapter Four: Results and Discussion

The results obtained from the current study will be presented and further discussed in this chapter, in relation to the aforementioned sub-aims of this study, and prominent themes pertaining to the specific sub-aims will be highlighted. Furthermore, the findings will be discussed in relation to the current literature so as to draw meaningful conclusions and recommendations to serve as guidelines for the proposed assessment and management foundation, upon which further research can be implemented, to facilitate the development of standardized practices for the management and assessment of children presenting with APD within the South African context.

Data obtained via participant interviews in this study yielded results pertaining to the key procedures, protocols, tools and practices that have been deemed by Johannesburg-based SLTs practicing in the area of APD, as appropriate and useful for both the assessment and management of children presenting with APD within the South African context.

4.1 Sub-aim One: To explore the experience that SLTs have in working with children with APD in Johannesburg, and to describe the training that SLTs underwent in the field of APD.

The following themes were identified within sub-aim one:

4.1.1 Learning regarding APDs in the private practice setting.

4.1.2 Limited availability of additional courses on APD are being offered to SLTs in the Johannesburg area

4.1.1. Theme One: Learning Regarding APDs in the Private Practice Setting

Nine out of the ten participants reported to have gained their experience and knowledge of children presenting with APD while working in private practice. Two of the ten participants learnt about children presenting with APDs while employed within government hospitals. One of these two participants working within a public health setting reported that a great deal of information was obtained in the hospital experience, while the other reported that only some experience was obtained in the public hospital setting. From these participant responses, it appears that the public hospital setting for community service, in terms of

gaining experience in the area of assessing and managing APD may be insufficient for SLTs within South Africa. Community service is one compulsory year that SLTs have to complete in public health placements, in order to gain experience and attain their professional degree (HPCSA, 2004). Two out of the ten participants indicated that they gained little experience in the area of assessing and managing APDs in their under-graduate studies, which may suggest inadequate or insufficient training in this regard. It is possible that this limited training may be due to the arguably contradictory research findings and information regarding the topic of APD worldwide. These findings are in agreement with Khan's (2006) research, which suggests that the Witwatersrand University in Johannesburg did not provide an approved, precise, standardized curriculum on APD, tailored for the South African population. Different APD teaching is provided to SLT students, leaving them to make their own decisions on what practices to implement when working with children presenting with APDs (Khan, 2006). This finding suggests that there is a strong need for students to get additional exposure to APD at a University level as well as a need for the development of more standardized and contextually appropriate APD curricula at Universities.

From the participant interviews it was evident that the most common settings in which the participants gained their experience in APD was in the private practice setting. This finding may be evidenced by the following participant responses to the question 'In what general settings did you gain your experience in APDs?' The answers from the participants included:

- 'I gained experience at the private practice I work at, not much at the hospitals I was at during community service' (participant 1)
- 'I got most of my experience, … um in private, I learnt everything I knew from observing my boss for two years' (participant 6)
- 'I learnt APDs in private practice and we did some practicals in fourth year, not much though' (participant 8)

4.1.2 Theme Two: Limited Availability of Additional Courses on APD Being Offered to SLTs .in the Johannesburg Area

It was evident from the participant responses, that all ten participants had no additional training in the area of APD in South Africa. Two out of the ten participants reportedly

attended several courses that were provided by the National Health Service (NHS) in the United Kingdom (UK). The NHS provides healthcare for all UK citizens based on their need for healthcare rather than their ability to pay for it and it is funded by taxes (Brooks, 2013). Four of the ten participants stated that they were not aware of any courses being offered on the topic of APD in South Africa. Furthermore, two participants expressed an interest in attending further training regarding APD. As previously mentioned, two out of the ten participants were trained in the area of APD while employed by the NHS. These two participants indicated that they went on two to three full-time, one week courses provided by the NHS hospitals within a one year timeframe. In contrast, courses on the topic of APD were reportedly lacking in the public health sector as well as the private health sector within Johannesburg, South Africa. It is possible that these participants are not members of the professional bodies within South Africa over and above the HPCSA such as SASLHA or SAAA, as these professional bodies tend to advertise courses on offer. In addition, as alumni from various Universities, it is the responsibility of the professional to keep abreast of courses being offered by the relevant departments, particularly because the CPD is a stipulation from the HPCSA. According to the HPCSA, every health professional in South Africa has to achieve a certain number of CPD points, to remain legally registered as a health professional (HPCSA, 2004). This is to ensure that health professionals in South Africa attend courses to further their professional knowledge and keep up to date with the current research trends as well as increase one's knowledge base and improve upon areas of theoretical or practical weakness. It is also possible that advertising of courses on offer is limited or insufficient. In addition there is generally a cost involved to attend CPD workshops, which may be a barrier to course attendance. Nevertheless, it is evident from the participant responses that a need for additional input in the area of APD for qualified SLTs as well as current undergraduate students exists. Further training is vital as research on the topic of APD is continuously exposing new developments and it is essential to keep up to date with the new information, to be able to offer ethical, appropriate, optimal therapy for children presenting with APD, as well as to maintain a high standard of therapy (Rosen, 2005). According to ASHA (2005) the knowledge base required for understanding, diagnosing and treating/managing individuals with APD is extensive and may require additional training and education beyond that obtained in a typical professional preparation program.

When the researcher asked the participants regarding additional training in the area of APD, responses included:

- ‘Yes, a lot ... um …Terri Bellis course in the UK, I have been on so many other NHS courses in the UK. None in South Africa, as I haven’t seen any’ (participant 5)
- ‘no, not any, but I would like to go on a course on APD, I just haven’t seen any being offered’ (participant 8)
- ‘no, I don’t know if there have been any courses on APD, that I know of’ (participant 10)

The results of the current study suggest that SLTs gain most of their experience and a large part of their APD knowledge base while working within private practice settings by observing other SLTs and implementing self-directed learning. The findings of this research study suggest that little or no formal training on the topic of APD is readily available or is being offered to SLT graduates, in the Johannesburg area. The lack of knowledge for SLT graduates could be due to the disagreement on the definition of APD as well as management worldwide. Additional courses or training for SLT graduates is most certainly a recommendation of this finding. However, perhaps more global corroboration in research on this topic is first required such that more refined definitions and guidelines for assessment and management may be taught at these courses.

4.2. Sub-aim Two: To describe the assessment practices and tools being used by SLTs for children suspected of presenting with APD, in the Johannesburg area.

