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Faculty of Humanities
Fakulteit Geesteswetenskappe
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Dysfluencies in a multilingual speaker: A case study

by

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TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

ABBREVIATIONS

Abbreviation	Meaning
CLD	Cluttering like dysfluencies
COCAF-4	Checklist of cluttering and associated features
HPCSA	Health Professions Council of South Africa
IPA	International Phonetic Alphabet
PWC	Person who clutters
PWD	Person with dysfluencies
PWS	Person who stutters
SLD	Stuttering like dysfluencies
SAE	South African English
SLT	Speech-Language Therapist
SSI	Stuttering Severity Index

Abstract

Purpose

This study aimed to describe the dysfluencies of a multilingual person across and within the Sepedi, Afrikaans, and South African English (SAE) population groups. The subsequent objectives were: to describe the nature and frequency of the stuttering-like dysfluencies (SLD) during the stuttering moments across and within these language groups of the person with dysfluencies (PWD); to describe the nature and frequency of the cluttering-like dysfluencies (CLD) during the cluttering moments across and within these language groups of the PWD; and to describe the secondary stuttering behaviours of the PWD across and within these language groups. After an extensive literature review, it was evident that there is limited research on SLD and CLD in a multilingual speaker who speaks Sepedi, Afrikaans, and SAE.

Method

The selected population for this study was a single participant – a case study. The participant presented with typical oral-facial structures and functioning according to the orofacial examination. The SLD and CLD were assessed with a self-designed assessment protocol in Sepedi, Afrikaans, and SAE. The protocol included a phonetically balanced word list for reading in each of these languages, a spontaneous telephone conversation with an unfamiliar speaker, a familiar topic discussed with the researcher in English and Afrikaans and an unfamiliar speaker who is fluent in Sepedi, and a reading passage in all three languages.

Results and discussion

This study aimed to describe the dysfluencies in a multilingual PWD across and within Sepedi, Afrikaans, and SAE. The most prevalent SLD across and within the three languages was the repetition of part-words. The most prevalent CLD across and within the three languages was the repetition of whole-words. The most dominant repetition of sounds was the plosive /d/ sound across and within Afrikaans and SAE. No repetition of sounds occurred in Sepedi, and only three repetitions of the syllable /se-/ were noted. A PWS will exhibit SLD associated with tension, and a PWC will show almost no CLD associated with tension. The most prevalent sounds responsible for the secondary behaviours in this case study were the fricative /v/ in Afrikaans and plosive /k/ sound in SAE and Afrikaans.

Conclusion

The results indicated that the participant's level of proficiency influences CLD and SLD in each of the three languages. The participant exhibited the most CLD and SLD in SAE, which is the third language (L3) of the participant, fewer CLD and SLD in Afrikaans, which is his second language (L2), and the least CLD and SLD in Sepedi, which is his first language (L1). There was no statistical difference in secondary stuttering behaviours across and within the three languages.

Keywords

stuttering, cluttering, a person who stutters, a person who clutters, dysfluencies, multilingualism, language proficiency, secondary behaviours.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

“If we knew what it was we were doing, it would not be called research”.
Albert Einstein

The aim of the chapter is to provide background information and a general overview of the available research regarding multilingualism and dysfluencies in Sepedi, Afrikaans, and SAE. An overview is given of the limited research regarding dysfluencies in stuttering and cluttering in a multilingual adult speaker. The chapter concludes with the rationale and research question.

Fluency refers to the rate, smoothness, endurance, and effort in speech production (American Speech-Language-Hearing Association [ASHA], 2020, p. 1). Typical fluent speech production entails the production of speech sounds through a sequence of specifically coordinated muscle movements (ASHA, 2020, p. 1). The emphasis during the coordinated muscle movements is on the subsystems of speech, such as breathing, phonation, and the articulation of a person with dysfluencies (PWD) (NIH, 2017, p. 1). A PWD experiences increased muscle tension in these subsystems and is unable to control the subsystems to produce fluent speech (Blitzer et al., 2009, p. 177).

In a typical fluent speech, a person will experience disfluencies which shows the natural process of production and planning in speech and language (Penttilä et al., 2022, p. 1). A fluency disorder is a speech flow disruption characterised by abnormal rhythm and rate (Cummings, 2014, p. 1). However, dysfluencies can also be elevated in certain disorders, such as Tourettes Syndrome, Autism Spectrum Disorder, Attention-deficit/hyperactivity disorder, and fluency disorders (Tetnowski et al., 2012, p. 11). There are different types of dysfluencies: repetitions, prolongations, blocks, interjections, silent pauses, broken words, incomplete phrases, and revisions (Bóna, 2019, p. 398). Repetitions refer to sounds, part words, whole words, and phrases that are repeated (Cummings, 2016, p. 1). Prolongation refers to any sound produced longer than normal (Bóna, 2019, p. 398). Blocks (tense pauses) are less audible manifestations of muscular tension between words when a person struggles to articulate a word (Cummings, 2016, p. 1). Interjections, also known as fillers, are any word that does not contribute to the sentence's meaning (St. Louis & Scott, 2020,

p. 76). Silent pauses occur when a person cannot produce sound (Bretherton-Furness & Ward, 2015, p. 70). Broken words constitute pauses within a word (Saad & Kamel, 2019, p. 12). Incomplete phrases occur when the person does not complete the sentence (Bóna, 2019, p. 398). Revisions occur when the person stops in the middle of a sentence and goes back to change the wording (Bretherton-Furness & Ward, 2015, p. 70).

Interjections and revisions serve as language formulation tools, word and phrase repetitions as tools for maintaining fluency, and silent pauses as message planning tools (Penttilä et al., 2022, p. 2). However, the type and frequency of dysfluencies vary between people and depend on several different factors, such as the age, gender, sentence length, topic, and language proficiency of a PWD (Altıparmak & Kuruoğlu, 2018, p. 700). In this study, the fluency disorders, stuttering and cluttering, are discussed under the descriptors stuttering-like dysfluencies (SLD) and cluttering-like dysfluencies (CLD).

1.1 STUTTERING

Stuttering is the interruption in the flow of speaking (Cummings, 2014, p. 1). Stuttering may also be associated with extreme tension, struggle behaviours, speaking avoidance, avoidance behaviours such as using filler-like ‘uh or ‘like’, and secondary behaviours such as eye blinking and jaw jerking (ASHA, 2020, p. 1; Frost, 2022, p. 3,4). A person who stutters (PWS) may show the following SLD with tension (secondary behaviours): repetition of sounds, syllables, or words; prolongation of sounds; and blocks (NIH, 2017, p. 1). These characteristics of dysfluency are already evident in childhood speech production and can persist into adulthood in advanced stutterers aged 14 years and above (Polikowsky et al., 2022, p. 1). However, stuttering and cluttering can co-occur, making diagnosing these two fluency disorders difficult (Cummings, 2016, p. 2).

1.2 CLUTTERING

Cluttering depicts a disruption in the fluent flow of communication (Miyamoto, 2020, p. 54; Van Zaalen- op’ t Hof et al., 2009, p. 138). The disorder presents with characteristics such as a rapid speech rate, a higher number of frequencies of dysfluencies not similar to the core behaviours of stuttering, and reduced intelligibility due to coarticulation (Van Zaalen-op’ t Hof et al., 2009, p. 138). Other cluttering characteristics include atypical pauses, decreased awareness of fluency problems, pragmatics issues, language formulation issues, and auditory processing difficulties (Cummings, 2016, p. 3). A person who clutters (PWC) may show the following CLD with mild to no tension (no secondary behaviours), which is not

related to a situation or specific sound: interjections, whole-word repetition, phrase-repetition, revision, pauses, and incomplete phrases (Bangert et al., 2022, p. 955; Bóna, 2018, p. 222; Cable, 2018, p. 2; Miyamoto, 2020, p. 54). However, research shows that more word and phrase repetitions and fewer repetitions of sound and syllables occur in the PWC (Myers et al., 2012, p. 10). The areas of the brain that play a role in cluttering are the basal ganglia and the medial prefrontal cortex, and dysfunctions in these areas impact the ability to produce accurate timing cues, resulting in dysfluencies (Bretherton-Furness & Ward, 2015, p. 63). These brain regions are consistent with difficulties in controlling and selecting speech motor programmes (Ward et al., 2015, p. 1). As such, some research suggests that a PWC does not have enough time for speech planning in the brain, which results in dysfluencies (Bóna, 2019, p. 224; Bretherton-Furness & Ward, 2015, p. 63). These symptoms distinguish cluttering as a genetically-based disorder (Bretherton-Furness & Ward, 2015, p. 63).

1.3 CLD AND SLD IN MULTILINGUALISM

Cluttering is usually only recognised in preschool years when the disorder starts to interfere with academic performance (Penttilä et al., 2022, p. 2). Conversely, stuttering typically begins in early childhood; nearly 95% of children who stutter start to do so before four years of age and the standard age of onset is at approximately 33 months (ASHA, 2020, p. 2). As mentioned earlier, there are several causes of dysfluencies, namely speech and language development, cognitive development, genetics, and environmental factors (Penttilä et al., 2022, p. 2). In addition, a PWD in a multilingual environment may experience differences in speech and language development across different languages, exacerbating the problem (Ogundare, 2012, p. 1,2). Research suggests that second language (L2)-speaking adults exhibit more dysfluencies than first language (L1)-speaking adults. This is because being bilingual or multilingual exerts a higher cognitive demand due to suppressing and monitoring the L1 (Smith et al., 2022, p. 2). The global increase in multilingualism has evoked interest in communication disorders among multilingual speakers and has raised questions about the effect of early exposure to multiple languages on speech fluency (Morrish et al., 2017, p. 154).

