

**Language Assessment for Children with a Range of Neurodevelopmental Disorders
Across Four Languages in South Africa**

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Abstract

Purpose: The purpose of this study is (1) to examine the applicability of a culturally and linguistically adapted measure to assess the receptive and expressive language skills of children with neurodevelopmental disorders (NDD) in South Africa and (2) to then explore the contributions of two additional language measures.

Method: In Part 1, 100 children with NDD who spoke Afrikaans, isiZulu, Setswana or South African English were assessed on the culturally and linguistically adapted *Mullen Scales of Early Learning (MSEL)*. Clinicians independently rated the children's language skills on a 3-point scale. In Part 2, the final 20 children to be recruited participated in a caregiver-led interaction after which the caregiver completed a rating scale about their perceptions of their children's language.

Results: Performance on the *MSEL* was consistent with clinician-rated child language skills. The two additional measures confirmed and enriched the description of the child's performance on the *MSEL*.

Conclusions: The translated *MSEL* and the supplemental measures successfully characterise the language profiles and related skills in children with NDD in multilingual South Africa. Together these assessment tools can serve a valuable function in guiding the choice of intervention and also may serve as a way to monitor progress.

Language assessment for children in South Africa must account for the high degree of diversity in language, culture, and societal inequality throughout South Africa. Contemporary Africa is considered as the most multilingual region in the world with between 1000 and 1140 languages spoken (Khokhlova, 2015). South Africa, located in sub-Saharan Africa, is a multilingual, multicultural country with 11 official languages. In the Gauteng province, the economic hub and most densely populated province in the country where the capital city of Pretoria is located, isiZulu (19.8%), English (13.3%), Afrikaans (12.4%) and Setswana (9.9%) are among the most frequent primary spoken languages of the population (Statistics South Africa, 2014).

The legacy of apartheid is still felt in the second decade of South Africa's democracy with disparities remaining across racial (which implies language), gender, economic and health conditions in South Africa (Samuels, Slemming, & Balton, 2012; Southwood & van Dulm, 2015). The apartheid regime allocated state resources to the development of Afrikaans (a descendant of Dutch which was influenced by Malayo-Javanese and Khoi languages) while English was afforded a lesser status and the South African Bantu¹ languages were ignored (Silva, 1997). The fact that a written form of these African languages had only been developed in the early 1900s, further put them in a weak position vis-à-vis Afrikaans and English language-speakers (Prah, 2007). Transformation needed to take place in a number of areas such as equal access to education, protection against discrimination and protection of language rights (van Staden, Bosker & Bergbauer, 2016).

South Africa's World Bank income efficiency ratings of from 0.660 to 0.696 indicate that South Africa is consistently one of the most unequal societies in the world today (Bhorat, 2015). The Poverty Trends Report for 2006 to 2015, released in August 2017, revealed that 30.4 million

South Africans (55.5%) of the population are living in poverty, a number that has sadly increased from 27.3 million people in 2011. The report highlights that the South African reality remains one characterized by the fact that most South African Bantu language learners still come from impoverished areas (van Staden, et al., 2016). In fact, the nine African languages are probably in a weaker position today in terms of social and political power than they were before the 1990s, despite the fact that more than three quarters of the population speak these languages (Prah, 2007).

Two hundred million children with disabilities live in low and middle-income (LAMI) countries including South Africa (Durkin, 2002; World Health Organization and World Bank, 2011). Infant mortality rates in these countries are decreasing and leading to a higher prevalence of neuro-developmental disorders (NDDs). NDDs are a group of conditions with onset in the developmental period. The disorders typically manifest early in development, often before the child enters grade school, and are characterized by developmental deficits that produce impairments of personal, social, academic, or occupational functioning. The range of developmental deficits varies from very specific limitations of learning or control of executive functions to global impairments of social skills or intelligence (American Psychiatric Association, 2013). As per the DSM-V definition, NDDs includes children with intellectual and developmental disabilities, autism spectrum disorder, cerebral palsy, epilepsy and other genetic disorders. These children are at extremely high risk for developing speech and language disorders secondary to their primary disorder (Beukelman & Mirenda, 2013; Yeargin-Allsopp & Boyle, 2002) and these secondary communication disorders range from mild to significant (Olusanya, Ruben, & Parving, 2006; UNICEF, 2006). A survey of 1344 children in schools for children with intellectual disabilities in the greater Pretoria South Africa area reported that 38%

of these children had little or no functional speech (Alant, 1999). These secondary speech and language impairments will have significant effects on the child's development including communication, social interaction, learning and education, and later employment and contribution to society.

An essential issue related to speech and language impairments is the design and use of assessment tools (e.g., McCauley, Fey, & Gilliam, 2016). As a multilingual multicultural country, South Africa provides a unique set of challenges for language assessment. Service delivery for children with a range of NDDs and their families in South Africa is hampered by amongst others, three related issues. First, there are limited assessment tools available across the 11 official languages (Pascoe & Norman, 2011). Second, the number of speech-language pathologists (SLP) in South Africa is modest at best with a ratio of 1:25000 (SLPs: SA population) compared to a ratio of 1:2500-2700 in the US, UK, Canada and Australia (Kathard & Pillay, 2013). Third, the number of speech-language pathologists (SLPs) who speak multiple languages and who are able to assess and provide intervention in two or more languages, is even smaller (Kathard et al., 2011). In the past five years, however, more SLPs are able to assess children with language impairments in an African language as compared to those who had been practicing for two decades or longer (Southwood & van Dulm, 2015). These three issues delay identification and delivery of services to children with a range of NDDs, whose speech, language and communication skills are significantly delayed negatively affecting their ability to participate, develop and learn at home and in the community.

The lack of culturally and linguistically appropriate assessment and intervention materials and procedures complicates the SLPs' ability to provide services to children with a range of NDDs (Pascoe & Norman, 2011; Van der Linde & Kritzing, 2013). Bornman, Sevcik, Ronski

and Pae (2010) reported that a number of Western measures had been translated into one language spoken in South Africa but not across the languages spoken in South Africa. Finding reliable and valid ways to assess developmental language skills in children with a range of NDDs is an essential step in ultimately developing, providing, and assessing effective and meaningful language interventions. Reliable and valid assessment methods will permit us to measure the effectiveness of interventions, compare different intervention approaches and/or intensities, and predict the effect of additional risk and opportunity factors on children's development (Kammerer, Isquith, & Lundy, 2013).

Bornman et al. (2010) developed a framework for cultural and linguistic translation of Western assessments for use in South Africa. While longitudinal large-sample studies to gather developmental data from typically-developing children in specific contexts and from specific cultural and language groups would certainly be desirable as a credible foundation for developmental assessments, funding, time, access, human resource and other limitations hardly permit such studies to be executed (Kammerer et al., 2013). Test translation and adaptation can be an alternative, if a rigorous process is followed to adequately address linguistic and cultural factors (Bornman et al., 2010; Peña, 2007). The *Mullen Scales of Early Learning (MSEL*; Mullen, 1995) is an assessment that provides an overall measure of cognitive ability of children from birth to 68 months of age through five subscales (gross motor, fine motor, visual reception, receptive and expressive language). Validation studies in the West found a high correlation ($R=0.70$) between the Mullen Early Learning Composite (ELC) and the Bayley Mental Development Index (Mullen, 1995). Burns, King, and Spencer (2013) applied the *MSEL* to a sample of 47 US children between the ages of 24 – 48 months with diagnoses of autism spectrum disorder, cerebral palsy and epilepsy. Although the children failed to demonstrate a 'signature'

profile for a diagnosis of these three conditions, the clinical sensitivity of the *MSEL* for these children was demonstrated. All three groups showed significant delays on the Fine Motor, Receptive Language, Expressive Language and Visual Reception subscales when compared to control group of children who were developing typically ($p < 0.001$).