The findings within this sub-aim will be discussed under the following themes:

4.2.1. The lack of uniformity in APD assessment practices
4.2.2. Limited availability of audiological equipment

4.2.1. Theme One: The Lack of Uniformity in APD Assessment Practices

From these participant responses, it is evident that little consistency in terms of assessment practice exists amongst SLTs in the Johannesburg area. In agreement with the literature, it is suggested that there is a lot of controversy in what practices should be followed for the assessment of children presenting with APD (Jerger & Musiek, 2002). The most commonly

used formal test when assessing children presenting with APDs, according to the participants, was the Pendulum. The Pendulum is a test of auditory perception. It is implemented on children older than 6 years of age. Six of the ten participants used this test, which was standardized on the American population and is, therefore, not contextually appropriate for the South African setting. Furthermore, South Africa is a country of many cultures, with 11 official languages and is a developing country, whereas America has been identified as a developed country, thus rendering many of the stimuli as culturally inappropriate for South African children, especially if they are not first language English speakers. Words such as 'super market' are not familiar to South African children and, therefore, this has a negative effect possibly causing inaccuracies on the results and diagnosis of APD. One of the ten participants in this study reportedly used the Scan C test to assess children presenting with APD. The Scan C test provides a valid and reliable test battery to help identify APD and describe the impact that APD on has on a child's daily life (Keith, 2000). The Scan C test ranges for ages five to eleven years. This is another American-devised test, and again contains words that are inappropriate to use to assess for APD for the South African population. One of the ten participants stated that she makes use of the RAPT (Renfrew Language Scales), which is a test for children aged three to nine years (Renfrew, 1997). This test is used to assess spoken language and evaluates APD in terms of information given verbally by the SLT and the grammatical structures used by the child in response to the initial verbal information and is also developed in a first world country (Renfrew, 1997). One of the ten participants used the TAPS (Test for Auditory Perception of Speech), which was developed to assess auditory perceptual skills (Martin & Brownell, 2005). Two participants utilized the CELF (Clinical Evaluation of Language Fundamentals), which is an individually administered language test, for individuals ages five to twenty-one, which evaluates receptive and expressive language ability and determines if a language disorder is present or not. If a language disorder is identified, further in-depth testing provides information about the nature of the disorder (Semel, Wiig, & Secord, 2003). Two out of the ten participants reported the application of the PLS 4, which assesses developmental language, including pre-verbal skills, interaction-based skills and early literacy. It is an interactive, play-based assessment addressing expressive and receptive language (Zimmerman, Steiner, & Pond, 2011). Two participants in the current study further stated that they test both reading and writing. Six of the ten participants reported to implement informal observations throughout the session, while doing informal activities such as rhyming, sequencing and following instructions in order to gather information about the child's AP skills. These results are suggestive of a lack

of uniformity with regard to assessment practices amongst the participants, as each SLT described their own compilation of assessment procedures and practices, which could lead to inconsistencies in diagnosing a child presenting with APD. This finding of suggestive multiple and varied practices and tools being used to assess children presenting with APD is in agreement with the literature, which itself displays little or no consensus on the topic. All of the formal tools that were reported as being used to assess children presenting with APDs have been recognized as having been standardized on the American population. Khan (2006) states that all children need to be addressed, assessed and managed at an individual level, in their language and within their context and environment. Different diagnoses are directly related to inconsistencies in management, as the diagnosis leads to determining the functional impact of the disorder and thus guides the treatment and management of the disorder (ASHA, 2005). Superimposing on the lack of formal guidelines for assessments is the need for deviations and adaptations of the tests reportedly used, so as to assess in a more culturally appropriate manner. While this is very necessary and will be discussed at length later in this report, these adaptations result in further inconsistencies and the inability to correctly use the score sheets and guidelines within the test manuals. In agreement with this finding, Bellis (2003) suggests that if one universal protocol can be followed, it would create some uniformity amongst assessment protocols used in the diagnosis of these children presenting with APD, as intervention is based on the diagnosis obtained (Bellis, 2003).

When asked ‘What speech assessment practices, including the names of tests, do you make use of with a child presenting with APD?’ the participant comments included:

- ‘Renfrew Scales, Renfrew word finding vocabulary test, Renfrew Bus Story, the Renfrew Action Picture test, the Preschool Language Scale 4 (PLS 4) and if the child is old enough, I do the Pendulum and phonemic awareness test’ (participant 1)
- ‘I test a lot of reading and writing in the older kids, the Pendulum is also great with the older kids. In the younger children there really isn’t any test I use, I just do lots of informal games and observe if the child can follow instructions, or can play memory games and if the child can hear the difference between sounds’ (participant 9)
- ‘I normally do an informal observation while doing receptive and expressive tests, as well as speech discrimination tests’ (participant 8)

4.2.2. Theme Two: Limited Availability of Audiological Equipment

When the researcher enquired about the use of audiological testing when assessing for APD, seven out of the ten participants answered that they do not do any AP audiological testing on their patients, although they are all qualified to do so. The most commonly stated reason for excluding audiological testing was the lack of the necessary equipment. However it could also be that SLTs in South Africa rather assess and manage children with language processing disorders, rather than APD, as most of their assessment tests and tools are language based i.e. CELF, Pendulum. Audiological equipment is costly and also requires a large amount of space. Sound-proof booths are necessitated and a number of consumables are required, thus further escalating the set-up costs, thus escalating the importance of referrals for audiological assessments. The ASHA (2005) Scope of Practice document claims that both audiologists and SLTs are essential in the complete screening and assessment process, differential diagnosis, and development and implementation of intervention plans. While the role of the SLT cannot be negated in the assessment and management of children with APD; failure to refer for an audiological assessment and vice-versa arguably compromises the completeness and accuracy of the diagnosis which in turn will affect management practices. The importance of multidisciplinary involvement and referrals is highlighted in this theme, and referrals to specifically audiologists practicing in the field of APD are essential.

When participants were asked by the researcher 'If dually qualified, what audiological tests do you use to assess APD?' the responses were recorded as:

- 'None, as we don't have the equipment' (participant 1)
- 'Would love to but we don't have the equipment' (participant 7)
- 'Nope, we don't have the equipment' (participant 10)

In summary of sub-aim two, the results clearly indicate that there are no standardized assessment practices that SLTs within the private practice setting in Johannesburg are implementing. While there is agreement in the use of certain formal tests, the adaptations to suit the child compromise the standardized results. Furthermore, it is apparent that dually qualified SLTs and audiologists working within the private practice setting appear to adhere to one component of their qualification; citing cost as the primary reason for this.

The second theme within sub-aim two regarding the general lack of audiological assessments being carried out by dually qualified SLTs working in Johannesburg indicates a need for a clearly stipulated, multidisciplinary referral pathway so as to ensure that all measures necessary for an APD diagnosis have been carried out. There is a link between SLTs in South Africa assessing and managing children with language processing disorders and the need to refer to APD experienced audiologists is highlighted.