A multilingual PWD may show different SLD and CLD across languages due to the age of exposure to the different languages, social influences of the languages, and the usage of the different languages (Morrish et al., 2017, p. 154; Smith et al., 2022, p. 3). Phonetic

complexity, such as consonant clusters and complex syllable structures, puts a heavy demand on the speech motor system during speech's planning and production phases (LaSalle & Wolk, 2011, p. 288). This demand may influence the SLD and CLD of a PWD. Therefore, a PWD may stutter and clutter more frequently in languages with greater phonetic complexity (Bangert et al., 2022, p. 965). A PWD will experience more SLD and CLD on content words than function words because function words are less phonetically complex and shorter in length (LaSalle & Wolk, 2011, p. 288). Thus, the grammatical structure of a language may influence the SLD and CLD of a PWD (Byrd, 2018, p. 327). In addition, the nature, frequency, and distribution of dysfluencies are related to the individual's proficiency in each language (Brundage et al., 2016, p. 120; Morrish et al., 2017, p. 155). Spoken language proficiency is a measure of vocabulary, grammar, and pronunciation (Markström, 2019, p. 4). Cluttering is more a language disorder than stuttering (Bóna, 2019, p. 393). It is, therefore, necessary to establish the language proficiency of a PWD to determine which dysfluencies are actual indicators of the stutter or clutter and which are related to reduced proficiency in that language. Byrd's 2018 investigations on bilingual English and Spanish speakers yielded no significant differences in dysfluencies regardless of language proficiency but indicated that dysfluencies occur due to the grammatical structure of the language. Shenker (2011) recommends using a comprehensive testing sample in a variety of contexts to assess a multilingual PWD because a PWC and a PWS might clutter or stutter more in one situation and less in another (Cable, 2018, p. 5).

There are numerous factors at play regarding a bi- and multilingual PWD. Only a few studies have investigated these factors extensively due to the scarcity of the context of multilingualism specifically (Morrish et al., 2017, p. 154). South Africa provides such a context in that the country has 11 official languages (Klop & Visser, 2020, p. 207), and a PWD in South Africa will likely be bilingual or multilingual (Mzangwa & Dede, 2019, p. 7). The present study consequently aimed to address the dearth of research, and prior research caveats, by describing a multilingual PWD who stutters and clutters. The PWD in this study speaks Sepedi (Northern Sotho), Afrikaans, and South African English (SAE). Standard SAE refers to all English varieties in South Africa (Bekker, 2012, p. 139). Afrikaans and English belong to the Indo-European language family and, more specifically, to the Germanic language group (Bech & Walkden, 2016, p. 1). Sepedi, in turn, belongs to the African language family and the Sotho language group (van der Merwe & Le Roux, 2014, p. 1). Languages belonging to different language families and groups have different phoneme

inventories and phonological rules. The grammatical structures of Sepedi, Afrikaans, and SAE differs as well (Zokirova, 2020, p. 150).

1.4 SEPEDI

Sepedi is one of the official languages of South Africa, belonging to the South-Eastern Bantu language zone S (van der Merwe & Le Roux, 2014, p. 1). Van der Merwe and Le Roux (2014) state that the sound systems of Germanic languages, including Afrikaans and English, differ from African languages[1] , such as Sepedi. The phoneme inventory of Sepedi can be divided into vowels and consonants,[2] which are presented in Table 1.

Table 1

Vowels and consonants of Sepedi

Vowels and consonants of Sepedi		
Vowels	**Sepedi word**	**English word**
/i/	-**š**ila	grind
/e/	mos**ela**	trail
/u/	-b**u**la	open
/o/	-b**o**la	divulge
/ɔ/	-b**ô**la	rot
/ɛ/	-s**ê**la	hunt (for food)
/a/	-š**al**a	remain
Consonants	**Sepedi word**	**English word**
/p'/	**p**itša	cooking pot
/ph/	**ph**ela	live

[1] The term African language is used by linguists in South Africa, and not the term 'Bantu language' (van der Merwe & Le Roux, 2014, p. 1).
[2] Only basic, unraised vowels are presented as there is controversy regarding the status of raised variants (Kotze, 1989, p. 62,63).

Vowels and consonants of Sepedi		
/β/	-**b**itša	call
/m/	**-m**aabane	yesterday
/f/	**-f**o**f**a	fly
/fs/	bo**fs**a	youth
/psh/	**-psh**ikologa	roll down
/fʃ/	-bo**fš**a	is tired
/pʃ'/	m**pš**a	dog
/pʃh/	**-pšh**a	dry up
/βʒ/	**bj**ang	grass
/ɱ/	**-my**e**my**ela	smile
/w/	**w**ena	you
/ǀ/	**c**e**c**e**c**e	exclamation of pity
/ŋǀ/	**n**ce-**n**ce-**n**ce	ticking of watch
/t'/	**t**au	lion
/th/	**-th**iba	stop
/ts'/	**-ts**eba	know
/tsh/	**tsh**ipi	iron
/r/	**-r**ora	roar (lion)
/s/	**-s**ola	serve up
/n/	**n**oga	snake
/ŋ!/	**nq**waa	said of badly brewed beer
/tʃ'/	**-tš**ea	take

Vowels and consonants of Sepedi		
/tʃh/	**-tšh**aba	flee
/ʃ/	**-š**oma	work
/ʒ/	**-j**a	eat
/tl’/	**-tl**a	come
/tlh/	n**tlh**a	point
/ŋǁ/	**nx**a**nx**ae	pardon
/ɬ/	**-hl**otla	filter
/l/	**-l**eka	try
/ɻ/	**-d**ula	sit
/j/	-bola**y**a	kill
/ɲ/	**-n**yaka	search
/h/	**-h**uma	become rich
/k’/	**k**oloi	waggon
/kh/	**-kh**utša	rest
/kxh/	**kg**omo	head of cattle
/ɣ/	**-g**ama	milk
/ŋ/	**ng**aka	witch doctor
/ɦ/	**-h**ema	breath

(Adapted from Kotze, 1989, p. 62,63)

1.5 AFRIKAANS

The Afrikaans phoneme inventory consists of vowels, including short and long monophthongs and diphthongs, and approximately 14 basic consonants and seven loan consonants (Wissing, 2020, p. 4). The consonants are divided into groups according to the manner of production, namely plosives, nasals, affricates, fricatives, trills, laterals, and

approximants (Coetzee, 2018, pp. 33–41). Afrikaans also contains 34 consonant clusters. Afrikaans was developed by incorporating syntactical and lexical borrowings from African languages, Khoisan languages, Malay, Portuguese, and several other European languages, especially Dutch. (Groenewald, 2019, p. 10). The vowels and consonants of Afrikaans are presented in Tables 2 and 3, respectively.

Table 2

Vowels of Afrikaans

Vowels of Afrikaans		
Monophthongs	**Afrikaans word**	**English word**
Short Afrikaans monophthongs		
/i/	n**ie**s	sneeze
/y/	n**uu**s	news
/e/	n**ee**	no
/ø/	n**eu**t	nut
/ə/	m**i**s	mist
/ɛ/	m**e**s	knife
/æ/	**e**k	I
/œ/	m**u**s	sparrow
/a/	m**a**s	mast
/ɔ/	m**o**s	moss
/o/	b**oo**r	drill
/u/	m**oe**s	must
Long Afrikaans monophthongs		
/i:/	t**ie**r	tiger
/y:/	m**uu**r	wall
/e:/	b**e**ne	bones
/ə:/	w**i**e	who
/ɛ:/	l**ê**	lay
/æ:/	sk**ê**r	scissor

/œ:/	br**û**e	bridge
/ɑ:/	k**aa**rt	map
/ɔ:/	m**ô**re	tomorrow
/o:/	gl**o**	believe
/u:/	vloer	floor
Afrikaans diphthongs		
Diphthongs	**Afrikaans word**	**English word**
/əi/	br**ei**	knit
/əu/	k**ou**s	sock
/œi/	h**ui**s	house
/a:i/	kr**aai**	crow
/o:i/	m**ooi**	pretty
/ui/	k**oei**	cow
/eu/	l**eeu**	lion
/ai/	m**a**ndjie	basket
/ɔi/	T**oi**let	toilet

Adapted from Pringle et al.(2022, pp. 337–338)

Table 3

Consonants and consonant clusters of Afrikaans

Consonants and consonant clusters of Afrikaans		
Consonants	**Afrikaans word**	**English word**
Plosives		
/p/	**p**as	fit
/t/	**t**as	suitcase
/k/	**k**as	cupboard
/b/	**b**oeke	books
/d/	**d**as	tie
/g/	**g**holf	golf
Affricates		

Consonants and consonant clusters of Afrikaans		
Consonants	**Afrikaans word**	**English word**
/ʧ/	**tj**ek	cheque
/dʒ/	**j**ellie	jelly
Nasals		
/m/	**m**ag	power
/n/	**n**ag	night
/ɲ/	ora**n**je	orange
/ŋ/	ba**n**g	scared
Alveolar trill		
/r/	**r**uik	smell
Uvular trill		
/R/	**r**ooi (dialect in Western Cape)	red
Fricatives		
/f/	**v**el	skin
/s/	**s**ak	bag
/ʃ/	**sj**errie	sherry
/x/	**g**as	gas
/v/	**w**as	wash
/z/	**z**oeloe	zulu
/ɦ/	**h**ang	hang
Approximant		
/j/	**j**as	jacket
Lateral		
/l/	**l**aai	drawer
Consonant clusters of Afrikaans		
Consonant phoneme clusters consisting of two phonemes		**Consonant phoneme clusters consisting of three phonemes**

Consonants and consonant clusters of Afrikaans		
Consonants	**Afrikaans word**	**English word**
/rt/, /rk/, /nt/, /st/, /kr/, /dr/, /br/, /sk/, /bl/, /pl/, /xl/, /kl/, /fl/, /lt/, /lf/, /lp/, /lk/, /rs/, /sl/, /ls/, /ts/, /ks/, /sp/, /pr/, /tr/, /rx/, /xr/, /sw/, /kw/, /kn/, and /ŋk/		/spr/, /str/, and /skr/

Pringle et al. (2022, pp. 337–338)

1.6 SOUTH AFRICAN ENGLISH

The history of SAE can be dated back as far as 1795, with the first British occupation (Bekker, 2012, p. 140). The SAE sound system consists of vowels, including long and short monophthongs and diphthongs, and consonants which are presented in Tables 4 and 5 respectively as discussed in a personal interview/email with Prof. Ian Bekker on 03/08/2022. Standard SAE is General South African English and is now the most widely spoken sociolect (Bekker, 2012, p. 139; Bekker et al., 2022, p. 77).