The *MSEL* has also been used to assess the development of young children in Uganda (Lorencz & Boivin, 2013). These authors concluded that the scale showed promise as a valid assessment measure that covers a reasonable age range and is relatively easy to administer. The *MSEL* (Mullen, 1995) was also culturally and linguistically translated into Afrikaans for children with typical development between 36 and 72 months and the results compared favourably with the existing Western norms (Bornman et al., 2010). Bornman et al. (2017) expanded this initial translation to include the additional three dominant languages spoken in Gauteng (South African English, isiZulu, and Setswana). They pilot tested the *MSEL*'s use with 195 children with typical development stratified across age and the four languages. The authors found that the children's performances were similar across the four languages at the different age groups, although they differed from the Western sample. The data from children with typical development (Bornman et al., 2017) suggested that the translated and adapted measure might be useful for describing general developmental and particularly language skills in young children from these four language backgrounds. To our knowledge, this is the first developmental assessment tool of this nature that has been translated across different South African languages. This instrument also offers potential for use with children with a range of NDDs because it contains separate scales for receptive and expressive language, as well as three other scales (gross motor, fine motor and visual reception). It therefore permits the clinician to obtain a general developmental profile of a child as well as information on receptive and expressive language skills.

The advantage of formal assessment measures of language skills, like those on the *MSEL*, is that children are uniformly assessed using one set of criteria, rather than relying on informal methods that may depend largely on clinician skill and interpretation. At the same time, formal assessments have several limitations, especially when it comes to assessing children with NDDs (Macy, Thorndike-Christ, & Lin, 2010) including the unfamiliarity of the testing situation (Flack, 2005). Obtaining a comprehensive and authentic picture of a child's language skills may require a combination of measures that together compensate for the limitations that each measure would have if it was used in isolation. For South African clinicians and researchers working in the field of child language development, it would be helpful if such assessments could be applied uniformly across children and families from different language backgrounds. Such uniformity would ensure that all children, regardless of language background, would be assessed using similar (culturally and linguistically validated) tests and measures, and would prevent bias favouring one language group over another.

Two types of measures that have been employed in Western settings have been transcripts of parent-child observations and parent perceptions about their children's language development. Observations of parent-child interactions can provide additional authentic reflections of a child's skills (Ebert & Pham, 2017). However, the number and variety of behaviors (e.g. language variables such as vocabulary, syntactical structures) elicited in less structured interactions may be limited and vary across children. Parent questionnaires regarding their children's language development may also elicit helpful information, and can tap parents' perceptions about how the child communicates as well as perceptions about how the child's communication affects the interactions. Romski et al. (2011) developed the *Parent Perception of Language Development (PPOLD)*, a 20-item questionnaire with a 5-point Likert scale that asked

parents to respond to a series of items concerning their child's language development. An exploratory factor analysis found that 15 of the 20 *PPOLD* questions fell into two major areas: how the parent feels about their child's communication and about the kinds of interventions that the child currently receives or will receive. Ronski and her colleagues administered the questionnaire to parents of toddlers with significant developmental delays and little speech pre- and post-language intervention. They found that the *PPOLD* provided a viable measure about the relationship of parent perception to child intervention outcome. At the same time, cultural factors (e.g., a tendency to minimize challenges or regard delays as temporary) may also influence the way a parent answers (Garcia, Perez, & Ortiz, 2000; Kammerer et al., 2013).

In order to understand the children's communication skills, we must have viable means by which to assess them regardless of their first language. The purpose of this manuscript is twofold: first, to examine the applicability of an adapted measure to assess receptive and expressive language skills across clinician-rated language skills as well as languages, and second, to then explore the additional contributions of child and caregiver language skills during a caregiver-child interaction and a caregiver perception measure to the assessment of language skills.

The study was conducted in two sequential parts. In Part 1, we assessed 100 children with a range of NDDs across the four languages. We employed one assessment measure namely the *MSEL* that had been translated into four prominent languages spoken in South Africa (Afrikaans, isiZulu, Setswana and South African English) so that the measure was consistent regardless of the language. The equivalency between these translations is reported in Bornman et al. (2017). Specifically, we asked two questions: 1) What were the differences in *MSEL* receptive and expressive language performance for children with different clinician-rated child expressive

communication ability? 2) What were the differences in *MSEL* performance within the three clinician-rated groups of children (not talking, talking in single words and phrases, talking in sentences) across language group (Afrikaans, isiZulu, Setswana, South African English)?

In Part 2, we asked the primary caregivers of the last five children recruited in each language group (a total of 20 children) to participate in 10-minute videotaped caregiver-led interaction with their child in the child's first language and to rate a series of statements their children's communication development on a five-point scale. Descriptively, we explored the relationship between a sub-sample of the children's performance on the receptive and expressive scales of the *MSEL*, a set of their language skills as measured with a SALT analysis (Child: MLUW, MLT, % of intelligible utterances, # of different words; Adult: MLUW, MLT) as well as caregiver perception.

Method

Participants

The participants for this study were recruited through the speech-language pathology departments of four tertiary care hospitals in the Gauteng province of South Africa. The Institutional Review Board of Georgia State University and the Research Ethics Committee of the Faculty of Humanities at the University of Pretoria approved the project. Ethics approval was then obtained from the registrars as well as all heads of the speech-language pathology departments at the four hospitals. There were five criteria for participation in the study: 1) an established medical diagnosis of NDD, as described in the DSM-V and confirmed by reviewing the child's hospital record; 2) chronological age younger than 105 months; 3) primary language of Afrikaans, isiZulu, Setswana, or South African English 4) speech-language therapy at least once a month at one of the four participating hospitals, and 5) accompanied to therapy by a

primary caregiver. SLPs at these hospitals used these five criteria to refer potential participants and their caregivers to the study. The caregivers of potential participants then met with the project staff and were given oral and written information about the study in their first language. They had the opportunity to formally consent to take part in the study or decline to do so.

For Part 1, 105 caregivers of children originally consented but five children did not complete the assessment due to non-compliance, excessive fatigue, or significant disruptive behaviour and their data are not included. One hundred children (95% of those who consented) between 24 and 104 months of age ($M=58$ months; $SD=16.3$) with established NDDs completed the *MSEL* assessment. The children's medical etiologies included general developmental delay ($n=27$), autism spectrum disorder ($n=25$), Down syndrome ($n=17$), cerebral palsy ($n=6$), brain abnormalities due to craniostenosis, microcephaly, hydrocephaly and other malformations of the brain ($n=5$), head injury ($n=4$), developmental delay post spinal tuberculosis, tuberculous meningitis or meningitis of unknown origin ($n=4$), developmental delay with concomitant epilepsy ($n=2$), fetal alcohol syndrome ($n=2$), while eight children were diagnosed with other genetic conditions and syndromes (one child each with cutis laxa, neurofibromatosis, Rett syndrome, Cri-du-chat syndrome, Dandy Walker syndrome and Noonan syndrome, as well as two children with unspecified syndromes). There were 71 boys and 29 girls, and they came from homes in which the first language was either Afrikaans, isiZulu, Setswana or South African English. The four languages were equally represented across the 100 children with 25 children speaking each language. Table 1 provides demographic information about the children by clinician rating across the four language groups.

Table 1*Part 1: Demographic Information About Children Who Were Assessed On The MSEL.*

Children	Clinician Rating of Child Communication		
	Not talking (n=29)	Talking in single words and phrases (n=36)	Talking in sentences (n=35)
Age in years M (SD)	4.5 (1.6)	4.7 (1.3)	5.3 (1.2)
Gender	6 female, 23 male	14 female, 22 male	10 female, 25 male
Language Spoken	3=Afrikaans 8=SA English 10=isiZulu 8=Setswana	7=Afrikaans 8=SA English 10=isiZulu 11=Setswana	15=Afrikaans 9=SA English 5=isiZulu 6=Setswana

Note. M=Mean; SD=Standard deviation

For Part 2, the caregivers of the last five children from each of the four languages for a total of 20 children from the original sample of 100 were recruited to participate in a supplemental assessment with their children. Because we asked caregivers to participate for a period of time, we limited the number of children to the last five recruited for each language. Table 2 provides demographic information about the children as well as their *MSEL* performance. Although there were 20 children, 24 primary caregivers, all biological parents, participated in the study. In 13 cases, only the mother participated, and in three cases only the father participated. In four cases, both the father and the mother participated. Their demographic information is provided in Table 3.

Table 2

Part 2: Demographic Information About The 20 Children Who Were Assessed On The Supplemental Measures.