4.3. Sub-aim Three: To describe the management practices and tools being used by SLTs for children suspected of presenting with APD, in the Johannesburg area.

The findings referring to the aforementioned sub-aim will be discussed under the following themes:

4.3.1. The lack of uniformity in APD management practices
4.3.2. APD and the South African context: tool adjustment and challenges faced
4.3.3. The lack of agreement regarding multidisciplinary intervention with children presenting with APD.

4.3.1. Theme One: The Lack of Uniformity in APD Management Practices

When the researcher enquired about what procedures and/ or programmes the participants in this study followed with regard to the management of children with APD, the common response indicated that no formal, common or specific programme or procedure was employed. All ten participants reported using an amalgamation of different strategies and approaches in therapy, such as syllabification, analysis and synthesis, memory games, listening games and the understanding of stories. Only one participant mentioned a formal standardized programme that was being used, in combination with numerous other self-developed intervention programmes. It was reported by the participant implementing formal programmes that the standardized resources being used are called ‘It's time to Listen’ and ‘Central Auditory Processing Activities’, which are both American-based APD programmes for SLTs. All the participants employing an amalgamation of therapy approaches suggested that there is no universal protocol or practice available for the management of children presenting with APDs, which is in accordance to BSA (2011), where it was reported that a major shortcoming in the present research on the topic of APD is the lack of a “gold

standard" that can be agreed upon for the practices of APD. There are bottom-up approaches, designed to improve auditory skills (Ferre, 2006); top-down programmes to focus on improving metalinguistic and metacognitive skills (Emanuel, 2002); formal programmes to follow (Bellis, 2003) as well as informal therapy techniques to implemement (Katz, 2002). Generally agreed-upon methods of defining, assessing and managing APD continue to elude speech-language therapists world-wide (Bellis, 1996).

4.3.2. Theme Two: AP and the South African Context: Tool Adjustment and Challenges Faced

From the participants' responses it is evident that the resources used by these Johannesburg-based SLTs, do not fully accommodate the South African population. Six of the ten participants reported making adjustments to their tests and/or therapy resources while four reportedly do not make any adjustments to the management tools or practices. Three out of the ten participants reported that they adjust their assessment and intervention resources to meet the needs of the South African child. Three participants reported making adjustments to the Scan C test and three participants make adjustments to the Pendulum. It is essential to note that the private health setting is not the context in which most South African children receive speech-language therapy services. Approximately 78% of the South African population utilizes public health care (Statistics South Africa, 2007). Private healthcare in South Africa is very costly and thus is generally only available to those of middle to upper socio-economic status. As such, the public health sector serves most of the lower-income echelon of the population (Statistics South Africa, 2007). Having identified from this study a need to make adjustments (all be they relatively minor) to management tools in the private health sector where the children generally have access to American television (as per participants response) as well as the World Wide Web, it is thought, by the researcher that further adjustments to management tool would be required for children of the lower socio-economic status, for whom internet access and electronic devices as well as resources in general are limited. Superimposed on this reliance on the public health care sector, is the multitude of language and diverse cultures for which South Africa is renowned (Fair & Louw, 1999). In South Africa's multilingual and multicultural population, 80% of the population is indigenous and speak English as a second language (UNICEF, 2007). These management tools would thus require even further adaptations in certain instances to reflect cultural sensitivity. This finding suggesting the need to adapt management tools within the

private practice setting reinforces the need for South African context-specific materials and standardized guidelines for management in order to provide effective and appropriate SLT services which are in line with international standards, but accounts for South Africa's unique 'Rainbow Nation'. Furthermore, there is an absence of South African specific normative data for many of the APD materials used (Saleh, Campbell & Wilson, 2003). This finding may have implications in terms of the reliability of assessment results as a child may perform poorly due to lack of exposure to the test items rather than due to the presence of an APD. This compromised reliability of assessment findings may in turn lead to misdiagnosing or limited development due to misguided intervention.

In response to the following questions asked by the researcher of the current study: 'What adjustments do you make to the existing assessment and management tools, to accommodate the South African population?' the following remarks were obtained:

- 'I don't adjust anything really, as most of my kids speak English and watch American TV and they manage quite well. I do adjust the scoring at the end though, especially with the Pendulum, where words such as generator, film star and sidewalk are used', 'No, I don't make any adjustments' (participant 4)
- 'I adjust the scores of the Pendulum and Scan C, to make sure it's fair, but you get a strong idea where the child is at from all the other sections' (participant 6)
- 'Yes, I do make adjustments to words that are American and I make them more applicable to the South African context' (participant 7)

The main challenges raised by the participants in this study are in relation to AP assessment tools, equipment and resources. As mentioned in the literature review there is an absence of South African normative data for APD materials used (Saleh, Campbell, & Wilson, 2003) and the materials that are used by SLTs have generally been standardized in contexts very different to that of South Africa, such as the United States of America. Furthermore, the cost of these assessment and management tools was identified as a challenge facing South African SLTs. Based on the high costs and the generally limited applicability of these assessment and management tools to the South African population, the participants voiced concerns pertaining to the limited assessment and management tools available with which to address this disorder.

‘Do you feel that there are any difficulties that therapists encounter in the area of APD in South Africa?’ was asked of the ten participants in the current study. The participants expressed the following:

- ‘Yes, there is a lack of South African resources, as binaural integration and dichotic listening tests are all pre-recorded CD’s and the accent and vocabulary is not always appropriate for the South Africans. Also equipment is very expensive and many therapists don’t have access to equipment, in fact I don’t know of anyone that have these tests and equipment’ (participant 1)
- ‘Yes it is a big challenge, as most tests are not applicable to … like the Scan tests and we don’t have access to tone based tests and when you do they are prohibitively expensive, so we have to do the best we can and use our clinical judgment to interpret results’ (participant 2)
- ‘I feel that there is no one way of doing therapy for AP and because of such diversity each child is receiving different intervention and sometimes I will see a child from a previous therapist, who didn’t even diagnose the AP problems, so yes there are challenges’ (participant 7)

4.3.3. Theme Three: The Lack of Agreement Regarding Multidisciplinary Intervention With Children Presenting with APD

It is evident from the literature review that various authors and researchers believe that APD should be addressed by different professionals. Bellis (2003) for example suggest that APD is of concern and may be diagnosed by only an audiologist. In contrast the AAA (2012) reports that a referral to another professional for behavioural, language learning or global assessments must be done before the APD assessment is implemented. Seven of ten participants reported that they work with an occupational therapist for different reasons, such as sensory integration, for listening skills and weak muscle improvement. One mentioned working with a remedial teacher, one mentioned working with the parent, two participants mentioned working with a physiotherapist and two participants mentioned working with a school teacher. According to ASHA (2005), intervention for APD requires an interdisciplinary approach involving the audiologist, speech-language pathologist and other professionals, and should be implemented as a collaborative effort by the audiologist and SLT. It was interesting to note that the SLTs did not refer to audiologists, especially as the

majority of the participants are dually qualified and thus should have had input regarding the audiologists role in terms of this disorder. Perhaps the reason why the SLTs are not referring to audiologists is that they are unaware of audiologists that implement APD assessments or perhaps that the SLTs are unaware of the referral process. However, literature states that a multidisciplinary team is important in assessing and treating children presenting with APDS (Ferre, 2006; ASHA, 2005; Bellis, 2003), although there is no agreement on which professionals should comprise such a team.