Table 4

Vowels of SAE

Vowels of SAE	
Short monophthongs	
/ɪ/	k**i**t
/e/	dr**e**ss
/æ/	tr**a**p
/ɒ/	l**o**t
/ä/	str**u**t
/ʊ/	f**oo**t
/ə/	lett**e**r
Long monophthongs	
/i:/	fl**ee**ce

Vowels of SAE	
/u:/	g**oo**se
/ɜ:/	n**u**rse
/ɔ:/	th**ou**ght
/ä:/	b**a**th
/ɛ:/	sq**ua**re
Diphthongs	
/eɪ/	f**a**ce
/œ}/	g**oa**t
/uə/	c**u**re
/ɪə/	n**ea**r
/aʊ/	m**ou**th
/aɪ/	pr**i**ce
/ɔɪ/	ch**oi**ce

Adapted from Bowerman (2008, p. 179,183,184)

Table 5

Consonants of SAE

Consonants of SAE	
Plosives	
/p/	**p**en
/b/	**b**ed
/t/	**t**ea
/d/	**d**id
/k/	**c**at
/g/	**g**ot
Fricatives and affricates	

Consonants of SAE	
/f/	**f**all
/v/	**v**iolin
/θ/	**th**in
/ð/	**th**is
/s/	**s**o
/z/	**z**oo
/ʃ/	**sh**oe
/ʒ/	vi**s**ion
/z/	**x**ylophone
/h/	**h**at
Nasals	
/m/	**m**an
/n/	**n**o
/ŋ/	si**ng**
Approximants	
/j/	**y**es
/w/	**w**et
/ɹ/	**r**ed
Lateral	
/l/	**l**eg

(Adapted from Bowerman, 2008, p. 179,183,184)

The following monophthongs, consonants, and consonant clusters affect the moments of stuttering in Afrikaans with associated core behaviour of sound repetitions: /a:/, /e:/, /f/, /v/, /o:/, /x/, /n/, /s/, /k/, /xr/, /kn/, /st/ and /kl/ (Morrish et al., 2017, p. 158). The English vowels,

consonants, and consonant clusters were found to be stuttered on more with associated core behaviour of sound repetitions: /ɑ:/, /e/, /eɪ/, /ä/, /g/, /k/, /t/, /f/, /l/, /p/, /tɹ/, and /kl/. No diphthongs were responsible for moments of stuttering in Afrikaans, yet in English, the diphthong /eɪ/ caused stuttering in the Morrish et al. study. A study on phonetic complexity in Turkish-speaking children who stuttered stated that consonant clusters are likely to increase the chances of stuttering (Aydin Uysal et al., 2021, p. 1). As such, phonetic complexity may be seen as one of the reasons for stuttering. For example, voiceless fricatives and voiceless plosives are phonetically more complex and will be stuttered on more than vowels that are phonetically less complex (Morrish et al., 2017, p. 155).

Phonetic complexity is not the only reason for stuttering and cluttering in a multilingual PWD (Morrish et al., 2017, p. 155). The severity of SLD and CLD may change from one language to another due to the speaker being less proficient in that language due to increased phonetic complexity and greater processing load (Smith et al., 2022, p. 2). A PWD may then stutter and clutter more in that specific language. However, a PWC might show more dysfluencies than stuttering due to language specific-features and limited time for linguistic planning (Bóna, 2019, p. 393). As mentioned earlier, cluttering is more of a language disorder than stuttering (Bretherton-Furness & Ward, 2015, p. 63).

PWC will show a few or all of the following characteristics: a fast speech rate, intelligibility problems, and a higher-than-average frequency of dysfluencies (Bangert et al., 2022, p. 131). A fast speech rate is the main difference between cluttering and stuttering, and it is hypothesised that a PWC will experience an increased speech rate in a demanding speaking situation (Cable, 2018, p. 1). Reasonably, the speech-language system of a PWC cannot accommodate the fast speech rate which may then influence intelligibility and increase CLD (Pap, 2019, p. 75; Van Zaalen- op' t Hof et al., 2009, p. 137). Another reason for intelligibility issues is coarticulation, which results in the deletion of sounds or syllables in multisyllabic words (St. Louis &Scott, 2020, p. 2; Van Zaalen- op' t Hof et al., 2009, p. 137). A PWC will experience intelligibility issues in running speech, but when a situation is controlled (by giving prompts to reduce the speech rate), a PWC will produce accurate syllables and words (Scott, 2020, p. 2). A PWC will show a higher-than-average frequency of CLD (interjections, whole-word repetition, phrase-repetition, revision, pauses, and incomplete phrases) (Bóna, 2018, p. 22). Dysfluency clusters are also present in a PWC's speech and indicate more

severe speech planning difficulties (Penttilä et al., 2022, p. 4,5). Dysfluency clusters are two or more dysfluencies that occur in the same word, which may include SLD and CLD (Myers et al., 2012, p. 10). However, the most prevalent dysfluency cluster type is CLD, for example, filled pauses, revisions, interruptions, and repetition of words and phrases (Penttilä et al., 2022, p. 4,5).

There is limited research on dysfluencies in African languages such as Sepedi, for example, and this dearth in research needs to be filled (Bóna, 2019, p. 393; Morrish et al., 2017, p. 158). There is also inadequate research on the analysis of dysfluencies in cluttered speech. Therefore further investigations are also necessary in this field, especially in the case of a multilingual PWD (Bóna, 2019, p. 393). In addition, African languages contain complex articulatory sounds, such as clicks, which are not present in Germanic languages. These sounds may increase the moments of dysfluencies in a PWC and a PWS (van der Merwe & Le Roux, 2014, p. 3). However, a PWC will experience fewer cluttering repetitions in sounds and syllables than a PWS, but a PWC may clutter more on multisyllabic words (Cable, 2018, p. 5; Miyamoto, 2020, p. 54).

Complex syllable structures also influence the stuttering patterns of a PWD, in addition to complex sounds such as clicks (Schäfer & Robb, 2012, p. 2). Moreover, a PWC will also clutter more on words with complex structures due to a linguistic planning deficiency (Bóna, 2019, p. 394). Afrikaans' and SAE's more complex syllable structure may lead to the hypothesis that a PWD may experience more dysfluencies in Germanic languages than in an African language (Ononiwu, 2010, p. 3). Even though African languages contain complex sounds, as mentioned previously. Thus, multilingual PWS may present with increased dysfluency on consonants across Sepedi, Afrikaans, and SAE (Morrish et al., 2017, p. 155). Stuttering will present more prominently at the beginning of a word and is also expected to be found across Sepedi, Afrikaans, and SAE (Khasawneh, 2021, p. 218). A multilingual PWC may present excessive repetitions in part-words and whole-words and excessive interjections or interruptions with a fast speaking-rate and pauses in grammatically incorrect places (Bóna, 2018, p. 222). However, these behaviours are not associated with tension, meaning no secondary behaviours (typically induced by tension) are associated with cluttering (Scott, 2020, p. 2). Cluttering is also expected to be found across all three languages. It is hypothesised that the frequency of SLD and CLD may differ across the three

languages due to language proficiency or due to the grammatical structure of the different languages (Byrd, 2018, p. 326).

A few attempts have been made to compare and study the linguistic features of the pattern of stuttering and cluttering in a multilingual person's speech. However, no such investigations exist in African languages (Schäfer & Robb, 2012, p. 609). Thus, more research is necessary for the South African multilingual context (Bóna, 2019, p. 393; Morrish et al., 2017, p. 159). Therefore, the research question of this study is: What dysfluencies are present in a multilingual PWD?

CHAPTER 2
METHOD

'**Research is creating new knowledge.'** *Neil Armstrong.*

The aim of the chapter is to provide a comprehensive description of the research procedures of the study. The aims and objectives of the study are presented and the research design, participants, materials, and apparatus, as well as the procedures followed throughout the study, are discussed. The chapter concludes with the ethical considerations.

2.1 RESEARCH AIM

This study aimed to describe the dysfluencies in a multilingual PWD.

2.1.1 OBJECTIVES

- To describe the nature and frequency of the SLD of a PWD during stuttering moments across and within Sepedi, Afrikaans, and SAE.
- To describe the nature and frequency of the CLD of a PWD during the cluttering moments across and within Sepedi, Afrikaans, and SAE
- To describe the secondary stuttering behaviours of a PWD across and within Sepedi, Afrikaans, and SAE.

2.2 STUDY DESIGN

This study employed a mixed-method cross-sectional design where the researcher drew on elements of quantitative and qualitative research approaches (Schoonenboom & Johnson, 2017, p. 1). Independent variables (Sepedi, Afrikaans, and SAE) were manipulated by changing the contexts and pressure of the tasks to bring about change in the dependent variables (speech characteristics) investigated. More specifically, the independent variables were manipulated to determine and understand the SLD, CLD and secondary behaviours across and within Sepedi, Afrikaans, and SAE. The study firstly employed a qualitative perceptual analysis of the characteristics of the dysfluency moments across and within the three languages. Subsequently, the nature of the stuttering and cluttering moments was described using a descriptive method. In short, the study used a quantitative approach to describe the frequency of the stuttering and cluttering moments and the dysfluencies responsible for these moments within and across the three languages. A case study was used by employing a once-off assessment of different SLD, CLD, and secondary behaviours across and within the three languages. The sample size of this current study was a single

individual. As such, the results cannot be generalised to the entire multilingual stuttering and cluttering population and must be described and interpreted within the context of this individual participant (Guetterman & Fetters, 2018, p. 2). A single case study is regularly used when there is a new phenomenon about which little is known - for example, a multilingual PWD. Therefore, case studies provide essential and in-depth descriptive information (Crowe, 2011, p. 2). These studies may also present explanatory information regarding the nature and reasons behind a specific phenomenon (Brink et al., 2018, p. 110).

However, case study designs may exhibit limitations such as inter-related issues of methodological rigour, external validity, researcher subjectivity, and construct validity (Willis, 2014, p. 4). These possible limitations should be considered in all data analyses and interpretational deductions. Nonetheless, the essential advantage of a case study design is the detailed analysis that results when a novel phenomenon or participant is studied – such as the context of a single multilingual PWD in Sepedi, Afrikaans, and SAE, in the present design (Brink et al., 2018, p. 110).

2.3 STUDY SETTING

Data collection occurred at one point in time and in one setting at the University of Pretoria in a soundproof room (R2-7) in the Communication Pathology building, Faculty of Humanities.

2.4 STUDY POPULATION AND SAMPLING

2.4.1 Study population

The participant in this study was a multilingual PWD, speaking Sepedi, Afrikaans, and SAE.