		Clinician Rating of Child Communication		
Children		Not talking (n=3)	Talking in single words and phrases (n=13)	Talking in sentences (n=4)
Age in years M (SD)		4.6 (2.4)	4.5 (1.0)	5.2 (0.6)
Gender		0 female, 3 male	6 female, 7 male	0 female, 4 male
Language Spoken		1=Afrikaans 1=SA English 0=isiZulu 1=Setswana	4=Afrikaans 1=SA English 4=isiZulu 4=Setswana	0=Afrikaans 3=SA English 1=isiZulu 0=Setswana
<i>MSEL</i> subtest				
Visual M (SD)	<i>Raw score</i>	24.0 (3.0)	23.3 (9.5)	37.8 (6.7)
	<i>AE</i>	21.3 (3.5)	22.8 (12.6)	40.3 (10.2)
Fine Motor M (SD)	<i>Raw score</i>	16.7 (3.2)	23.7 (7.2)	39.0 (5.4)
	<i>AE</i>	14.7 (3.2)	23.5 (11.2)	46.0 (10.7)
Receptive Language M (SD)	<i>Raw score</i>	20.0 (5.6)	21.1 (6.1)	28.8 (6.7)
	<i>AE</i>	19.7 (6.7)	21.0 (7.3)	30.8 (5.3)
Expressive Language M (SD)	<i>Raw score</i>	14.0 (1.0)	19.2 (7.0)	33.0 (2.9)
	<i>AE</i>	14.0 (1.0)	20.0 (8.5)	37.5 (4.2)

Note. M = Mean; SD = Standard deviation; AE = age equivalent.

Table 3

Part 2: Demographic Information About The 24 Caregivers Who Participated In The Supplemental Measures

		Clinician Rating of Child Communication		
Caregiver		Not talking (n=5)	Talking in single words and phrases (n=15)	Talking in sentences (n=4)
Age in years M (SD)		34.6 (3.5)	35.9 (8.4)	37 (5.7)
Gender		3 female, 2 male	11 female, 4 male	3 female, 1 male
Highest level of education		2=high school 1=diploma 2=college education	13=high school 1=diploma 1=college education	1=high school 2=diploma 1=college education

Note. M=Mean; SD=Standard deviation; diploma=1 to 2 years of education past high school; college education=3 to 4 years of education past high school.

Assessment Protocol: Part 1

Each child in this study was assessed using the adapted *MSEL* (Mullen, 1995; Bornman et al., 2017) in their first language. The *MSEL* consists of five scales that measure gross motor, fine motor, visual reception, receptive language, and expressive language skills. The latter four scales are referred to as the cognitive scales. These four scales were the only ones that were interpreted in this study.

The *MSEL* was administered individually to each child at the hospital in a quiet environment. The clinicians were either SLPs or teachers from the Center for Augmentative and Alternative Communication (CAAC) who were trained in assessment of children with disabilities and specifically in the administration and scoring of the *MSEL*. Assessments were conducted according to the guidelines in the Item Administration Book of the *MSEL* (Mullen, 1995), and children's responses were scored accordingly. The clinicians were all fluent speakers of the child's first language. During the assessment, one clinician presented the items to the child, while a second clinician completed the score sheet. After the assessment was complete, the two clinicians reviewed and clarified the scoring and resolved any potential differences. Both raw scores and age-equivalents were calculated.

In order to obtain a general clinical rating of each child's speech and language skills, video recordings of the *MSEL* sessions were independently observed and rated by at least two of three South African SLPs who were fluent speakers of the child's primary language. These SLPs rated the children's speech and language skills during the assessment on a three-point Likert scale (1=not talking; 2=talking in single words and phrases; 3=talking in sentences). The child's words and sentences were judged to be attempting or approximating words or sentences whether or not those words/sentences were intelligible Cohen's kappa was calculated on 20% of the

sample to determine if there was agreement between the raters for clinicians' ratings of expressive language. There was excellent agreement between the two raters' judgments, $K=.924$, $p=.000$. A kappa over .75 is considered excellent (Fleiss, 1981).

Assessment Protocol: Part 2

Part 2 included two supplemental measures: 1) a caregiver-child play interaction and 2) caregiver perception of the child's language development. Caregivers participated in a 10-minute videotaped caregiver-led play interaction with their child and completed a caregiver interview on their perceptions of their child's language development. In all but one instance, only one caregiver participated in the observation and interview. In that one instance, both caregivers wanted to participate in the interaction; but on viewing the interaction it became evident that only one caregiver actually participated in the interaction, while the other one observed. Only one caregiver for each child completed the *SA-CPOLD*.

Caregiver-child play interaction. The first measure was based on a 10-minute videotaped observation of the child and his or her caregiver using their first language and engaged in play with a standard set of toys (a ball, an illustrated South African children's book that was available in all four languages and a set of wooden blocks). This interaction provided information about the caregiver-child language skills and supplemented the information from the *MSEL*. The caregiver-child interaction took place in a quiet room at the hospital and was videotaped. The first clinician introduced the materials to the caregiver-child dyad and instructed the caregiver to play with the child, as they typically would, using the materials provided. The first clinician then left the room, while a second clinician remained to videotape the interaction. The second clinician did not interact with the dyads at any time during the interaction.

Two clinicians who had substantial experience with SALT transcription taught seven transcribers to use the *Systematic Analysis of Language Transcripts* (SALT; Miller & Chapman, 1985; Miller, Andriacchi, & Nockerts, 2011; Miller & Iglesias, 2012) transcription procedures. Before beginning to transcribe the 10-minute samples, they received group practice in transcription using three standard transcripts of at least 20 utterances. Once they demonstrated understanding of SALT transcription conventions, the 10-minute interactions were transcribed in the language used during the interaction by a transcriber who spoke and wrote in that language. A second transcriber, who also spoke and wrote in the language, performed a check of the first transcription, reached consensus with the first transcriber on any changes, and finalized the transcript. From the SALT transcripts, the utterance intelligibility, mean length of utterance in words (MLUW), lexical diversity, and mean length of turns in utterances (MLT) from the child were determined. Mean length of utterance in words (MLUW) and mean length of turns in utterances (MLT) were also calculated for the caregiver.

Caregiver perception measure. Twenty caregivers also completed a second measure, the *South African Caregiver Perception of Language Development* (SA-CPOLD) adapted from the *Parent Perception of Language Development* (PPOLD; Ronski et al., 2011). The SA-CPOLD consists of 15 simply positive statements concerning caregivers' perceptions of their child's language development. Like the PPOLD, it uses a 5-point Likert scale from 1=*strongly disagree* to 5=*strongly agree*, and therefore scores could range from a high of 45 to a low of 15. The SA-CPOLD, included in Table 5, was translated into the different target languages included in the study, using the same methodology for translation recommended by Bornman et al. (2010). Statements that used the construct "communicate" was divided into 2 separate questions, as there is not a word in isiZulu or Setwana that encapsulates both the receptive and

expressive component of "communicate", e.g., Question 11 in the PPOLD " *I am increasingly confident that I can help my child develop ways of communicating*" became question 10A "*I feel confident that I can help my child understand better*" and 10B "*I feel confident that I can help my child talk better*". It was administered as a structured caregiver interview by a clinician fluent in the language that the caregiver spoke to their child. The clinician explained the instructions, asked the caregiver to respond to each statement on the 1-5 scale and recorded the caregivers' responses for later summary and analysis.

Planned Data Analyses

To address the first question in Part 1 of the study, two one-way Analyses of Covariance (ANCOVA) were run with age as a covariant. In order to address the second question in Part 1 of the study, two one-way Analyses of Covariance (ACNOVAs) were run with age as a covariant first on the receptive and then on the expressive subscales of the *MSEL*. To determine any effects of language group (Afrikaans, isiZulu, Setswana, South African English) on *MSEL* performance within each clinician-rated group of children (who did not talk, who talked in single words and phrases, or who talked in sentences), a two-way Analysis of Variance (ANOVA) was run first on the receptive subscale, and then on the expressive language subscale of the *MSEL*. Since the sample size in Part 2 of the study was modest, descriptive statistics were employed to characterize the relationship between the *MSEL* and the supplemental measures.

Results

Clinician Ratings, Language, and *MSEL* Performance

The clinician ratings categorized 29 of the children (29%) in the sample as not talking, 36 children (36%) as talking in single words and phrases, and 35 children (35%) as talking in sentences. The children's mean chronological age was 54 months (SD=18.59), 56 months

(SD=15.23), and 63 months (SD=14.18), respectively. Table 4 provides a summary of the children's performance on the *MSEL* across the four subscales by clinicians' rating. As shown in Table 4, the children's performance on all four scales shows substantial delays. Children who were not talking were more delayed than children who were talking in single words and phrases, who were in turn more delayed than those talking in sentences.