The question posed to the research participants was: 'What multidisciplinary intervention is there for children presenting with APD and do you practice any multidisciplinary intervention?' Answers that were recorded were as follows:

- 'I know OT's are quite involved in auditory processing, because it's a sense, but I also know that they don't have much knowledge on auditory processing. They have programs like 'so listen' where you basically plug a child into headphones for two hours a day for ten days and it's meant to improve AP. Physios also work with vestibular processing' (participant 2)
- 'We don't work within a multidisciplinary team, as realistically there is no time and our practice is not set up to work with other professionals' (participant 8)
- 'I like to get an educational psychologist involved as well as an OT, but it is sometimes not so easy to communicate with other professionals with all the children as it's very time consuming' (participant 9)

In summary, sub-aim three indicates that little consistency in the intervention tools and practices implemented by SLTs with children presenting with APDs. Furthermore, the current study's findings with regard to sub-aim three, suggest that assessment and management tools require some adaptations for the South African population attending APD therapy within the private health sector setting and thus possibly even further adaptations in the public health sector. There is also a lack of consensus on which professionals should be working with children presenting with APDs and thus creating an ill-defined referral pathway. Finally, dually qualified SLTs appeared to assess for APDs without personally conducting audiological assessments, citing equipment costs as the primary reason for this.

4.4. Sub-aim Four: To identify the referral resources SLTs use when working with children presenting with APD.

The findings pertaining to this sub-aim will be discussed under the following theme:

4.4.1. Little or no uniformity in the referral process of a child presenting with APD

4.4.1. Theme One: Little or No Uniformity in the Referral Process of a Child Presenting With APD

Two of the ten participants in the current study indicated that they do not refer to any additional professionals. Six participants reported that they refer to an occupational therapist. Four participants reported that they refer to an educational psychologist for a global assessment to assess all aspects of a child including speech, motor, emotional, learning ability and overall level at which the child is at, and one indicated that patients are referred to a physiotherapist. These results suggest those occupational therapists are referred to for sensory integration therapy and that no set referral hierarchy or pathway for SLTs is suggested. A limitation of the current study is that the reason for referral was not explored thus rendering it difficult for the current researcher to fully understand these referral practices to make further inferences regarding these referrals. SLTs in the event that they do not work in isolation, most frequently partner with an audiologist in the screening, assessment and intervention for APD (Witton, 2012, AAA, 2012; ASHA, 2005). However, it was also noted that none of the participating SLTs refer to an audiologist unless a hearing screening is 'failed'. According to Bellis (2003) a child presenting with APD cannot be diagnosed accurately without an audiological assessment in a sound-proof booth (Bellis, 2003). ASHA (2005) stipulates that a full understanding of the ramifications of APD for the individual requires a multidisciplinary assessment to determine the functional impact of the disorder and to guide treatment and management of the condition and its associated deficits.

When asked by the researcher 'To which other professionals do you refer a child presenting with APD to assist in the assessment and management of these children?' and 'Do you refer to any other professional to complement your findings' the participant answers that were recorded included:

- ‘No one else, unless the child presents with sensory integration, then an OT’ (participant 2)
- ‘An educational psychologist for certain patients’ (participant 4)
- ‘Physio or an OT, depending if the child has sensory issues or muscle weakness of fine or gross muscles’ (participant 10)
- ‘If the hearing screening is normal then no one, otherwise an audiologist for a hearing test’ (participant 2)

Sub-aim four concludes that, there is little agreement with regard to the referral procedure/pathway for a child presenting with APD. This general lack in consensus in terms of referring the child to a number of key role players may lead to very different progress in treatment approaches and subsequent treatment, depending on the professional to whom the child has been referred. The need for a special interest or working group open to all professionals working in the area of APD is indicated. This will allow for the various professionals to explain their roles in working with children with APDs, which should result in increased referrals and subsequent improvements in APD management and prognosis.

5. Chapter Five: Conclusion

Further implications of the findings from the current research project will be discussed in this chapter, as well as the recommendations for future research on the topic of APD practices in the South African context, specifically the assessment and management of children presenting with APDs, will be suggested. The limitations of the current study will also be viewed.

5.1. Summary of Findings

The primary aim of the proposed research is to describe the experience and current practices of SLTs working in private practices in the assessment, management and referral of children presenting with APD in Johannesburg, South Africa.

This empirical research was operationalized according to the four sub-aims and within each sub-aim, common themes were explored and have been summarised accordingly:

5.1.1. Sub-aim One: To explore the experience that SLTs have in working with children with APD in Johannesburg, and to describe the training that SLTs underwent in the field of APD.

It was identified in this current research project that nine of the ten participants gathered their APD information from their exposure and experience from working within a private SLT practice. It is evident from these results that most SLTs in the Johannesburg area obtain limited practical experience and theoretical input regarding APD practices as undergraduate students. In addition, suggested by the results of this study that SLTs in the Johannesburg area gain limited practical experience on APDs from their community service year. It is possible that this limited exposure to APD in the public health settings is due to the insignificant number of school-going age patients to which SLTs may offer their services, as children over six years of age of this population is served by school-based therapists and is considered to be the responsibility of the Department of Education rather than the Department of Health.

In this research project, nine of the ten SLTs reported to have gained this APD practices in the private practice environment, by observing their colleagues and employers

therefore supporting Khan's (2006) finding, which suggests that SLTs are not receiving adequate theoretical knowledge and practical experience regarding children presenting with APD, within the South African context.

It was noted in this research that not one of the participants had obtained further formal training on APD in South Africa and they further reported that no courses to their knowledge were being offered on the topic of APD in the Johannesburg area. This result highlights the need for additional, formal APD training to be offered to SLT graduates that is both cost effective and contextually and culturally relevant. In addition APD requires further elaboration in undergraduate SLT and audiologists curricula.

5.1.2. Sub-aim Two: To describe the assessment practices and tools being used by SLTs for children suspected of presenting with APD, in the Johannesburg area.