2.4.2 Sampling method

The size of the entire multilingual stuttering and cluttering population in South Africa for this current study is unknown. As such, it was more advantageous to use a sample. Using a sample was also less time-consuming and more cost-effective (Martínez-Mesa et al., 2016, p. 327). The sampling method used was purposive sampling, and the subdivision of purposive sampling was non-probability sampling.

One of the most common forms of non-probability sampling is purposive sampling. The researcher used non-probability sampling and purposive sampling to select a participant for the current study. Purposive sampling is when the researcher identifies and selects a specific individual who stutters and clutters, for example, a PWD in Sepedi, Afrikaans, and

SAE (Palinkas et al., 2015, p. 2). Non-probability sampling is recommended for a case study design (Ishak & Bakar, 2014, p. 2).

2.4.3 Sample size

The sample size of this current study was a single participant for the case study design.

2.5 Participant selection

2.5.1 Participant selection criteria

The participant was chosen based on the following inclusion criteria:

- The participant was previously diagnosed with stuttering and cluttering by a registered speech-language therapist.
- The participant should not have had any other communication difficulties, such as hearing impairment or other neurologically-based communication disorders.
- The participant is an adult to ensure an advanced stutterer with a persistent stuttering pattern (stuttering into adulthood) is present (Polikowsky et al., 2022, p. 1).
- The participant is multilingual in Sepedi, Afrikaans, and SAE to allow comparison and cross-linguistic analysis.
- The participant presented with typical oral-facial structures and functioning according to the orofacial examination and did not present with any structural abnormalities which could have influenced speech production in additional ways.

2.5.2 Equipment and material for participant selection

The Stuttering Severity Index (SSI) was used to determine the severity of the dysfluency of the PWD (Riley & Bakker, 2009, p. 11). The checklist of cluttering and associated features (COCAF-4) (Appendix A, p.39) was one of the tools used to make a differential diagnosis between cluttering and stuttering (Ward, 2018).

2.5.3 Procedure for participant selection

The researcher had already identified a suitable participant willing to participate in this current study by chance while visiting an animal clinic in Pretoria. The participant agreed to participate in this study.

2.6 DATA COLLECTION

2.6.1 Material and apparatus for data collection

The current study used a self-designed assessment protocol designed in Sepedi, Afrikaans, and SAE. The protocol included a phonetically balanced word list in Afrikaans (Appendix B, p.40), SAE (Appendix C, p.41), and Sepedi (Appendix D, p.42); a spontaneous telephone conversation with an anonymous speaker in Sepedi, Afrikaans, and SAE, a familiar topic discussed with the researcher in Afrikaans and SAE, an anonymous speaker who is fluent in Sepedi, and a reading passage “The North Wind and Sun", available in all three languages (Appendix E, p.43). The English version of “The North Wind and Sun” was translated into Sepedi by a board-certified translator at the University of South Africa. The tool was subsequently back-translated to English by a linguist who is a first-language speaker of Sepedi. A panel of experts in linguistics and speech-language pathology validated the Sepedi translation by comparing the semantic content with the standardised English version of “The North Wind and Sun” (van der Merwe et al., 2017, p. 3).

The instrumentation used while conducting the assessment included a Samsung S21 smartphone placed on a tripod 2 m away from the participant to capture a frontal view of the participant’s body (Morrish et al., 2017, p. 156). This frontal view focused on the face and chest of the participant to assess secondary behaviours associated with stuttering in each language (Karani & Mupawose, 2020, p. 1). A digital Phillips voice recorder/voice tracker three microphone system was used to record adequate quality speech samples in each language. The voice recorder was placed 15 cm anterior to the participant in a soundproof room to avoid background noise interference, which may alter the assessment results (Saha et al., 2020, p. 1). Video and voice recordings were stored on a password-protected hard drive, and backups were made on a google drive with similar access protection. The recordings were played back through Windows Media Player (Microsoft Corporation) to allow for repeated viewings and assessment by only the listening panel comprising five qualified and HPCSA registered Speech-Language Therapists (SLTs).

2.6.2 Procedure for data collection

The researcher obtained ethical clearance from the Ethics Committee of the Faculty of Humanities, University of Pretoria (HUM006/0422). Formal written consent was obtained before the commencement of data collection. The participant was informed about the current study and what was expected verbally and in the written consent form. Data collection took

place at one time and with one setting, and recording conditions were controlled to support validity (Quintão et al., 2020, p. 269). The recordings were made in a soundproof room in the Department of Speech-Language Pathology and Audiology at the University of Pretoria. The recording duration was approximately three hours, with a ten-minute break between Sepedi, Afrikaans, and SAE testing.

The assessment protocol aimed to elicit speech samples in less stressful and pressured situations because the more pressured the situation, the more a person will probably stutter. However, a PWC will clutter less in pressured situations and more in less stressful situations (Richard et al., 2021, p. 2). The listening panel of five qualified Health Professions Council of South Africa (HPCSA) registered SLTs analysed the core behaviours of the participant by making use of the Dysfluency Index (Appendix F, p.44) to assess the different SLD and CLD. The professionals also employed the Assessment of Associated Motor Behaviours (Appendix G, p.45) to assess secondary behaviours (Shipley & McAfee, 2016, p. 401). For frequency, duration, and severity of dysfluencies, the professionals administered the SSI (Appendix H, p.46) and the COCAF - 4 (Riley & Bakker, 2009, p. 11; Ward, 2018, p. 1).

2.6.3 Apparatus

Interview phase: The participant was interviewed by the researcher in Afrikaans (the first additional language of the participant) to obtain a comprehensive background history adapted from Shipley and McAfee (2016; p. 83,84) (Appendix I, p.47).

Testing phase: Speech samples were collected in four different speaking situations in Sepedi, Afrikaans, and English. These samples included a spontaneous telephone conversation with an anonymous speaker, speaking spontaneously face-to-face with the researcher about a familiar topic and reading a phonetically balanced reading passage and word list. The professionals also observed the participant for possible secondary stuttering behaviour in all three languages. The order of these tasks was randomised in each language to reduce, as far as possible, any learned effects and any carry-over, which can manipulate stuttering or cluttering behaviour throughout recordings. The tasks were numbered, and with each assessment in a different language, the numbering was randomised. All speech samples from the three languages were audio and video recorded for perceptual analyses by the listening panel.

2.6.4 Validity and reliability of variables

Validity encompasses the accuracy and truthfulness of scientific findings (Brink et al., 2018, p. 118). Therefore, in a single case study, multiple sources of evidence must be used, and a process of triangulation of the data – a logical chain of events – must be well-defined, and the researcher should review the reports of the interviews. The first two factors are directly related to the data quality, while the last factor provides information about the development processes (Quintão et al., 2020, p. 269). The triangulation process is important because it refers to the importance of using different sources of data collection (Brink et al., 2018, p. 209). The different sources of data collection were an interview with the participant and observing the core (SLD and CLD) and possible secondary behaviours of the participant during stuttering and cluttering moments, during the telephonic conversation, as well as other related documents used for triangulation to strengthen the credibility of the results.

Triangulation is essential to evaluating methodological rigour (Pecson & Pogoy, 2021, p. 139). Triangulation was employed in four different ways (Quintão et al., 2020, p. 269):

1. *Data triangulation*: triangulation using multiple data sources, for example, interviews, recordings, and observation.
2. *Researcher triangulation*: triangulation through the participation of different assessors, for example, a listening panel consisting of five qualified and HPCSA registered SLTs.
3. *Theory triangulation:* triangulation through the adoption of multiple perspectives on the same data set; for example, by using a professional outside the field of Speech-Language Pathology to analyse the different speech samples (an academic doctor in linguistics).
4. *Methodological triangulation* is triangulation through the adoption of different complementary methods, such as mixed-method cross-sectional and case study designs.

Instrument validity was used to determine the validity of the current study. Instrument validity seeks to establish whether the assessment protocol accurately identifies what SLD and CLD affect stuttering and cluttering moments in multilingual PWD. Content validity, which is used with the interview, was used to ensure that the assessment of the instrument represents all the components of the dependent (speech characteristics) and independent variables

(Sepedi, Afrikaans, and SAE) to be measured by making use of a listening panel consisting of five qualified HPCSA registered SLTs (Brink et al., 2018, p. 160).

The instruments' reliability can be measured if it consists of the same results repeated over time on the same participant or by different researchers (Brink et al., 2018, p. 163). For this current study, stability in interviewing and repeated observation was used, which refers to the consistency of results over a short time, every hour. The challenge with stability is that people may respond to the instrument a second time based on their memory of their acquaintance with it. Still, the assessment materials were randomised with each language to ensure no memory of the tasks with a 10-minute break every hour.

2.7 Data management and analysis

Perceptual analysis and descriptive statistics were used for quantitative and qualitative data analysis. Perceptual analysis means the researcher makes sense of perceptions, feelings, and attributes by analysing words or speech characteristics in qualitative data. Descriptive statistics synthesise and describe quantitative data (Brink et al., 2018, p. 172). All descriptive statistics were performed using the Statistical Package for Social Sciences version 28 and all figures were constructed using Microsoft Excel. Perceptual analysis was used to study the SLD and CLD across Sepedi, Afrikaans, and SAE. The sounds stuttered on were phonetically transcribed using the International Phonetic Alphabet (IPA). Descriptive statics was used to study the nature and frequency of the stuttering in the three languages.

Perceptual analysis was conducted during the testing procedure by using a listening panel consisting of five qualified HPCSA-registered SLTs experienced in stuttering and cluttering. The adapted version of the Dysfluency Index was used to analyse the dysfluencies on which errors did occur in Sepedi, Afrikaans, and SAE, by describing the nature/core behaviours of the participant. The Assessment of Associated Motor Behaviours was used to observe and discuss the possible secondary behaviours of the PWD (Shipley & McAfee, 2016, p. 401). The video and audio recordings were replayed to allow for acoustic and visual analysis until an agreement was reached between the listening panel and the researcher to ensure the results' consistency. A panel member could not view other panel members' responses during the analysis procedure. Intra-rater reliability was used to determine a point-to-point agreement for each assessment section for each listener in the listening panel through the blind repetition of a randomly selected assessment recording. The repeated session scores

were then compared for each listener. Inter-rater agreement was calculated according to the binary scores from the five raters in the listening panel. A score of 0/5, 1/5, and 2/5 was taken as incorrect, and 3/5, 4/5,and 5/5 as correct (Geertsema & le Roux, 2020, p. 8).