Table 4*Mullen Scales of Early Learning Raw and Age Equivalent Scores By Clinician Rating*

		Clinician Rating of Child Communication					
		Not talking <i>n</i> =29		Talking in single words and phrases <i>n</i> =36		Talking in sentences <i>n</i> =35	
<i>MSEL</i> subtest		Raw Score	AE	Raw Score	AE	Raw Score	AE
Visual	M	18.45	15.55	24.83	23.75	34.80	37.26
	SD	4.54	4.74	8.88	11.46	8.06	13.17
	Delay		38.45		32.17		26.14
Fine Motor	M	19.48	17.83	25.00	25.33	33.66	38.02
	SD	4.29	4.81	7.53	11.37	8.22	14.26
	Delay		36.17		30.59		25.38
Receptive	M	15.93	14.97	22.36	22.92	30.37	33.94
	SD	5.25	6.48	7.14	9.66	6.86	11.28
	Delay		39.03		33.00		29.47
Expressive	M	11.03	10.72	20.31	21.50	29.60	33.04
	SD	3.75	4.59	7.49	9.70	7.68	11.04
	Delay		43.28		34.42		29.86

Note. M=Mean raw score on the *MSEL*, SD=Standard deviation, AE=Age Equivalent in months.

When controlling for age, a statistically significant difference in receptive language raw score was found between groups of children who were not talking, talking in single words and phrases, or those talking in sentences, $F(2, 96)$, 33.731 $p=.000$, partial $\eta^2=.413$. Post hoc analyses with a Bonferroni adjustment revealed that children who talked in sentences performed significantly greater on the receptive language subtest than children who were not talking ($M_{diff}=13.39$ raw score points, 95% CI [9.40 – 17.38], $p <.05$) and children who were talking in single words and phrases ($M_{diff}=7.18$ raw score points, 95% CI [3.44 – 10.91], $p <.05$). Children who talked in single words and phrases performed significantly greater than children who were not talking ($M_{diff}=6.22$ raw score points, 95% CI [2.36 – 10.07], $p <.05$).

Another statistically significant difference was found in expressive language raw score between groups of children who were not talking, who were talking in single words and phrases, and who were talking in sentences when controlling for age, $F(2, 96)$, 54.94 $p=.000$, partial $\eta^2=.534$. Post hoc analyses with a Bonferroni adjustment revealed that children who were talking in sentences performed significantly greater on the expressive language subtest than children who were not talking ($M_{diff}=17.33$ raw score points, 95% CI [13.30 – 21.36], $p <.05$) and children who were talking in single words and phrases ($M_{diff}=8.31$ raw score points, 95% CI [4.53 – 12.09], $p <.05$). Children who were talking in single words and phrases performed significantly greater than children who were not talking ($M_{diff}=9.02$ raw score points, 95% CI [5.12 – 12.92], $p <.05$).

Figures 1 and 2 report mean raw score performance on the subscales of receptive and expressive language respectively for children within each expressive communication group by first language group. Results of the two-way ANOVA on the receptive language subscale revealed a statistically significant interaction between child expressive communication and

language group to effect receptive language subtest performance on the *MSEL*, $F(6, 88)=2.55$, $p=.025$, partial $\eta^2=0.148$. There was a significant simple main effect of language group on *MSEL* receptive language score for children who were talking in single words and phrases $F(3, 88)=2.990$, $p=0.035$, $\eta^2=0.092$. Post hoc analyses with a Bonferroni adjustment revealed that children in the South African English language group who talked in single words and phrases had significantly higher receptive language raw scores than children in the Setswana language group who also talked in single words and phrases ($M_{diff}=7.818$ raw score points, [95% CI -.001 - 15.637], $p=.050$). There were no differences in performance found between children in the other language groups who talked in single words and phrases. There were no significant differences between children in the four language groups who were not talking or talking in sentences, and their performance on the *MSEL* receptive language subtest.

A second two-way ANOVA was done to determine the effects of child expressive communication ability and language group on performance on the expressive language subtest of the *MSEL*. Results revealed a statistically significant interaction between child expressive communication and language group to affect expressive language subtest performance on the *MSEL*, $F(6, 88)=3.854$, $p=.022$, partial $\eta^2=0.208$. There was a significant simple main effect of language group on *MSEL* expressive language score for children who talked in single words and phrases $F(3, 88)=7.229$, $p=0.000$, $\eta^2=0.198$, and for children who talked in sentences $F(3, 88)=4.502$, $p=.005$, $\eta^2=0.133$. Post hoc analyses with a Bonferroni adjustment revealed that children in the South African English language group who talked in single words and phrases had significantly higher expressive language raw scores than children in the isiZulu language group who also talked in single words and phrases, ($M_{diff}=10.275$, [95% CI 2.793 - 17.757], $p=.002$) and the Setswana language group who talked in single words and phrases ($M_{diff}=12.011$,

[95% CI 4.682 - 19.341], $p=.000$). Children in the South African English language group who talked in sentences had significantly higher expressive language raw scores than children in the Afrikaans language group who talked in sentences ($M_{diff}=8.822$, [95% CI 2.172 - 15.473], $p=.003$).

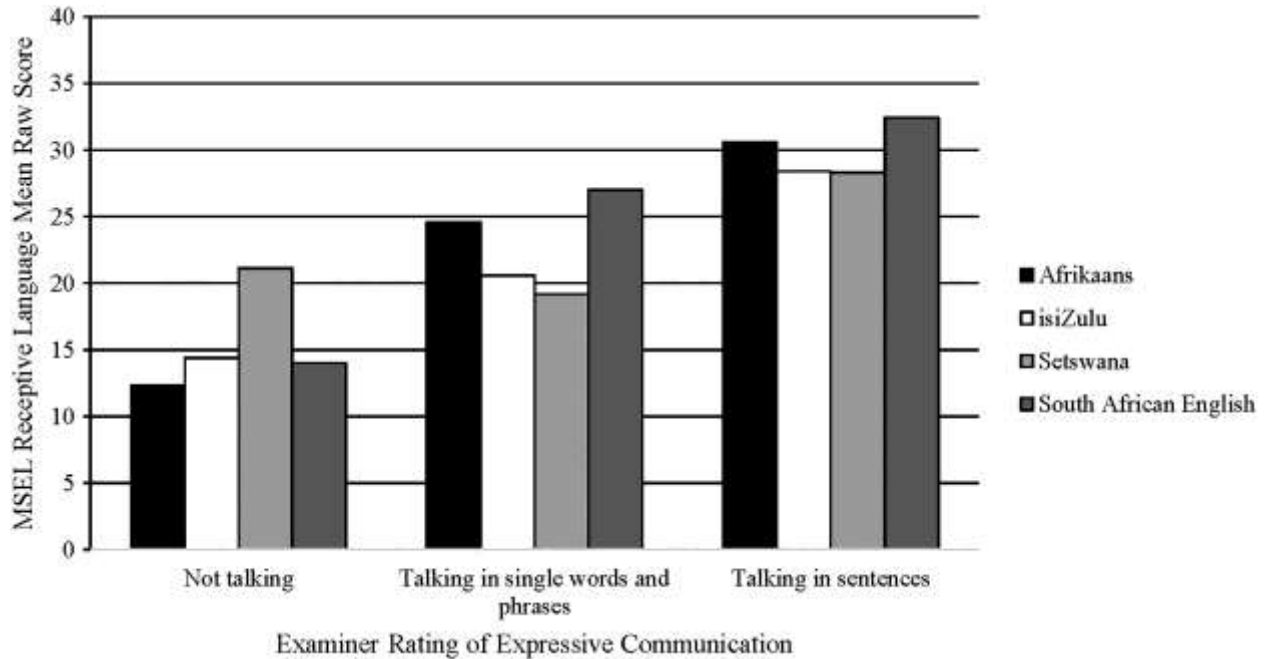


Figure 1. Mean MSEL receptive Language raw scores by clinician rating and language group.