It was identified in this research that there is very little uniformity with regard to assessment practices, when assessing children presenting with APD. As previously mentioned, Bellis (2003) cautions that the complexity of the central auditory nervous system precludes a simplistic approach to the identification and treatment of children presenting with APD and the multicultural and multi-linguistic nature of the South African context further exacerbates this already multi-faceted disorder. The tools applied by SLTs in private practice in Johannesburg, for the assessment of children presenting with APD vary significantly from one participant to another. This lack of consensus regarding 'who' and 'what' should be involved in the assessment of APD and may be a contributing factor as to why each of the SLTs interviewed had an individually devised 'best practice' in the assessment of children presenting with APDs. The ramification of the numerous varying protocols and practices being published in the literature, and the absence of a universally agreed upon definition of the disorder of children suspected of presenting with APD, is that many different protocols and practices are being implemented by SLTs in the Johannesburg area and presumably country-wide, which in turn, creates much room for error in the diagnosis of this disorder. From this finding regarding a lack of formal assessment practices and tools, it becomes clear that a need for research first and foremost, in establishing a more detailed and universally accepted definition of this disorder is required. An agreed upon definition in turn will

facilitate research to establish standardized guidelines for APD assessment for the South African context.

In addition to the lack of uniformity in the assessment practices and tools used by the SLTs in the current study, some standardized tools such as the Renfrew (Renfrew, 1997) and CELF (Semel, Wiig, & Secord, 2003) are being adapted to greater and lesser degrees by the participants so as to ensure that test stimuli are linguistically and culturally appropriate for the South African context. While adapting the tests in order to meet the cultural and linguistic needs of the child is essential; adaptations unfortunately render these tests as non-standardized. This lack of linguistically and culturally appropriate tools evidences the need for the development of assessment and management tools in languages typical of the South African context such as isiZulu and Sesotho utilizing test stimuli appropriate for the South African context.

It was revealed in the current study that seven of the ten participants do not conduct any audiological assessments on children presenting with APD. The most common reason as reported by the participants was the lack of audiological equipment, which in turn was owed to financial constraints. An implication of this finding is the need for SLTs to be advised and/or reminded regarding the role of the audiologist in APD assessment and management in children. It was surprising to the researcher to establish that even dually qualified SLTs and audiologists were not referring children with possible APD for further audiological assessment. The need for multi-disciplinary assessment and management practices for children with APD needs to be reiterated at an undergraduate level and a workshop or CPD activity at which representatives from the various disciplines involved in working with APD may serve as a platform for the various professionals to explain their roles.

5.1.3. Sub-aim Three: To describe the management practices and tools being used by SLTs for children suspected of presenting with APD, in the Johannesburg area.

All the participants in the current study employ an amalgamation of therapy approaches when providing intervention for children presenting with APDs. Within the South African context, the definition of APD is not clearly stipulated and no standardized guidelines for the management of patients with APDs have been suggested by professional bodies such as the

HPCSA, SAAA or SASLHA. This lack of consensus on management practices paired with undefined assessment guidelines ultimately impacts on the management of children who may present with APD. Although no two children presenting with APD will present in exactly the same manner, thus necessitating individually planned therapy, a standardized guideline that can facilitate the development of therapy goals based on patient specific symptoms would allow for a more consistent form of intervention across therapists for children presenting with APD. This guideline would further ensure that all necessary areas are considered in both assessment and management by SLTs that may otherwise have been overlooked or left undetected.

This research project further ascertained that the tools being used for management of children presenting with APD also, do not account for the needs of the South African population. Three of the ten participants reported to make some alterations and adaptions to their intervention resources for South African children particularly those speaking English as a second language. The participants identified the lack of both assessment and management tools tailored for the multicultural and linguistic context of South Africa as well as the general lack of resources such as finances and space for audiological equipment, to be limiting factors when working with children presenting with APD. It was postulated by the current researcher that these difficulties are likely to be experienced to an even greater extent in the public health sector.

5.1.4. Sub-aim Four: To identify the referral resources SLTs use when working with children presenting with APD.

APD is a heterogeneous disorder that affects different people in different ways (Bellis, 2003); therefore, necessitating a multidisciplinary approach to the assessment and remediation of APD. The research identified that no two SLTs participating in the current study made use of the same multidisciplinary referral process.

It was identified in the findings of this research that there is no uniform referral procedure amongst SLTs in the Johannesburg area. This finding further reiterates the need for standardized assessment and management guidelines, such that SLTs may be aware of areas that require assessment or management, which is not within the SLT scope of practice.

Additionally, the information sharing workshop for professionals from various disciplines recommended previously in this report may facilitate the development of referral networks thus ensuring more holistic assessment and management of children presenting with APD. The findings of the current study do not agree with this statement as no participants in the current study reported to referring children presenting with APD for an audiological assessment.

5.2. Implications and Recommendations of This Study

A summary of implications of this study are outlined below and appear to be most commonly related to the training that SLTs undergo regarding children presenting with APDs.

5.2.1. Training in the Area of APD in Children

The findings suggesting that most SLTs gain their experience in APD practices from private practices as opposed to the curricula provided by their respective Universities, demonstrates that there is a significant need for more intensive training of undergraduate students on the topic of APD, with particular input on the South African context. This recommendation however, is difficult to implement when no universal or standardized guidelines regarding APD are currently available particularly with regard to guidelines suitable to South Africa's unique context.

5.2.2. Limited APD Courses Being Offered

Another recommendation, based on the findings of the current study, is the need to further investigate the reported lack of courses on offer on the topic of APD or barriers to SLT attendance of these courses. Financial constraints or poor advertising of courses available have been proposed as possible contributing factors, however, additional research in this regard is required.

5.2.3. Culturally Appropriate Resources

It is pertinent to the prognosis of APD management, that further research be undertaken in creation of culturally appropriate management and assessment tools and resources standardized on the population of South Africa. The lack of standardized assessment tools available to SLTs in South Africa, which is both linguistically and culturally appropriate, was an issue that was being addressed by the now disbanded South African APD taskforce

(Wilson and Campbell, 2000). A test battery with a low-linguistic dependency was developed by this task force, although very few SLTs are aware of this, may possibly be used in the interim while diagnostic materials for the numerous South African language groups are devised. This test battery initiative was supported by ASHA (2005) despite stating that APD assessment test batteries should comprise of both verbal and non-verbal stimuli. ASHA (2005) therefore suggested exercising caution until tests incorporating verbal stimuli are made available in other languages. In the interim, as an alternative, the evaluation of an English second-language speaker may require the reliance of SLTs on nonverbal stimuli. Hence, the importance of multidisciplinary intervention and appropriate referrals are pertinent in the assessment and management of children presenting with APD. However, no further research has been carried out in this regard.