The stuttering and cluttering moments were converted to percentages to indicate the frequency of dysfluency in each language quantitatively. Firstly, the results were compared to classify which language presented with the maximum number of errors. Secondly, the nature of each stuttering and cluttering moment was determined to identify which SLD and CLD were shared in Sepedi, Afrikaans, and SAE. Thirdly, to determine, which SLD and CLD were elicited by which specific sounds. Fourthly, the sounds on which each stuttering moment occurred were analysed according to their articulatory characteristics and phonetically transcribed. The sounds were transcribed according to the IPA (IPA, 2020, p. 1). Specific speech characteristics were listed in a table and then compared for each stuttering and cluttering moment in Sepedi, Afrikaans, and SAE. The analysis focused on the articulatory characteristics of vowels and consonants and the SLD and CLD in each language. Lastly, the possible secondary behaviours were analysed and displayed in a table and compared to determine whether there was any correlation between Sepedi, Afrikaans, and SAE during stuttering and cluttering.

The visual and audio recordings were sent to the listening panel. No personal information was shared since the participant was only referred to as “the participant” in this study. Instructions were provided on how to analyse the data, together with the associated motor behaviour checklist and the Dysfluency index. The listening panel had a certain period to complete the data analysis and sent it back to the researcher. The data analysis was conducted with the assistance of a statistician.

2.8 ETHICAL CONSIDERATIONS

Several ethical considerations and matters were considered whilst conducting this study. The participant was not harmed or put at risk whilst conducting the study. However, although no harm came to the participant, the data collection procedure was reported as tiresome. The participant was aware that he was willingly participating in this current study and could have discontinued participation at any stage and that his decisions would have been respected. The participant’s right to privacy and confidentiality was always protected (Lockhat, 2021, p. 1). The researcher ensured that the personal information about the

participant was destroyed after the current study was conducted by deleting any files electronically (Lockhat, 2021, p. 1).

The participant was referred to in all written and stored documentation and audio-visual files as “the participant” to ensure that his identifying information was kept confidential. Research reports and articles in scientific journals do not include any information that may identify him. All data collected was securely stored in hard copy and electronically for research and archiving purposes. The hard copies were locked in a room with restricted access (Room 3-1, Communication Pathology Building, University of Pretoria). Electronic copies are held in a password-protected file on a computer in this same room. Additionally, the content of this research study was uploaded and stored in the access-protected UP repository. The storage would be for a minimum of 15 years. The researcher and supervisors acknowledged and adhered to ethical and confidentiality principles regarding identifying individuals in research and managing their data, as per POPIA.

An informed consent form (Appendix J, p.48) was given to the participant before conducting the assessment and agreeing on it. The informed consent form detailed what was expected of the participant and ensured that he was aware that his participation was strictly voluntary (Social Media Research Group, 2016, p. 17). The researcher considered any possible barriers to completing the assessment, for example, the participant’s transportation to the University of Pretoria and back home. The participant's social, physical, and psychological well-being always had to be protected. This meant that the participant could choose to discontinue their participation in the assessment at any time should they feel uncomfortable continuing, and the researcher had to respect the participant’s privacy. An application for ethical approval from the Research and Ethics Committee of the Faculty of Humanities, University of Pretoria, was also submitted. The application for ethical clearance is included in Appendix K, p. 49.

CHAPTER 3
RESEARCH ARTICLE

This article was submitted to *Communication Disorders Quarterly*. The format of the article is that of the journal and differs from the rest of the dissertation. Articles had to be in American English, should be quantitative or qualitative research reports (20–25 double-spaced manuscript pages [including figures, tables, and appendices]), and typed with 1-inch margins, left alignment, Times New Roman 12-pt. type for all text. The referencing style of this journal is the American Psychological Association (APA) (APA, 2020). The proof of submission of the article is available in Appendix L.

Dysfluencies in a multilingual speaker: A case study

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Abstract

Research involving a multilingual person who clutters and stutters in African languages is limited. This study aimed to describe the dysfluencies of a multilingual person with dysfluencies (PWD) across and within Sepedi, Afrikaans, and South African English (SAE). A single multilingual adult participant with an advanced and persistent mild stuttering and moderate cluttering pattern participated in this current study. A mixed-method cross-sectional design was implemented. Perceptual analysis was used to study stuttering-like dysfluencies (SLD) and cluttering-like dysfluencies (CLD) across and within the three languages. The results revealed that the most prevalent SLD in all three languages was the repetition of part words. The repetition of whole words was the most prevalent CLD. The plosive /d/ sound represented the highest occurrence and resulted in repetitions of sounds across and within Afrikaans and SAE. There were no repetitions of sounds in Sepedi, but three repetitions of the syllable /se-/ occurred. Future research is recommended on a bigger sample size, and the investigation of other African languages should be considered.

Keywords

stuttering, cluttering, a person who stutters (PWS), a person who clutters (PWC), dysfluencies, multilingualism, language proficiency, secondary behaviors

Fluency disorders are typically evident as speech flow disruptions characterized by abnormal rhythm and rate (Cummings, 2014, p. 1). In many instances, these dysfluencies may be elevated in disorders

such as Tourettes Syndrome, Autism Spectrum Disorder, and Attention-deficit/hyperactivity disorder (Tetnowski et al., 2012, p. 11). The different types of dysfluencies include repetitions, prolongations, blocks, interjections, silent pauses, broken words, incomplete phrases, and revisions (Bóna, 2019, p. 398). Repetitions refer to sounds, part words, whole words, and phrases that are repeated (Cummings, 2016, p. 1); while prolongations represent any sound produced longer than normal (Bóna, 2019, p. 398). Blocks (tense pauses) occur when a person struggles to get a word out, presenting fewer audible manifestations of muscular tension between words (Cummings, 2016, p. 1). Interjections are words that do not contribute to the meaning of the sentence (St. Louis & Scott, 2020, p. 76). While silent pauses occur when a person cannot produce sound (Bretherton-Furness & Ward, 2015, p. 70), broken words constitute pauses within a word (Saad & Kamel, 2019, p. 12). Finally, revisions occur when the person stops in the middle of a sentence and goes back to change the wording (Bretherton-Furness & Ward, 2015, p. 70).

Revisions and interjections serve as language formulation tools, word and phrase repetitions as tools for maintaining fluency, and silent pauses as message planning tools (Penttilä et al., 2022, p. 2). However, the type and frequency of dysfluencies vary between people and depend on several different factors, such as the age, gender, sentence length, topic, and language proficiency of a PWD (Altıparmak & Kuruoğlu, 2018, p. 700). In this study, the fluency disorders, stuttering and cluttering, are discussed, where stuttering-like dysfluencies (SLD) have the status of atypical dysfluencies, and cluttering-like dysfluencies (CLD) refer to typical dysfluencies.

Stuttering

Stuttering constitutes interruptions in the flow of speaking (Cummings, 2014, p. 1). Stuttering may also be associated with extreme tension, struggle behaviors, speaking avoidance, avoidance behaviors such as using filler-like ‘uh ’or ‘like’, and secondary behaviors such as eye blinking and jaw jerking (American Speech-Language-Hearing Association [ASHA], 2020, p. 1). A person who stutters (PWS) may show the following SLD with tension (secondary behaviors): repetition of sounds,

syllables, or words; prolongation of sounds; and blocks (NIH, 2017, p. 1). These characteristics of dysfluency are already evident in childhood speech production and can persist into adulthood (advanced stutterers aged 14 years and above) (Polikowsky et al., 2022, p. 1). However, stuttering and cluttering can co-occur, making diagnosing these two fluency disorders difficult (Cummings, 2016, p. 2).

Cluttering

Cluttering depicts a disruption in the fluent flow of communication (Miyamoto, 2020, p. 54; Van Zaalen- op' t Hof et al., 2009, p. 138). The disorder presents with characteristics such as a rapid speech rate, a higher number of frequencies of dysfluencies not similar to the core behaviors of stuttering, and reduced intelligibility due to coarticulation (Van Zaalen- op' t Hof et al., 2009, p. 138). Other cluttering characteristics include atypical pauses, decreased awareness of fluency problems, pragmatics issues, language formulation issues, and auditory processing difficulties (Cummings, 2016, p. 3). A person who clutters (PWC) may show the following CLD with mild to no tension (no secondary behaviors), which is not related to a situation or specific sound: interjections, whole-word repetition, phrase-repetition, revision, pauses, and incomplete phrases (Bangert et al., 2022, p. 955; Bóna, 2018, p. 222; Cable, 2018, p. 2; Miyamoto, 2020, p. 54). However, research shows that more word and phrase repetitions and fewer repetitions of sounds and syllables occur (Myers et al., 2012, p. 10). The areas of the brain that play a role in cluttering are the basal ganglia and the medial prefrontal cortex. Dysfunctions in these areas impact the ability to produce accurate timing cues, resulting in dysfluencies (Bretherton-Furness & Ward, 2015, p. 63).

These brain regions are consistent with difficulties in controlling and selecting speech motor programs (Ward et al., 2015, p. 1). Moreover, some research suggests that a PWC does not have enough time for speech planning in the brain, which results in dysfluencies (Bóna, 2019, p. 224; Bretherton-Furness & Ward, 2015, p. 63). These symptoms distinguish cluttering as a genetically-based disorder (Bretherton-Furness & Ward, 2015, p. 63).

CLD and SLD in Multilingualism

Cluttering is usually only recognized in the preschool years when it starts to interfere with academic performance (Penttilä et al., 2022, p. 2). Yet, stuttering typically already begins in early childhood, as nearly 95% of children who stutter start to do so before four years of age, and the standard age of onset is at approximately 33 months (ASHA, 2020, p. 2). As mentioned earlier, there are several causes of dysfluencies, namely speech and language development, cognitive development, genetics, and environmental factors (Penttilä et al., 2022, p. 2). In addition, a person with dysfluencies (PWD) who functions in a multilingual environment may experience those differences across various languages, which may exacerbate the problem (Ogundare et al., 2012, pp. 1,2). Research suggests that second language (L2)-speaking adults exhibit more dysfluencies than first language (L1)-speaking adults (Morrish et al., 2017, p. 154). A bi- or multilingual individual may experience higher cognitive demand due to suppressing and monitoring the L1 while using another language (Smith et al., 2022, p. 2). South Africa has 11 official languages, and a PWD in South Africa will likely be bilingual or multilingual (Mzangwa & Dede, 2019, p. 7). The global increase in multilingualism has evoked interest in communication disorders among multilingual speakers and has raised questions about the effect of early exposure to multiple languages on speech fluency (Morrish et al., 2017, p. 154).