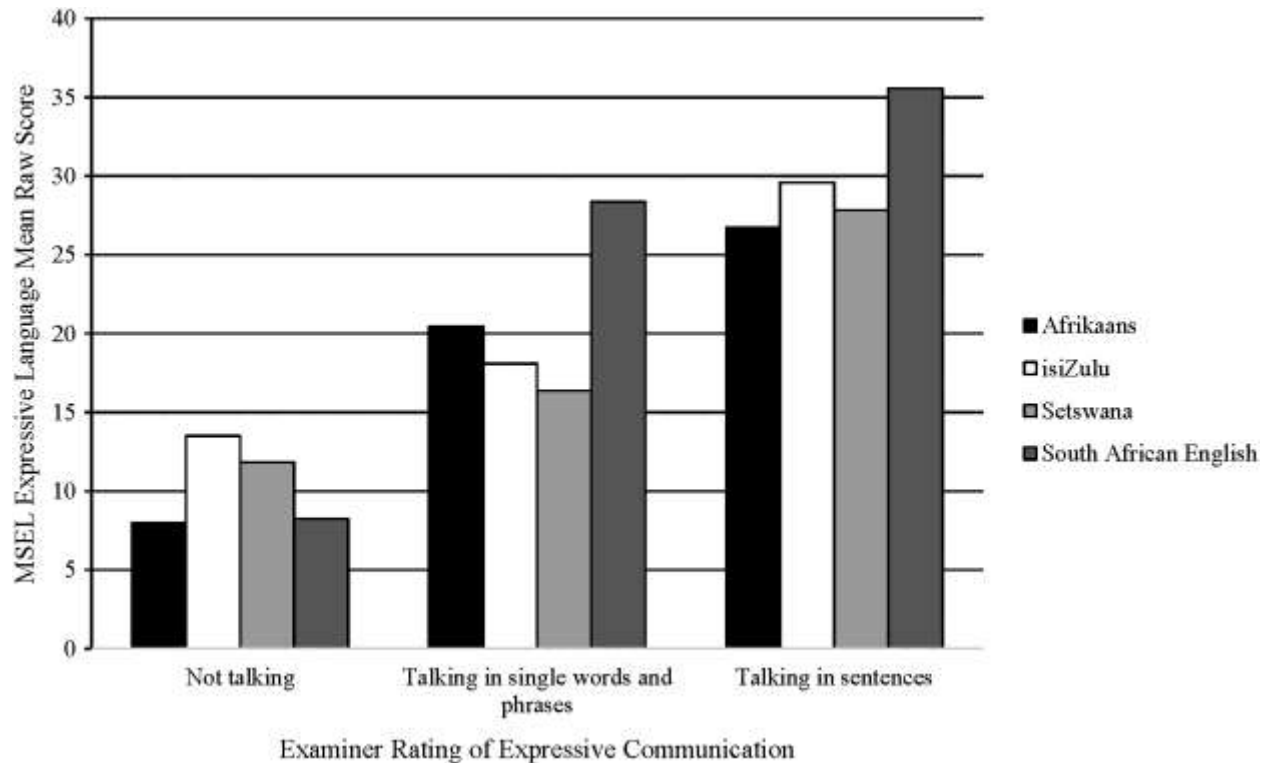


Figure 2. Mean *MSEL* expressive language raw scores by clinician rating and language group.

Exploring Performance on the Supplemental Measures

The majority of the 20 children who participated in the second part of the study were talking in single words and phrases (65%). Only three children (15%) were not talking and four children (20%) talked in sentences. At the end of the 10-minute interaction, the observer asked the primary caregivers if they thought that their child's level of performance during this interaction was typical of their child's general performance. All stated that it was.

Table 5 describes the mean child and caregiver language transcript variables across children by clinician ratings. Overall, the transcript data were consistent with the clinician ratings which were consistent with the *MSEL* performance. Thirty seven percent of the children's utterances were intelligible with an overall mean length of utterance in words (MLUW) of 1.2, which was consistent with clinician ratings that they typically spoke in 'single words and

phrases'. Not surprisingly, the percentage of intelligible utterances increased across the three groups from .07 to .36 to .66. The child mean length of utterance in words (MLUW) and the mean number of different words used also increased across the groups. The overall mean number of different words was 22.0. One of the children who talked in single words and phrases contributed to the high number of different words used due to the alphabet naming play activity the dyad engaged in. The children's turns were relatively short with an overall average of 1.4 utterances per turn. The caregivers mean length of utterance in words (MLUW) was similar for the children who did not talk and the children who spoke in sentences. The caregivers used much shorter utterances for the children who were using single words and phrases. It may be that the caregivers differentiated the children's skills when they had expressive language output but not when they did not speak. With respect to mean length of turn, the children's turns became longer and the caregivers' turns shorter as the children's language skills increased in sophistication.

Table 5*Part 2: Description of Child Language Transcript Variables By Clinician Rating*

Language Transcript Variable	Clinician Rating of Child Communication		
	Not talking (n=3)	Talking in single words and phrases (n=13)	Talking in sentences (n=4)
	M (SD)	M (SD)	M (SD)
<u>Child</u>			
% Intelligible Utterances	0.07 (0.04)	0.36 (0.25)	0.66 (0.17)
MLU in Words	1.16 (0.25)	1.29 (0.20)	1.54 (0.41)
# of Different Words	8.67 (7.64)	19.46 (30.80)	46.0 (4.97)
Mean Length of Turn in Utterances	1.36 (0.37)	1.38 (0.35)	1.76 (0.47)
<u>Caregiver</u>			
MLU in Words	2.94 (0.63)	2.30 (0.72)	2.80 (0.75)
Mean Length of Turn in Utterances	9.62 (3.7)	10.02 (11.37)	3.50 (0.51)

Note. M=Mean; SD=Standard deviation, MLU=Mean length of utterance

Figures 3 and 4 show individual variability in the number of different words children used and mean percent of intelligible utterances children used by language group. The percentage of intelligible utterances was similar for children whose language was isiZulu and Afrikaans and for children whose language was Setswana and South African English. Again, not surprisingly, there was variability in the number of different words as well, with a greater range of words being used by children who used sentences than children who used single words and phrases.

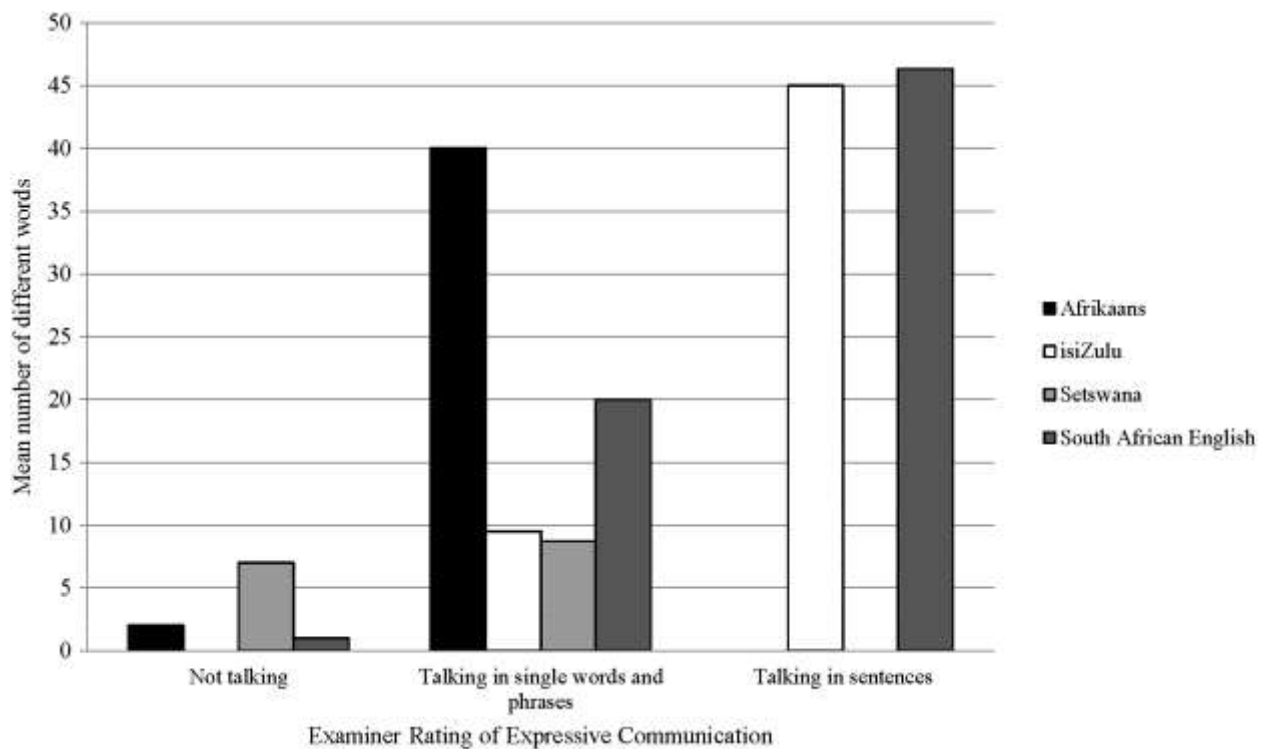


Figure 3. Mean number of different words used by children in each language group by child expressive communication. $n=3$ not talking, $n=13$ talking in single words and phrases, $n=4$ talking in sentences. All children in the isiZulu language group used single words and phrases or sentences. All children in the Afrikaans and Setswana groups were either in the group rated as not talking or talking in single words and phrases.