5.3. Limitations

Despite the current researcher's every effort to ensure trustworthiness of the findings of this study, certain limitations have been identified and will be discussed. Acknowledging the limitations of a research project is important to establish the quality of the findings (Cresswell, 2003). In addition, a comprehensive evaluation of the research process for guidance provision for future studies in the area, such that repetition of certain errors may be avoided (Gravetter & Forzano, 2003).

- The sample size of the current study proved to be limiting as the information gathered may not be used to make assumptions or generalizations on the APD practices used by all SLTs in the Johannesburg area operating in private practice.

- The utilization of an interview as a data collection method was also deemed a limitation of the study because this data collection method relies on participants' openness in their responses to the researchers' questions. Participants may give incorrect information, or not have knowledge about the questions they are asked. The findings of this study only describe participants' *reported* clinical practice, which may differ to *actual* practice in some cases (Gravetter & Forzano, 2003). Furthermore, the transcription of interviews proved to be very time-consuming.

- Another limitation is the fact that the participants included in this research study were only located in the Johannesburg area and practicing in the private health sector. This prevents the results found from being used to make inferences to other regions of Gauteng and South Africa (Cresswell, 2003). Inferences regarding APD practices within the private sector should therefore be interpreted with caution.

- A further limitation includes that future research on the topic of APD practices should comprise a greater, more diverse sample size particularly including participants in the public health sector as this sector serves the majority of the population of South Africa.

- Another limitation includes that the participants that were used in this study only graduated from two Universities. This prevents the results found from being used to make inferences to graduates from other Universities in South Africa.

5.4. Strengths

The strengths of the research study include:

- The findings in the current study have revealed a number of subjects pertaining to APD assessment and management requiring further investigation.
- The researcher conducted a pilot study to ensure the content validity of the interview schedule, thus improving the trustworthiness of this research tool.

5.5. Recommendations for future research

A larger, more diverse sample size of participants, from different Universities would offer more information for future research, which could further give us an indication of not only what practices are being used with children presenting with APD, but also different environments i.e. schools, government areas, rural areas in different provinces. Observations of the participant's assessment and management practices could also enhance the findings of future research, as reported clinical practice may differ to actual practice, providing more detailed information for the researcher (Gravetter & Forzano, 2003). It would be valuable to obtain similar information from SLT's working with mainly English Second language speakers in a variety of contexts.

5.6. Summary

Having identified the paucity of knowledge regarding the APD a practice being implemented by SLTs, internationally as well as within South Africa, this study has provided insight into the assessment and management practices of ten SLTs working within the private healthcare sector in Johannesburg, South Africa, for future research to be built upon. It is hoped that the findings of this study will serve useful in informing and facilitating the development of standardized assessment and management practice guidelines and tools, appropriate to the South Africa population. In addition, recommendations to increase referrals between various professionals working within the field of APD have been made and areas requiring further research have been identified. Until such time as standardized guidelines are developed, it is the onus of each professional coming into contact with children presenting with possible APD to base their practices on evidence-based research and to continuously pursue knowledge in the area of APD so as to increase the accuracy of diagnoses and the prognosis and efficacy of intervention.

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Appendices

Appendix 1: Information letter to the owner of the speech therapy practice

Information Letter to Owner of the Practice to Grant Permission for your Employee's Participant Involvement in a Speech Therapy Research Project

Dear Sir/Madam:

My name is Liane Lewis. I am currently studying towards my Masters in Speech-language Pathology, at the University of the Witwatersrand. In order to complete my Masters degree, I am required to conduct research in an area of interest. My aim is to investigate the protocols that are currently being followed to assess and manage children presenting with auditory processing disorder (APD), in Johannesburg South Africa. It is hoped that the findings of this study will enable the development of a standardized, baseline protocol for the assessment and management of children with APD. I would, therefore, like to invite your employee to participate in this research study.

Participation in this study will involve my conducting a once-off structured interview with your employee. The interview may be conducted either at my office or your office, whichever is most convenient for your employee. This process is anticipated to last 45- 60 minutes. The questions will be related to your employee's current protocols, procedures and tools used in assessing and managing children who present with APD. Participation in this study is entirely voluntary and your employee may withdraw from the research process at any time with no negative repercussions for her/ him or your practice. Participants will not be remunerated for their participation, nor will there be any risks for the participants or their practices.

Participants are assured that they participate on the condition that data will be anonymously reported and that information divulged to me is for academic purposes only. Every effort will be made to ensure that no personal information is made available to third and confidentiality will be maintained

Please could you write a permission letter on your practice's letterhead to give permission for your employee to participate in the study?

Many thanks
Miss Liane Lewis
Cell phone: 072 876 1744
E-mail: liane.sandtonspeech@gmail.com

Appendix 2: Information letter for the participant

Information Letter to Speech-language Therapists to Grant Permission for Participant Involvement in a Speech Therapy Research Project

Dear Sir/Madam:

My name is Liane Lewis. I am currently studying towards my Masters in Speech-language Pathology, at the University of the Witwatersrand. In order to complete my Masters degree, I am required to conduct research in an area of interest. My aim is to investigate the protocols that are currently being followed to assess and manage children presenting with auditory processing disorder (APD), in Johannesburg South Africa. It is hoped that the findings of this study will enable the development of a standardized, baseline protocol for the assessment and management of children with APD. I would, therefore, like to invite you to participate in this research study.

Participation in this study will involve my conducting a once-off structured interview with you. The interview may be conducted either at my office or your office, whichever is most convenient for you. This process is anticipated to last 45- 60 minutes. The questions will be related to your current protocols, procedures and tools used in assessing and managing children who present with APD. Participation in this study is entirely voluntary and you may withdraw from the research process at any time with no negative repercussions for you or your practice. Participants will not be remunerated for their participation, nor will there be any risks for the participants or their practices. You may choose to refrain from answering a particular question(s), during the interview and this will have no negative consequences for you or the practice at which you work. I will audio record the verbal responses. Should you feel uncomfortable with this, you may state such at any time and this request will too, be respected. Access to recordings will be restricted, as they will be stored on the researcher's computer in a password encrypted system.

Participants are assured that they participate on the condition that data will be anonymously reported and that information divulged to me is for academic purposes only. Every effort will be made to ensure that no personal information is made available to third parties (the names of the speech-language therapists and your practice will not appear in the research report). Confidentiality will be maintained and personal details will only be available to me, as the researcher, and my supervisors. Upon completion of this research, the results, if requested, will be explained in detail to all the participants and the findings will be made available to you.