A multilingual PWD may show different SLD and CLD across languages due to the age of exposure to different languages and the social influences of the languages (Morrish et al., 2017, p. 154; Smith et al., 2022, p. 3). Different language families exhibit different phoneme inventories, which may increase or decrease the phonetic complexity of each language (Bangert et al., 2022, p. 965). Phonetic complexity, such as consonant clusters and complex syllable structures, puts a heavy demand on the speech motor system during the planning and production phases of speech (LaSalle & Wolk, 2011, p. 288). This demand may influence the SLD and CLD of a PWD. Therefore, a PWD may stutter and clutter more frequently in languages with greater phonetic complexity (Bangert et al., 2022, p. 965).

A PWD may also experience more SLD and CLD on content words than function words as these are less phonetically complex and shorter in length (LaSalle & Wolk, 2011, p. 288). As such, the grammatical structure of a language may influence the SLD and CLD of a PWD (Byrd, 2018, p. 327). In addition, the nature, frequency, and distribution of dysfluencies are related to the individual's expressive proficiency (vocabulary, grammar, and pronunciation) in each language (Morrish et al., 2017, p. 155).

Cluttering is generally considered a language-based fluency disorder (Bóna, 2019, p. 393). It, therefore, naturally follows that it is necessary to establish the language proficiency of a PWD. These investigations aim to determine whether the dysfluencies are actual indicators of the stutter or clutter, and their possible roles in reduced proficiency within a certain language must be delineated. Byrd's 2018 explorations of bilingual English and Spanish speakers yielded no significant differences in dysfluencies regardless of language proficiency. Yet, the present study's results indicated that dysfluencies possibly occur due to the specific grammatical structure of a language. Following these findings, it is reasonable to suggest comprehensive speech-and-language testing in various linguistic contexts when assessing a multilingual PWD as a PWC. A PWS may clutter or stutter more in a certain situation and less in another (Cable, 2018, p. 5).

There are a lot of factors at play when it comes to bi- and multilingual PWD. However, only a few studies have delineated these factors extensively due to the scarcity of the context of multilingualism specifically (Morrish et al., 2017, p. 154). South Africa provides such a milieu as the country boasts the 11 official languages previously mentioned (Klop & Visser, 2020, p. 207). The present study consequently aimed to address the dearth of research, and prior research caveats, by describing a multilingual PWD who stutters and clutters. The PWD speaks Sepedi (Northern Sotho), Afrikaans, and South African English (SAE). Standard SAE refers to all English varieties in South Africa (Bekker, 2012, p. 139). Afrikaans and English belong to the Indo-European language family and, more specifically, to the Germanic language group (Bech & Walkden, 2016, p. 1). Sepedi, in turn,

belongs to the Bantu[i] language family and the Sotho language group (van der Merwe & Le Roux, 2014, p. 1). Languages belonging to different language families and groups have different phoneme inventories and phonological rules. The grammatical structure of Sepedi, Afrikaans, and SAE also differs (Zokirova, 2020, p. 150).

Sepedi

Sepedi is one of the official languages of South Africa, belonging to the South-Eastern Bantu language zone S (van der Merwe & Le Roux, 2014, p. 1). These two authors state that the sound systems of Germanic languages, including Afrikaans and English, differ from African languages, such as Sepedi. The phoneme inventory of Sepedi can be divided into vowels and consonants, which are presented in Table 1.

Table 1. Sepedi vowels and consonants

Vowels	/i/, /e/, /u/, /o/, /ɔ/, /ɛ/, /a/
Consonants	/p'/, /ph/, /β/, /m/, /f/, /fs/, /psh/, /fʃ/, /pʃ'/, /pʃh/, /βʒ/, /ɱ/, /w/, /|/, /ɲ|/, /t'/, /th/, /ts'/, /tsh/, /r/, /s/, /n/, /ŋ!/, /tʃ'/, /tʃh/, /ʃ/, /ʒ/, /tl'/, /tlh/, /ŋǁ/, /ɬ/ , /l/, /ŋ|/, /ɻ/, /j/, /ɲ/, /ɦ/, /k'/, /kh/, /kxh/, /ɣ/, /ŋ/, /h/

Adapted from Kotze (1989, pp. 62,63)

Afrikaans

The Afrikaans phoneme inventory consists of vowels, including short and long monophthongs and diphthongs, approximately 14 basic consonants, seven loan consonants, and 34 consonant clusters (Wissing, 2020, p. 4). Afrikaans was developed by incorporating syntactical and lexical borrowings from African, Khoisan, Malay, Portuguese, and several other European languages, especially Dutch (Groenewald, 2019, p. 10). The vowels and consonants of Afrikaans are presented in Table 2.

Table 2. Afrikaans vowels, consonants, and consonant clusters

Vowels	/i/, /y/, /e/, /ø/, /ə/, /ɛ/, /æ/, /œ/, /a/, /ɔ/, /o/, /u/, /iː/, /yː/, /eː/, /əː/, /ɛː/, /æː/, /œː/, /ɑː/, /ɔː/, /oː/, /uː/, /əi/, /əu/, /œi/, /aːi/, /oːi/, /ui/, /eu/, /ai/, /ɔi/
Consonants	/p/, /t/, /k/, /b/, /d/, /g/, /ʧ/, /ʤ/, /m/, /n/, /ɲ/, /ŋ/, /r/, /R/, /f/, /s/, /ʃ/, /x/, /v/, /z/, /ɦ/, /j/, /l/
Consonant clusters	/rt/, /rk/, /nt/, /st/, /kr/, /dr/, /br/, /sk/, /bl/, /pl/, /xl/, /kl/, /fl/, /lt/, /lf/, /lp/, /lk/, /rs/, /sl/, /ls/, /ts/, /ks/, /sp/, /pr/, /tr/, /rx/, /xr/, /sw/, /kw/, /kn/, /ŋk/, /spr/, /str/, /skr/

Adapted from Coetzee (2018, p. 33-34), and Wissing (2020, p. 4)

South African English (SAE)

The history of SAE dates back as far as 1795, with the first British occupation of the Cape Colony (Bekker, 2012, p. 140). The SAE sound system consists of vowels, including long and short monophthongs and diphthongs, and consonants, respectively, as presented in Table 2. Standard SAE is General South African English and is now the most widely spoken sociolect (Bekker, 2012, p. 139; Bekker et al., 2022, p. 77). The vowels and consonants of SAE are presented in Table 3, respectively, as discussed in a personal interview/email with Prof. Ian Bekker on 03/08/2022.

Table 3. SAE vowels and consonants

Vowels	/ɪ/, /e/, /æ/, /ɵ/, /ä/, /ʊ/, /ə/, /i:/, /u:/, /ɜ:/, /ɔ:/, /ä:/, /ɛ:/, /eɪ/, /œ}/, /uə/, /ɪə/, /aʊ/, /aɪ/, /ɔɪ/
Consonants	/p/, /b/, /d/, /t/, /k/, /g/, /f/, /v/, /θ/, /ð/,/s/, /z/, /ʃ/, /ʒ/, /z/, /h/, /m/, /n/, /ŋ/, /j/, /w/, /ɹ/, /l/

Adapted from Bowerman (2008, pp. 171,172) and Le Roux (2016, pp. 122–129)

The following monophthongs, consonants, and consonant clusters affect the moments of stuttering in Afrikaans with associated core behavior of sound repetitions: /a:/, /e:/, /f/, /v/, /o:/, /x/, /n/, /s/, /k/, /xr/, /kn/, /st/ and /kl/ (Morrish et al., 2017, p. 158). The English vowels, consonants, and consonant clusters that were found to be stuttered on more with associated core behavior of sound repetitions are: /ɑ:/, /e/, /eɪ/, ä/, /g/, /k/, /t/, /f/, /l/, /p/, /tɹ/, and /kl/ (Morrish et al., 2017, p. 158). No diphthongs were responsible for moments of stuttering in Afrikaans, but in English, the diphthong /eɪ/ caused stuttering (Morrish et al., 2017, p. 158). The presence of consonant clusters will likely increase the chances of stuttering (Aydin Uysal et al., 2021, p. 11). As such, phonetic complexity is one reason for stuttering (Bangert et al., 2022, p. 965). Voiceless fricatives and plosives, for example, are phonetically more complex and will be stuttered on more than phonetically less complex vowels (Morrish et al., 2017, p. 155). Conversely, phonetic complexity is not the only challenge when determining stuttering and cluttering in a multilingual PWD (Morrish et al., 2017, p. 155).

The severity of SLD and CLD may also change from one language to another due to the speaker being less proficient in that language due to increased phonetic complexity and greater processing load (Smith et al., 2022, p. 2). These factors may, in turn, induce an increase in stuttering and cluttering in the weaker language. Nonetheless, a PWC may also show more dysfluencies than stuttering exclusively, which are related to language-specific features due to limited time for linguistic

planning (Bóna, 2019, p. 393). A PWC may, for example, show a few or all of the following characteristics: a fast speech rate, intelligibility problems, and a higher-than-average frequency of dysfluencies (Bangert et al., 2022, p. 131). A fast speech rate is the main difference between cluttering and stuttering, and it is hypothesized that a PWC will experience a faster speech rate in a demanding speaking situation (Cable, 2018, p. 1). Thus, their speech-language system cannot accommodate the fast speech rate, which may then influence intelligibility and increase CLD (Van Zaalen- op' t Hof et al., 2009, p. 137).

Another reason for poor intelligibility in a PWC is coarticulation. This process results in the deletion of sounds or syllables in multisyllabic words (St. Louis & Scott, 2020, p. 2; Van Zaalen- op' t Hof et al., 2009, p. 137). A PWC will experience intelligibility problems in running speech, but when a situation is controlled (by giving prompts to reduce speech rate), they produce accurate syllables and words (St. Louis & Scott, 2020, p. 2). Furthermore, a PWC will show a higher-than-average frequency of CLD (interjections, whole-word repetition, phrase repetition, revision, pauses, and incomplete phrases) (Bóna, 2018, p. 22). Dysfluency clusters are a combination of two or more dysfluencies which occurs in a single word and are also present in a PWC's speech and are an indication of more severe speech planning difficulties (Penttilä et al., 2022, p. 4,5).