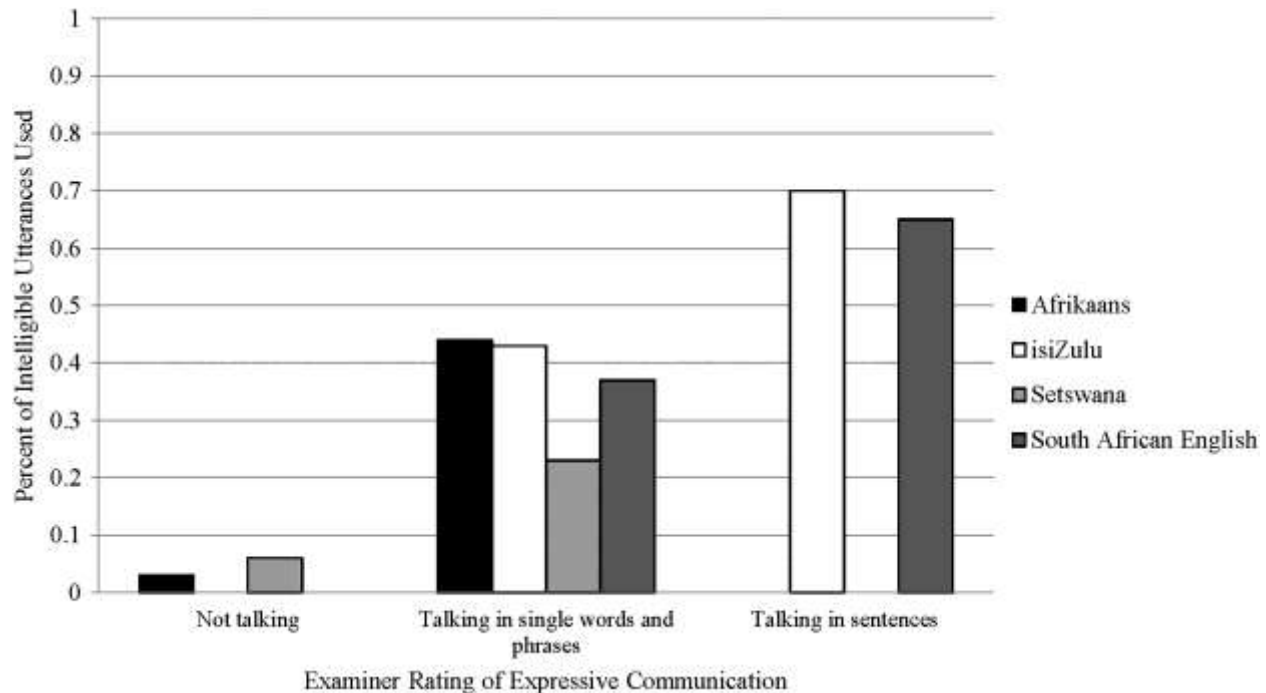


Figure 4. Mean percent of intelligible utterances used by children in each language group by child expressive communication. $n=3$ not talking, $n=13$ talking in single words and phrases, $n=4$ talking in sentences. All children in the isiZulu language group used single words or phrases or sentences. All children in the Afrikaans and Setswana groups were either in the group rated as not talking or talking in single words and phrases.

Table 6 provides a summary of the caregiver mean scores on each item of the SA-CPOLD across the clinician-ratings of the child's communication and overall. The caregivers reported a mean total score of 58.25 out of 75 on the SA-CPOLD with mean scores of 4.09 for children who were not talking, 3.86 for children who were using single words and phrases, and 3.82 for children who talked in sentences. There were relatively comparable responses across languages with caregivers reporting a mean total score of 60.8 for Afrikaans; 56.0 for isiZulu; 59.2 for Setswana and 57.0 for South African English, respectively. Caregivers were consistent in their views, irrespective of whether their child was not talking, talking in single words and phrases or talking in sentences, on items 5, 8, and 15. Parents were in relative agreement that their child needed extra help so that he /she could talk better (mean 4.75), but they were also

Table 6*Mean SA-CPOLD Caregiver Responses*

Statement	Clinician Rating of Child Communication			Mean (SD)
	Not talking (n=3)	Talking in single words and phrases (n=13)	Talking in sentences (n=4)	
1. My child can tell me what he/she wants and needs in a way that I can easily understand.	4	4.31	5	4.4(0.66)
2. My child wants to talk to me.	5	4.31	5	4.55(0.92)
3. I am worried about my child's ability to talk and say words	4	4.31	2	3.8(1.50)
4. My child can talk as well as other children his/her age.	1	1.38	3	1.65(1.11)
5. I feel my child needs extra help so that s/he can communicate better.	5	4.69	4.75	4.75(0.43)
6. My child can understand things that we say to him/her as well as other children of his/her age.	4	3	4.75	3.50(1.40)
7. My child is naughty because s/he cannot tell me what s/he wants.	3.33	3.15	2.5	3.05(1.60)
8. My child and I have found methods to talk to and understand each other that work very well for us.	4.67	4.46	4.5	4.50(0.59)
9. My child and I have found methods to understand each other that work very well for us.	4.67	4.23	3.75	4.20(0.81)
10. Because my child cannot talk properly, s/he struggles to tell me what s/he wants or needs.	4	4	2.25	3.65(1.39)
11. I feel confident that I can help my child talk better.	5	4.38	5	4.60(0.86)
12. I feel confident that I can help my child understand better.	5	4.15	4.75	4.40(0.92)
13. The therapist (at the clinic/ hospital) has helped me and my child to talk better.	4.33	3.69	4.75	4.00(1.26)
14. My child is slow to talk because s/he is slow with everything, like walking and learning.	3	3.38	1.25	2.90(1.51)
15. Even though my child is slower to talk than other children, s/he will catch up.	4.33	4.38	4	4.30(1.05)
Mean (SD)	4.09(1.01)	3.86(0.82)	3.82(1.24)	3.88(0.81)

Note. SD=Standard deviation.

confident that that their child wanted to talk to them (mean 4.55) and indicated that they had found ways to communicate with their children though they were less often likely to understand their children's communications to them (mean 4.50). They responded in agreement with the clinicians' ratings on items 1, 2, 3, 4, 7, 9, 10, 11, 12, and 14. They were inconsistent in their responses on only two items 6 and 13 related to the child's understanding and the help they received from therapy.

Discussion

The results support the use of the culturally and linguistically translated *MSEL* with this population of children with NDD in South Africa. The translated and adapted *MSEL* provided a strong measure of general development including receptive and expressive language that can be used with children with NDD whose first language is Afrikaans, isiZulu, Setswana or South African English. Having a consistent measure to assess receptive and expressive language across languages is important for ensuring that assessment can take place regardless of first language. This finding addresses one of the three service delivery issues for children with a range of NDDs and their families in South Africa (Pascoe & Norman, 2011). In this sample of children, there was consistency between the ratings of language level by experienced clinicians and the children's performance on the *MSEL*, as children were rated as talking in sentences performed significantly better on the expressive language scores of the *MSEL* than children who were not talking, irrespective of their first language. Furthermore, as expected, children who were talking in sentences performed better in the receptive subscales of the *MSEL* than those children who were not talking or talking in sentences and phrases. Children with NDD who were not talking showed more delayed performance than children who were talking in single words and phrases, who were in turn showed more delayed than those talking in sentences, regardless of primary

language. This finding provides another indication of validity for the adapted version of the *MSEL*. The clinician language ratings provided a broad sense of some concurrent validity for the relative language skills of the children assessed with the *MSEL*. It is important to note, however, that these clinician-ratings are only a general qualitative ranking without much detail and are based only on observation of expressive language as an estimate of the receptive and expressive skills on the *MSEL*.