Please do not hesitate to contact the undersigned should you have any queries regarding this research project:

Many thanks
Miss Liane Lewis
Cell phone: 072 876 1744
E-mail: liane.sandtonspeech@gmail.com

Appendix 3: Consent form of the participant

Informed Consent Form for Speech-Language Therapists to Participate in a Speech Therapy Research Project

Study Title: Current Auditory Processing Disorder Assessment and Management protocols implemented by speech-language therapists in Johannesburg, South Africa.

Should you agree to participate in this research, please sign below and e-mail this letter to the researcher's e-mail address (liane.sandtonspeech@gmail.com). Alternatively, you can fax this letter, signed, to my supervisor, Mrs. Nicola Burger, on 086 541 0535. Your participation is appreciated.

I _____ (participant's full legal name) hereby confirm that I am registered with the Health Professions Council of South Africa (HPCSA). I understand all the particulars for the research endeavor stated in the information sheet attached. I have the right to withdraw from the study at any time, the right not to answer any questions and am aware that data will be anonymously reported. I hereby, give my consent to participate in the proposed research study, by agreeing to being interviewed. I agree to be audio recorded during this interview.

Signed on _____ (date).

_____

Participant's Signature

Appendix 4: Interview schedule

Section 1

1. What is your full name?
2. What University did you graduate from?
3. What is your first home language?
4. What year did you graduate?
5. What is the number of years' experience that you have had as a general speech therapist (not specific to APD)?
6. What is the name of your company/ practice and how many years have you worked there (this will remain anonymous and will not appear in the research report)?

Section 2

7. In what settings did you gain your general APD experience?
8. Have you had any additional training or attended courses on APDs?
9. How many years have you worked with children presenting with APD?
10. How many children on average a year have you (a) assessed and (b) managed with APD?
11. Do you send out any questionnaires to be completed by the school teacher and/ or parent prior to the assessment? If so can we see a sample and can we discuss the questionnaire?
12. Are you dually qualified?
13. How long does an APD assessment take you on average?
14. What specific speech tests are you conducting in your assessment? Include the names of tests and programmes that are being used?
15. If dually qualified what audiological tests, including specific behavioral and electrophysiological assessment tools, such as auditory discrimination tests, auditory temporal processing and pattering tests, dichotic speech tests, monaural low redundancy speech tests, binaural integration tests, electroacoustic measures and electrophysiological measures, do you use? Can you please elaborate on the above tests that you use?
16. Do your assessment results guide your APD management planning? If so please elaborate.

17. What programs and procedures are you following in the management of children with APD?
18. What adjustments, if any, do you make to your existing tools to cater for the South African context?
19. Do you feel that there are the difficulties and challenges that, Speech-language Pathologists and/or Audiologists encounter in the area of APD within the South African context?

Section 3

20. Please tell me what you know regarding multidisciplinary intervention for APD and do you work within a multidisciplinary team for children presenting with AP?
21. To which other professionals do you refer for the assessment of a child suspected with APD?
22. To which other professionals do you refer for the management of a child suspected with APD?
23. Do you refer each child you assess for further assessment to compliment your own findings for example an audiologist?
24. Please feel free to share any final comments.

Appendix 5: Ethical clearance certificate

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Lewis

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER H13/06/35**
PROJECT TITLE	Current APD assessment and management protocols implemented by speech language therapists in Johannesburg, RSA
INVESTIGATOR(S)	Ms L Lewis
SCHOOL/DEPARTMENT	Human & Community Development/Speech Pathology & Audiology
DATE CONSIDERED	21/06/2013
DECISION OF THE COMMITTEE	Approved Unconditionally
EXPIRY DATE	23/07/2015

DATE 24/07/2013 **CHAIRPERSON** (Professor T Milani)

cc: Supervisor : Ms N Van Zyl; S Abdoola

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

_____ _____/_____/_____

Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

Appendix 6: Data collected from participants, presented in themes

Sub-aim one

To establish what knowledge SLTs in Johannesburg have on APD, where their knowledge is gathered from and what they understand from their work experience in APS's.

The below are questions and answers recorded from the interview that answer the above mentioned first sub-aim:

Question asked: What general settings did you gain your experience in APD?	
Participant	Comments
1	'I gained experience at the private practice I work at, not much at the hospitals I was at during comm serv'
2	'Mostly in government with second language speakers'
3	'I did I little in undergrad, but mostly in private'
4	'Completely private practice'
5	'in the NHS in England and in private practice'
6	'I got most of my experience um in private, I learnt everything I knew from observing my boss for 2 year'
7	'I learnt a lot working in the NHS and the rest I learnt by teaching myself in private practice'
8	'I learnt APD in private practice and we did some pracs in fourth year, not much though'
9	'all in private practice'
10	'I mainly learnt in private practice and I did do some AP in community service'

Question: Have you had any additional training in the area of AP?	
Participant	Comments
1	‘no’
2	‘no’
3	‘no, I would like to but I haven’t yet’
4	‘no’
5	‘Yes, a lot.um Terri Bellis course in the UK, I have been on so many other NHS courses in the UK. None in South Africa, as I haven’t seen any’
6	‘no, I have never seen any courses on APD being offered’
7	‘yes, I went on several courses in the UK, through the NHS and loved them, but they were not all totally applicable to South Africans’
8	‘no, not any, but I would like to go on a course on APD, I just haven’t seen any being offered’
9	‘none’
10	‘no, I don’t know if there have been any courses on APD, that I know of’

Sub-aim two

To describe what assessment practices and tools are being used by SLTs in the Johannesburg area, when working with a child with APD.

Question: What speech assessment practices, including the names of tests do you follow with a patient presenting with APD?	
Participant	Comments
1	‘Renfrew Scales, Renfrew word finding vocabulary test, Renfrew Bus Story, the Renfrew Action Picture test, the PLS 4, and if the child is old enough, I do the Pendulum and phonemic awareness test’
2	‘I do the Pendulum and then qualitative judgment in the receptive tests

	used. I also use qualitative tests with no standardized tests such as rhyming and sequencing'
3	'I do the Pendulum'
4	'I'll do the speech discrimination part of the Pendulum, I do minimal pairs, and then I do part of the Scan C, I do the dichotic words and dichotic sentences'
5	'Celf 4, TAPS 3, then reading, spelling, reading comprehension, written language, sequencing cards, where they have to put the cards in order, tell the story and write the story'
6	'I use the PLS4 and informal observations'
7	'I use the CELF'
8	'I normally do an informal observation while doing receptive and expressive tests, as well as speech discrimination tests'
9	'I test a lot of reading and writing in the older kids, the Pendulum is also great with the older kids. In the younger children there really isn't any test I use, I just do lots of informal games and observe if the child can follow instructions, or can play memory games and if the child can hear the difference between sounds'
10	'I do parts of the Pendulum and then informal tests like memory games and following instructions'