There is limited research on dysfluencies in African languages, such as Sepedi, and more research is required in this area (Bóna, 2019, p. 393; Morrish et al., 2017, p. 158). There is also limited research on the analysis of dysfluencies in cluttered speech; therefore, more research is necessary in this field, especially in the case of a multilingual PWD (Bóna, 2019, p. 393). In addition, African languages contain complex articulatory sounds, such as clicks, which are not present in Germanic languages. These sounds may increase the moments of dysfluencies in a PWCand a PWS (van der Merwe & Le Roux, 2014, p. 3). However, a PWC will experience fewer cluttering repetitions in sounds and syllables than a PWS, where a PWC may clutter more on multisyllabic words (Cable, 2018, p. 5; Miyamoto, 2020, p. 54).

Complex syllable structures also influence the stuttering patterns of a PWD, not only complex sounds such as clicks (Schäfer & Robb, 2012, p. 2). Still, a PWC will also clutter more in complex structures due to a linguistic planning deficiency (Bóna, 2019, p. 394). The more complex syllable structures of Afrikaans and SAE may lead to the hypothesis that a PWD may experience more dysfluencies in Germanic languages than in an African language (Ononiwu, 2010, p. 3). Thus, a multilingual PWS may present with an increased dysfluency on consonants across Sepedi, Afrikaans, and SAE (Morrish et al., 2017, p. 155). Stuttering will present more prominently at the beginning of a word and is also expected to be found across Sepedi, Afrikaans, and SAE (Khasawneh, 2021, p. 218). A multilingual PWC may present with excessive repetitions in part and whole words, excessive interjections or interruptions with a fast speaking rate, and pauses in grammatically incorrect places (Bóna, 2018, p. 222). Accordingly, these behaviors are not associated with tension, meaning no secondary behaviors are associated with cluttering (St. Louis & Scott, 2020, p. 2). Cluttering is also expected across all three languages in this study. It is hypothesized that the frequency of SLD and CLD may differ across the three languages due to language proficiency or the grammatical structure of the different languages (Byrd, 2018, p. 326).

A few attempts have been made to compare and study the linguistic features of the pattern of stuttering and cluttering in the speech of a multilingual person, but none in African languages (Schäfer & Robb, 2012, p. 609). Thus, more research is necessary for the South African multilingual context to fill this dearth in research (Bóna, 2019, p. 393; Morrish et al., 2017, p. 159). Therefore, the research question of this study is: Which dysfluencies are present in a multilingual PWD?

Method

Aim

This study aimed to describe the dysfluencies in a multilingual PWD.

Study Design

This study employed a mixed-method cross-sectional design where the principal investigator draws on elements of quantitative and qualitative research approaches (Schoonenboom & Johnson, 2017, p. 1). Independent variables (the languages Sepedi, Afrikaans, and SAE) were manipulated by changing the contexts and pressure of the tasks to bring about change in the dependent variables (speech characteristics), which were investigated. More specifically, the different tasks of the independent variables were manipulated to determine and understand the SLD, CLD, and secondary behaviors across and within these languages. The current study first utilized a qualitative perceptual analysis of the characteristics of the dysfluency moments across and within the different languages. Subsequently, the nature of the stuttering and cluttering moments was described using a descriptive method. In short, the current study used a quantitative approach to describe the frequency of the stuttering and cluttering moments and the dysfluencies responsible for these moments. A case study was used by employing a once-off assessment of different SLD, CLD, and secondary behaviors as mentioned.

Participant

The participant adhered to the following inclusion criteria: a) diagnosis of stuttering and cluttering by a speech-language pathologist (SLP), and b) no other communication difficulties such as hearing impairment or other neurologically based communication disorders. The participant is a 41-year-old male with an advanced and persistent mild stuttering and moderate cluttering pattern, as described by Polikowsky et al. (2022, p. 1). The onset of the stuttering and cluttering was at an early age. The participant is a multilingual speaker of Sepedi, Afrikaans, and SAE, with typical oral-facial structures and functioning.

Procedure

Ethical approval was granted by the Research and Ethics Committee of the Faculty of Humanities (HUM006/0422), University of Pretoria, South Africa, before the onset of data collection. The

participant was made aware of his willing participation in the study and offered the option to discontinue participation at any time. The participant gave his consent.

Data collection occurred at one point in time and in one setting, and recording conditions were controlled to support validity (Quintão et al., 2020, p. 269). The recordings were made in a soundproof room in the Department of Speech-Language Pathology and Audiology at the University of Pretoria, South Africa. The recording duration was approximately three hours, with a ten-minute break between testing of the different languages. The principal investigator interviewed the participant in Afrikaans (the first additional language of the participant) to obtain a comprehensive background history adapted from Shipley and McAfee (2016; pp. 83, 84). Speech samples were collected in four different speaking situations in the three languages. These samples included a spontaneous telephone conversation with an anonymous speaker who was fluent in Sepedi as well, speaking face to face in a spontaneous manner with the principal investigator and a speaker fluent in Sepedi about a familiar topic, and reading a phonetically balanced reading passage and word list. Secondary stuttering behavior was also observed throughout the assessment in all three languages. The order of these tasks was randomized in each language to reduce, as far as possible, any learned effects and carry-over, which can manipulate stuttering or cluttering behavior throughout recordings. The tasks were numbered, and the numbering was randomized with each assessment in a different language. All speech samples from the three languages were audio and video recorded for perceptual analyses by the listening panel, which consisted of five qualified Health Professional Council of South Africa (HPCSA) registered SLPs.

Material and Apparatus

The current study used a self-designed assessment protocol in Sepedi, Afrikaans, and SAE. The protocol included a phonetically balanced word list for each of these languages, a spontaneous telephone conversation with an unfamiliar speaker, a familiar topic discussed with the principal investigator, and a reading passage: “The North Wind and Sun". The English version of “The North

Wind and Sun" was translated into Sepedi by a board-certified translator at the University of South Africa, back translation was done by a similarly-qualified translator, and finally a panel agreed on the suitability of the translation (van der Merwe et al., 2017, p. 3). A professionally translated version was already available in Afrikaans. Instrumentation used includes a Samsung S21 smartphone, a digital Phillips voice recorder/voice tracker with a three-microphone system, and a computer. The Dysfluency Index and the Stuttering Severity Index (SSI-4) were used to determine the severity, frequency, and duration of the SLD and CLD in all three languages (Riley & Bakker, 2009, p. 11; Shipley & McAfee, 2016, p. 399)

Data analysis

Perceptual analysis was used to study the SLD and CLD within and across the three languages. The sounds stuttered on were phonetically transcribed using the International Phonetic Alphabet (IPA). Descriptive statistics were used to study the nature and frequency of the stuttering. The stuttering and cluttering moments were converted to percentages to indicate the frequency of dysfluency in each language quantitatively. The adapted version of the Dysfluency Index was used to analyze the dysfluencies on which errors occurred in Sepedi, Afrikaans, and SAE by describing the nature/core behaviors of the participant. The Assessment of Associated Motor Behaviors was used to observe and discuss the secondary behavior of the PWD (Shipley & McAfee, 2016, p. 401). The video and audio recordings were replayed to allow for acoustic and visual analysis until an agreement was reached between the listening panel and the principal investigator to ensure the consistency of the results. Intra-rater reliability was used to determine a point-to-point agreement for each assessment section for each listener in the listening panel.

Results

Nature and frequency of SLD and CLD during the stuttering and cluttering moments of a PWD across and within Sepedi, Afrikaans, and SAE.

The combined total of dysfluencies (SLD and CLD) across and within the three languages were 291. The weightings for the different languages were Sepedi 21,9%, Afrikaans 36,4%, and SAE 41,5%.

Sepedi

The total number of SLD in Sepedi was 24 stuttering-like dysfluency moments. Thus, the following SLD were observed: part-words 16 (66,6%), prolongations of sounds/syllables five (20,8%), repetitions of sounds/syllables three (12,5%) and no silent prolongations (0%), broken words (0%), or blocks (0%). The total number of CLD in Sepedi was 40 cluttering-like dysfluency moments. Accordingly, in this study, the following CLD were discerned: repetitions of whole-words 11 (27,5%), repetitions of phrases, eight (20%), interjections of whole-words, eight (20%), incomplete phrases five, (12,5%), revisions five, (12,5%), silent pauses three (7,5%), with no interjections of phrases (0%), and interjections of sounds/syllables (0%). Figure 1 depicts the frequency of SLD and CLD in Sepedi.