However, regarding the expressive subscale of the *MSEL*, differences were reported for children who talked in single words and phrases between the children in the South African English language group and the isiZulu and Setswana group (with the South African English group performing better) as well as for children who were talking in sentences. In this group, the South African English group outperformed all three other groups: Afrikaans, isiZulu and Setswana. Western measures, like the *MSEL*, even when adapted culturally and linguistically, may not be may not fully capture some subtle differences in the language abilities of children growing up in rural African environments.

The inclusion of the caregiver-child play interaction (with SALT transcript analysis) and the *South African Caregiver Perception of Language Development (SA-CPOLD)*, added information about the child's language skills in the natural environment that can be useful for the planning of intervention as well as information about how the caregiver felt about the child's communication skills. Using formal measures in conjunction with informal ones such as caregiver-child observations enables clinicians to obtain an impression of the skills of a child and assess language skills during typical natural interactions (Ebert & Pham, 2017). Care must be taken, however, when using assessment instruments in culturally, linguistically and socio-economically diverse contexts to ensure the appropriateness of these instruments. Using

multiple measures can provide a deeper and broader understanding of the child's language skills as well as the caregiver's perception about the child's language skills.

With respect to the language measures gained from the transcripts of the interactions, the MLUW measure was consistent with the clinician's ratings of expressive language skills. The lexical diversity measure provided an indication of the breadth of the child's vocabulary while the utterance intelligibility measure indicated how well the child's language was being understood by his or her communicative partner. The mean length of turn measure provided a sense of how active the child was in the communicative interaction. The two caregiver language measures, MLUW and MLT, provided a general estimate of the caregiver's role in the interaction. These measures are used clinically to gain a judgement of children's language production skills (Ebert & Pham, 2017; Miller, Andriacchi, & Nockerts, 2011). Overall, these measures support and enhance the data obtained from the *MSEL*.

This was the first use of the *South African Caregiver Perception of Language Development (SA-CPOLD)* in an assessment context. It provided an indication of the caregivers' views about the child's skills and their role in communicating with the child. While the sample of caregivers was modest, responses suggested that it was a viable measure to include in language assessment in South Africa. These responses suggested that the child's skills were equally interpretable to caregivers and clinicians in their observations and interactions with the children. While the purposes of the Ronski et al (2011) *PPLD* study and this one were quite different, both suggest that gaining information about caregiver perception is an important, and unfortunately often overlooked, part of the clinical assessment process. The caregivers' responses in both studies were consistent with what the assessments found. Including a caregiver

perception measure in language assessment can enhance profile of the child's language functioning in the natural environment (Romski, Sevcik, Cheslock, & Barton-Hulsey, 2016).

Limitations

Both parts of this study have limitations. In Part 1, two limitations are particularly evident. First, we employed a 3-point Likert scale of clinician rating for simplicity and ease of consensus across clinicians. Unfortunately, it may have lacked sensitivity in terms of differentiating the children especially at more advanced levels of language skill. Second, in terms of *MSEL* scoring, we used a consensus building approach which did not lend itself to a traditional agreement measure. In Part 2, there are also a number of limitations. First, the modest sample size in Part 2 of the study did not lend itself to statistical analyses and does not have a consistent number of children across the three clinician-rated categories. Thus, one cannot make generalized observations about these results. They are truly exploratory in nature. Second, the majority of the children were quite delayed in receptive and expressive language; therefore, we did not have a sample that included an adequate number of children at all levels of NDD. Third, the SALT analyses across the four languages also yielded some challenges. It was difficult to compare MLU word counts based on orthographic space between predominantly analytical languages, such as English and Afrikaans, and Southern Bantu languages such as isiZulu (a synthetic language with conjunctive orthography) and Setswana (a synthetic language with disjunctive orthography). Although children who participated in this study were mostly still at an early stage in expressive language development and used mostly words that were morphologically simple, the lower MLU observed in the isiZulu group in particular needs to be interpreted in the light of the structural and orthographic differences between isiZulu and the other three languages. In order to adequately employ the *Systematic Analysis of Language*

Transcripts (SALT) with Southern Bantu languages, additional transcript analyses will be needed to handle these differences.

Future Research Directions

There are a number of avenues for future research. These include expanding the linguistic and cultural translation of the *MSEL* to isiXhosa, as it is the second largest language spoken as a first language in South Africa, after isiZulu (Statistics South Africa, 2014). Furthermore, studies should investigate the usefulness of the *MSEL* and other tools for measuring intervention outcomes and progress. Further analyses of the transcript data, in terms of caregiver responsibility and functions of the child's communication to name a few, could provide additional details about the child's communication skills and the caregiver's skills as well. There is also a need for longitudinal data about the language development of children, both typical and with NDD, exposed to multiple languages, like those in South Africa.

Clinical Implications

Having a consistent measure to assess receptive and expressive language across languages is important for ensuring that assessment can take place regardless of the child's first language. The *MSEL*, in conjunction with the natural interaction and caregiver perception, can be used to inform language intervention decisions including beginning intervention goals and progress during intervention. Given the multilingual environment of South Africa, there are many training needs for speech language pathologists so that they have the tools needed to serve multilingual communicators with NDD. Although not documented in the last census, multilingualism and cultural diversity are real in many South African households, with many homes often using a combination of the 11 official languages. South African SLPs are faced with the challenge of assessing and treating multilingual children with language impairments

(including those with NDD) on a daily basis (Pascoe et al., 2010). Many parents prefer English as the language of learning and teaching for their child, irrespective of whether or not their first language is another vernacular (Gonasillan, Bornman, & Harty, 2013). English has become disproportionately influential as it is an international language with widespread use in politics, commerce, and industry, resulting in perceived economic advantages (Khokhlova, 2015). Recent research, however, indicated that public opinion has begun to recognize the importance of the child's first language for matters of personal identity and intergenerational communication (the local) even though knowledge of English - oral and written - is uncritically accepted as essential for global participation (Evans & Cleghorn, 2014).

Conclusions

The translated *MSEL* and the supplemental measures successfully characterize the language and related skills of children with NDD in multilingual South Africa. The translated *MSEL* provides a measure of receptive and expressive language that can be used with children who speak one of four of the dominant languages used in multilingual South Africa. Having a consistent measure to assess the language skills of children in their first language is important for ensuring that assessment provides a valid account of a child's capability. The supplemental measures enrich the information about how the child uses the language they have in interactions and considers the caregivers' perceptions about the child's language skills. Together these assessment tools can serve a valuable function in guiding the choice of intervention and also may serve as a way to monitor progress.

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References

- Alant, E. (1999). Students with little or no functional speech in schools for students with severe mental retardation in South Africa. *Augmentative and Alternative Communication, 15*, 83–94. doi.org/10.1080/07434619912331278595
- American Psychiatric Association (2013).
<https://doi.org/10.1176/appi.books.9780890425596.dsm01>
- Beukelman, D. R., & Mirenda, P. (2013). *Augmentative and alternative communication: Supporting children and adults with complex communication needs*. Baltimore, MD: Paul H. Brookes Publishers.
- Bhorat, H. (2015). FactCheck: Is South Africa the most unequal society in the world? The conversation. Available on: <http://theconversation.com/factcheck-is-south-africa-the-most-unequal-society-in-the-world-48334>
- Bornman, J., Sevcik, R. A., Ronski, M. A., & Pae, H. K. (2010). Successfully translating language and culture when adapting assessment measures. *Journal of Policy and Practice in Intellectual Disabilities, 7*, 111-118.
- Bornman, J. Ronski, M.A., Tönsing, K.T., Sevcik, R., White, R., Barton-Hulsey, A., & Morwane, R. (2017). Adapting and translating the Mullen Scales of Early Learning for the South African context. Manuscript in revision for publication to *South African Journal of Communication Disorders*.