If dually qualified, what audiological tests do you use to assess APD?	
Participant	Comments
1	None, as we don't have the equipment
2	I don't do any
3	We do a standardized hearing test to ensure normal thresholds, so that includes immittance, acoustic reflexes, um as well as otoscopic and then pure tone thresholds. Then we will do speech testing, um in that ear as well. If we find the results are unreliable we want to see the functioning of the nerve or the cochlear we will do OAE's and ABR's

4	After pure tones, instead of doing regular speech audiometry, ill use speech discrimination tests from the pendulum, um minimal pairs, which I will do under headphones under 40dB and test each ear independently. Um I also use part of the Scan C, I use dichotic words and dichotic sentences as well.
5	A full audiological PTA, tymps, otoscopic, quick speech discrim, and then the auditory continuous performance test, ACPT, which is up to 12 years. I do auditory figure ground of the TAPS 3. Then the Scan and sometimes SSW, if I feel I need further info on APD.
6	No, I don't do any audio
7	Would love to but we don't have the equipment
8	No, we don't do audio testing here
9	No, we just do pure tone screening, to make sure the hearing is all fine
10	Nope, we don't have the equipment.

Sub-aim three

To describe what management practices and tools are being used by SLTs in the Johannesburg area, when working with a child with APD.

What adjustments do you make to the existing tools?	
What adjustments do you make to your tools, to accommodate the South African population?	
Participant	Comments
1	I adjust everything that is from America, depending not only on if the child is English speaking, but also on the child's individual level.
2	It is difficult to use the Scan as it has the American accent so 'bath' and 'bass' so these items are not necessarily valid because they don't have

	the same linguistic meaning for each child.
3	'Um, we do take into account that the Scan C is in an American accent, you need to take this into account when doing your results.
4	I don't adjust anything really, as most of my kids speak English and watch American TV and they manage quite well. I do adjust the scoring at the end though, especially with the Pendulum, where words such as generator, film star, and sidewalk are used.
5	With the population we have, we don't make any adjustments; we don't see any Zulu, or Afrikaans children, only English speaking children.
6	I adjust the scores of the Pendulum and Scan C, to make sure it's fair, but you get a strong idea where the child is at from all the other sections
7	Yes, I do make adjustments to words that are American and I make them more applicable to the South African context.
8	No, I don't make any adjustments
9	Yes, I make adjustments and have made my own version of some of the sections in the Pendulum, although I know this affects the scoring.
10	No, but I do adjust the scores accordingly

Do you feel that there are any difficulties that therapists encounter in the area of APD in South Africa	
1	Yes, there is a lack of South African resources, such as binaural integration and dichotic listening tests are all pre-recorded CD's and the accent and vocabulary is not always appropriate for the South Africans. Also equipment is very expensive and many therapists don't have access to equipment, in fact I don't know of anyone that have these tests and equipment
2	Yes it is a big challenge, as most tests are not applicable to like the Scan tests and we don't have access to tone based tests and when you do they

	are prohibitively expensive, so we have to do the best we can and use our clinical judgment to interpret results
3	In private it is challenging, but not as challenging as in government, where a lot of children don't speak English at all, as there are no standardized tests for those languages in AP.
4	Yes, as there is a gap in recommendations and management and although I do the best I can do and I feel I offer good service
5	Yes, especially tests like the Scan C, its really annoying
6	Yes, I feel that very few therapists out there are comfortable with doing therapy for AP as there is not enough training on this subject and even I feel that I had to teach myself all that I know.
7	I feel that there is no one way of doing therapy for AP and because of such diversity each child is receiving different intervention and sometimes I will see a child from a previous therapist, who didn't even diagnose the AP problems, so yes there are challenges
8	Yes and no, depending on the therapist. Self programmes are the best way to treat AP, and either it's an area of strength or not, but then you need to refer to a therapist that is comfortable with AP.
9	I feel that more training in the area would have helped a lot in this area, specifically to us South Africans, as a lot of what we were taught was based on a first world population
10	Yes, I think there is much diversity and although I have created my own techniques to treat AP, as I have adapted many tools and resources, I wonder sometimes if there are better approaches although I do get really good results.

What multidisciplinary intervention is there for children presenting with APD and do you practice any multidisciplinary intervention?	
Participant	Comments
1	I know OTs do therapy for listening but there is not much research that supports therapeutic listening
2	I know OT's are quite involved in auditory processing, because it's a sense, but I also know that they don't have much knowledge on auditory processing. They have programs like 'so listen' where you basically plug a child into headphones for two hours a day for ten days and its meant to improve AP. Physios also work with vestibular processing.
3	If a child has SI issues then we will refer to an OT but that all
4	Maybe involvement with the school teacher and parent for a team approach
5	I will only see a child after they have been seen an OT for sensory integration therapy, they need OT to be able to advance in speech, so it is essential. I also get an educational psychologist involved and remedial teaches with decoding
6	I like to work with an OT if I see any core muscle weakness to help with concentration
7	Teacher involvement helps with carry over, especially in the classroom environment.
8	We don't work within a multidisciplinary team, as realistically there is no time and our practice is not set up to work with other professionals
9	I like to get an educational psychologist involved as well as an OT, but it is sometimes not so easy to communicate with other professionals with all the children as its very time consuming.
10	I don't work within a multidisciplinary team, but I do like my AP children to be seen by an OT or physio if they have any sensory issues that is preventing them from focusing or if they have any muscles weakness that needs strengthening

Sub-aim four

To discover what referral resources these SLTs are utilizing.

To which other professionals do you refer a child presenting with APD to assist in the assessment and management of children presenting with APD?	
participants	comments
1	No one really at the moment
2	No one else, unless the child presents with sensory integration, then an OT
3	To an educational psychologist if we suspect any additional deficits
4	An educational psychologist for certain patients
5	Educational psychologist and an OT
6	To an OT if suspected muscle weakness
7	To an OT sometimes, but not very often
8	No one at the moment
9	Educational psychologist or an OT
10	Physio or an OT, depending if the child has sensory issues or muscle weakness of fine or gross muscles

Do you refer to any other professional to compliment your findings?	
participants	comments
1	No one
2	If the hearing screening is normal then no one, otherwise an audiologist for a hearing test
3	no
4	No, not necessarily
5	Mostly an educational psychologist, although most of our referrals come from an educational psychologist and then sometimes an OT

6	no
7	No, unless we suspect a hearing loss
8	No one
9	Sometimes an educational psychologist
10	no