- Burns, T.G., King, T.Z., & Spencer, K. S. (2013). Mullen Scales of Early Learning: The utility in assessing children diagnosed with autism spectrum disorders, cerebral palsy, and epilepsy. *Applied Neuropsychology: Child, 26*, 33-42.
- Durkin, M. (2002). The epidemiology of developmental disabilities in low-income countries. *Mental Retardation and Developmental Disabilities Research Reviews, 8*, 206–211.
doi:10.1002/mrdd.10039
- Ebert, K., & Pham, G. (2017). Synthesizing information about language samples and standardized tests in school-age bilingual assessment. *Language, Speech & Hearing Services in Schools, 48*, 42-55.
- Evans, R., & Cleghorn, A. (2014). Parental perceptions: A case study of school choice amidst language waves. *South African Journal of Education, 34*, 1-19. Retrieved from <http://www.scielo.org.za/pdf/saje/v34n2/20.pdf>
- Flack, P. (2005). Towards new understandings of learning disability. *Africa Education Review, 2*, 318–328. doi:10.1080/18146620508566308
- Fleiss, J.L. (1981). *Statistical methods for rates and proportions* (2nd ed.). New York, NY: John Wiley.
- Garcia, S. B., Perez, A. M., & Ortiz, A. A. (2000). Interpreting Mexican-American mothers' beliefs about language disabilities from a sociocultural perspective: Implications for early childhood intervention. *Remedial and Special Education, 21*, 90-100.
- Gonasillan, A., Bornman, J. & Harty, M. (2013). Vocabulary used by ethno-linguistically diverse South African toddlers: A parent report using the Language Development Survey. *South African Journal of Communication Disorders, 60*, 10 – 15.

- Gowlett, D. (2006). Zone S. In D. Nurse & G. Philippson (Eds.), *The Bantu languages* (pp. 609–651). London, England: Routledge.
- Kammerer, B., Isquith, P. K., & Lundy, S. (2013). Approaches to assessment of very young children in Africa in the context of HIV. In M. J. Boivin & B. Giordani (Eds), *Neuropsychology of children in Africa: Perspectives on risk and resilience*. (pp. 17–36). New York, NY: Springer.
- Kathard, H. & Pillay, M. (2013). Promoting change through political consciousness: A South African speech-language pathology response to the World Report on Disability. *International Journal of Speech-Language Pathology*, *15*, 84-89.
- Kathard, H., Ramma, L., Pascoe, M., Jordaan, H., Moonsamy, S., Wium, A.-M., & Khan, N. B. (2011). How can speech-language therapists and audiologists enhance language and literacy outcomes in South Africa? (And why we urgently need to). *South African Journal of Communication Disorders*, *58*, 59-71. doi.org/10.4102/SAJCD.V58I2.27
- Khokhlova, I. (2015). Lingua franca English in South Africa. *Procedia Social and Behavioural Sciences*, *214*, 983-991.
- Lorencz, E.E., & Boivin, M.J. (2013). Screening for neurodisability in a low-resource setting using the Ten Questions Questionnaire. In M.J. Boivin & B. Giordani (Eds), *Neuropsychology of children in Africa: Perspectives on risk and resilience* (pp. 139-153). New York, NY: Springer.
- Macy, M., Thorndike-Christ, T., & Lin, Y.-C. (2010). Parental reports of perceived assessment utility. *Infants & Young Children*, *23*, 286–302. doi:10.1097/IYC.0b013e3181f1ec1b
- McCauley, R., Fey, M., & Gilliam R. (2016). *Treatment of language disorders in children: (2nd ed.)*. Baltimore, MD: Paul H. Brookes .

- Miller, J., Andriacchi, K., & Nockerts, A. (2011). *Assessing language production using SALT software*. Middleton, WI: SALT Software LLC.
- Miller, J., & Chapman, R. (1985). *Systematic analysis of language transcripts*. Madison, WI: Language Analysis Laboratory.
- Miller, J. F. & Iglesias, A. (2012). *Systematic Analysis of Language Transcripts*. Middleton, WI: SALT.
- Mullen, E. (1995). *Mullen scales of early learning*. Circle Pines, MN: American Guidance Service Inc.
- Nurse, D., & Philippson, G. (2006). Introduction. In D. Nurse & G. Philippson (Eds.), *The Bantu Languages* (pp. 1–12). London, England: Routledge.
- Olusanya, B. O., Ruben, R. J., & Parving, A. (2006). Reducing the burden of communication disorders in the developing world. *Journal of the American Medical Association*, 296, 441-444. doi:10.1001/jama.296.4.441
- Pascoe, M., Maphalala, Z., Ebrahim, A., Hime, D., Mdladla, N., Mohamed, M., & Skinner, M., (2010). Children with speech difficulties: An exploratory survey of clinical practice in the Western Cape. *South African Journal of Communication Disorders*, 57, 66-75.
- Pascoe, M., & Norman, V. (2011). Contextually-relevant resources in speech-language therapy and audiology in South Africa: Are there any? *South African Journal of Communication Disorders*, 58, 2–5. doi:10.4102/SAJCD.V58I1.35
- Peña, E. D. (2007). Lost in translation: Methodological considerations in cross-cultural research. *Child Development*, 78, 1255-1264.
- Prah, K.K. (2007). *Challenges to the promotion of indigenous languages in South Africa*.
http://www.casas.co.za/fileassets/newscast/misc/file/204_cv_challenges%20to%20the%20promotion%20of%20indidegous%20languages%20in%20sou_.pdf

- Romski, M., Sevcik, R. A., Adamson, L. B., Cheslock, M., Smith, A., Bakeman, R. (2011). Parent perceptions of the language development of toddlers with developmental delays before and after participation in parent-coached language interventions. *American Journal of Speech-Language Pathology*, 20, 111-118 doi:10.1044/1058-0360(2011/09-0087
- Romski, M. A., Sevcik, R. A., Cheslock, M., & Barton-Hulsey, A. (2016). The System for Augmenting Language: AAC and Emerging Language Intervention. In R. McCauley, M. Fey & R. Gillam (Eds.) *Treatment of Language Disorders in Children: Conventional and controversial intervention; 2nd Edition* (pp. 155-186). Paul H. Brookes
- Samuels, A., Slemming, W., & Balton, S. (2012). Early childhood intervention in South Africa in relation to the developmental systems model. *Infants & Young Children*, 25, 334-345.
- Silva, P. (1997). South African English: Oppressor or Liberator? The Major Varieties of English, Papers from MAVEN 97, Vaxjo, 20–22 November 1997. Available on https://www.ru.ac.za/media/rhodesuniversity/content/dsae/documents/articles/Silva_article.pdf
- Southwood, F., & Van Dulm, O. (2015). The challenge of linguistic and cultural diversity: Does length of experience affect South African speech-language therapists' management of children with language impairment? *South African Journal of Communication Disorders* 62, 71-85. doi: 10.4102/sajcd.v62i1.71
- Statistics South Africa. (2014). *Profile of persons with disabilities in South Africa*. Census, 185. Retrieved from <http://www.statssa.gov.za/publications/Report-03-01-59/Report-03-01-592011.pdf>
- Statistics South Africa. (2017). Poverty Trends in South Africa: An examination of absolute poverty between 2006 & 2015. Retrieved from <http://www.statssa.gov.za/?p=10341>
-

- UNICEF. (2006). Excluded and invisible: The state of the world's children 2006. Retrieved from http://www.unicef.org/sowc06/pdfs/sowc06_fullreport.pdf
- Van der Linde, J. & Kritzinger, A. (2013). Perceptions of rural primary healthcare personnel about expansion of early communication intervention. *African Journal of Primary Health Care and Family Medicine*, 5, 1–11.
- van Staden, S., Bosker, R., & Bergbauer, A. (2016). Differences in achievement between home language and language of learning in South Africa: Evidence from prePIRLS 2011. *South African Journal of Childhood Education*, 6, 10 pages.
doi:<http://dx.doi.org/10.4102/sajce.v6i1.441>
- World Health Organization and World Bank. (2011). *World report on disability*. Geneva, Switzerland: World Health Organization.
- Yeargin-Allsopp, M., & Boyle, C. (2002). Overview: The epidemiology of neurodevelopmental disorders. *Mental Retardation and Developmental Disabilities Research Reviews*, 8, 113–116. doi:10.1002/mrdd.10030

Endnote

¹ Linguistically, isiZulu is classified as a Nguni language and Setswana as a Sotho language. Both form part of the Southern Bantu languages according to the linguistic classification by Guthrie (Gowlett, 2006). Southern Bantu languages form part of the Bantu language families, which, in turn, are part of the Benue–Congo languages of the Niger–Congo family (Nurse & Philippson, 2006). In this manuscript, the term ‘Bantu language’ is used strictly in its linguistic sense.