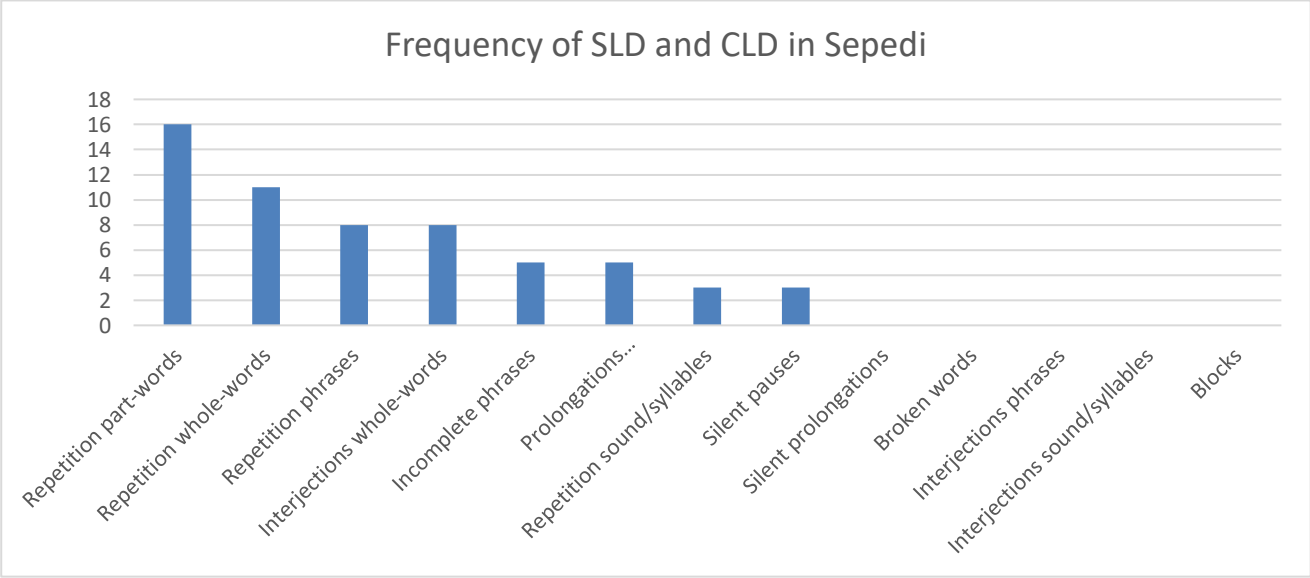

Figure 1. Frequency of SLD and CLD in Sepedi

Afrikaans

The total number of SLD in Afrikaans was 51 stuttering-like dysfluency moments. Accordingly, the following SLD were observed: repetitions of part-words 29 (56,8%), repetitions of sounds/syllables 18 (35,2%), prolongations of sounds/syllables 4 (7,8%), with no silent prolongations 0 (0%), broken

words (0%), or blocks (0%). The total number of CLD was 55 cluttering-like dysfluency moments. The observed CLD were as follows: repetitions of whole-words 25 (45,4%), repetitions of phrases 12 (21,8%), revisions nine (16,3%), interjections of whole-words eight (14,5%), silent pauses one (1,8%), with no interjections of sounds/syllables (0%), interjections of phrases (0%), or incomplete phrases (0%). Figure 2 visually depicts the frequency of SLD and CLD in Afrikaans.

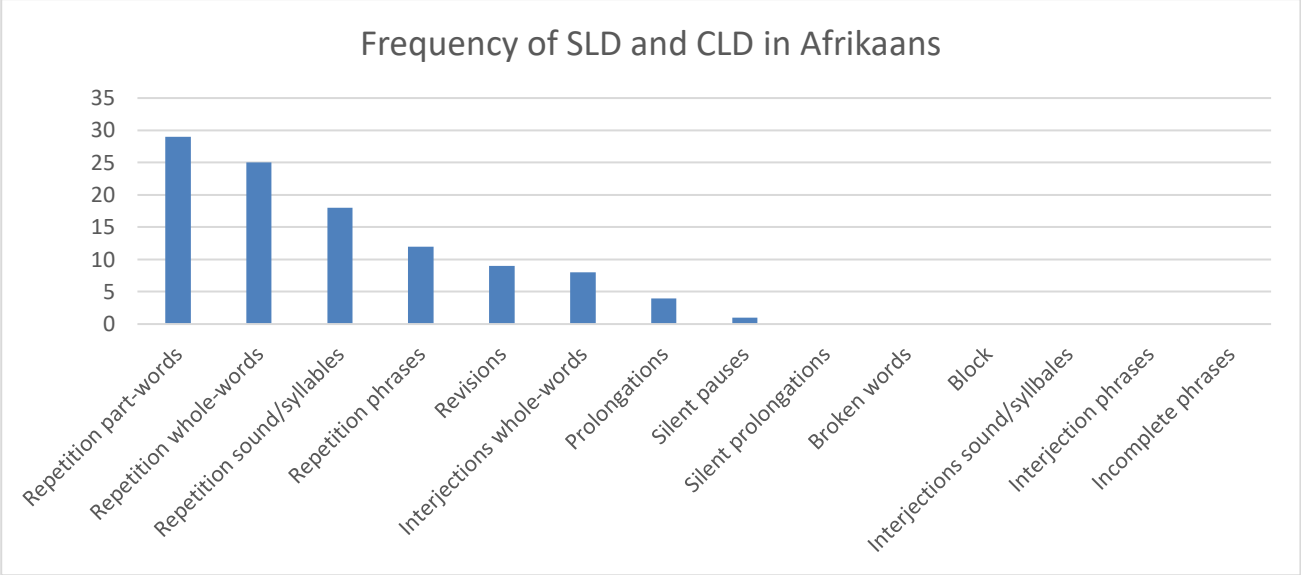

Figure 2. Frequency of SLD and CLD in Afrikaans

SAE

The total number of SLD in SAE was 62 stuttering-like dysfluency moments. Subsequently, the following SLD were observed: repetitions of part-words 43 (69,3%), repetitions of sounds/syllables 11 (17,7%), prolongations of sounds/syllables, five (8,0%), silent prolongations, two (3,2%), broken words one (1,6%), and no blocks (0%). The total number of CLD in SAE was 59 cluttering-like dysfluency moments. The following CLD were detected: repetitions of whole words 21 (35,5%), interjections of whole words 15 (25,4%), repetitions of phrases 12 (20,3%), silent pauses, four, (6,7%), incomplete phrases, four (6,7%), revisions three (5,0%), with no interjections of sounds/syllables (0%), or interjections of phrases (0%). Figure 3 depicts the frequency of SLD and CLD in SAE.

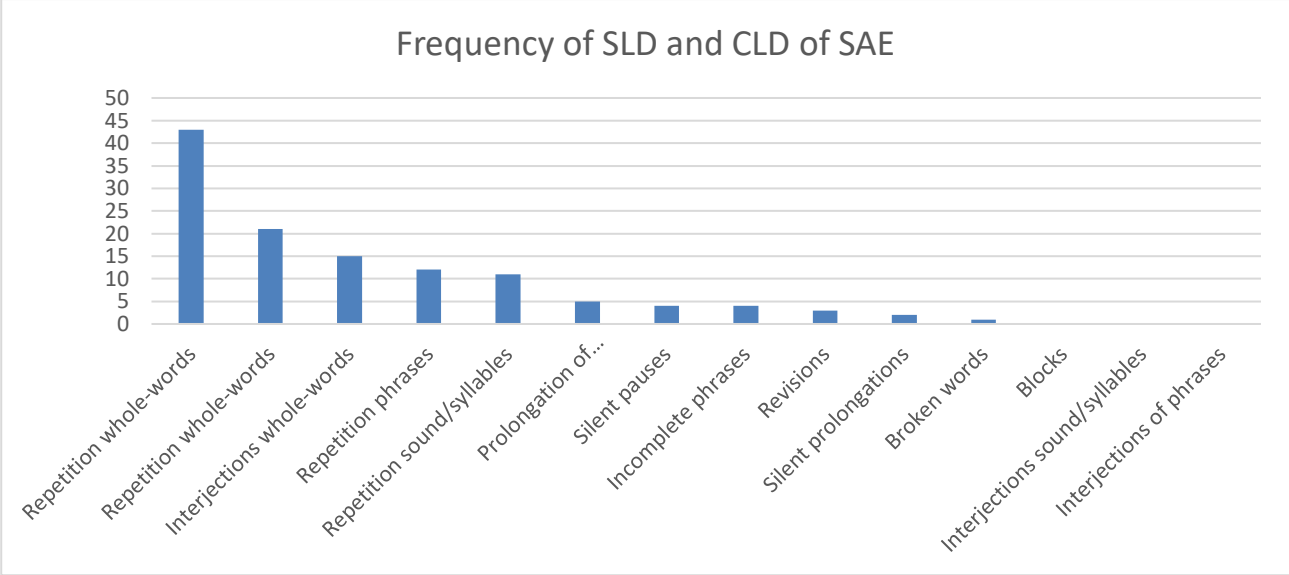

Figure 3. Frequency of SLD and CLD in SAE

Dysfluencies in Sepedi, Afrikaans, and SAE

The most prevalent SLD in Sepedi, Afrikaans, and SAE was the repetition of part words. The most common CLD in these languages was the repetition of whole words. All the repetitions of sounds/syllables across and within Sepedi, Afrikaans, and SAE occurred on single consonant sounds and none on vowel sounds. The total number of stuttering-like dysfluencies (repetitions of sounds) in Afrikaans was 18. The most common sounds resulting in a stuttered speech in Afrikaans were the plosives /d/ 6 (33,3%) and /p/ 3 (16,6%), and the fricative /v/ 3 (16,6%). The total number of stuttering-like dysfluencies (repetition of sound) was 11 in SAE. In SAE, the most common sound resulting in stuttered speech was the plosive /d/ 5 (45,4%). In Sepedi, there was no repetition of sounds, and subsequently, no stuttered speech was recorded. However, three repetitions of syllables /se-/ were noted. The plosive /d/ sound represented the highest occurrence and resulted in repetitions across and within Afrikaans and SAE. Nonetheless, plosives, nasals, and fricatives in Afrikaans and English were collectively responsible for moments of dysfluency. Table 4 summarizes the repetitions of sounds/syllables across and within the three languages.

Table 4. Repetition of sounds/syllables across and within Sepedi, Afrikaans, and SAE

	Sepedi		**Afrikaans**		**South African English (SAE)**	
	Frequency	**Example**	**Frequency**	**Example**	**Frequency**	**Example**
Sounds	No repetitions of sound		3 1 6 2 1 1 1 3	/p/ /g/ /d/ /s/ /m/ /b/ /n/ /v/	1 2 1 2 5	/s/ /n/ /p/ /k/ /d/
Syllable repetition	3	se-	0		0	

Secondary stuttering behaviors of a PWD across and within Sepedi, Afrikaans, and SAE

The following associated motor behaviors were present during moments of stuttering: eye blinking, facial grimaces, frowning, fidgeting of the hands, and hand gestures. In Afrikaans, facial grimaces, and eye blinking occurred on the word “toe” (then), in SAE on the plosive /p/ sound, and non in Sepedi. Frowning was present in Afrikaans on the nasal /m/ and plosive /d/ sounds, and in Sepedi, on the /se-/ syllable. In Afrikaans, fidgeting transpired on the fricative /v/ sound. Hand gestures were only present in Afrikaans on the fricative /v/ and plosive /k/ sounds, in SAE on the plosive /k/ sound, and none occurred in Sepedi. No secondary behavior was noted in any CLD across and within Afrikaans, SAE, and Sepedi. Table 5 summarizes the secondary stuttering behavior across and within the different languages.

Table 5. Secondary stuttering behavior

Associated Motor Behavior	**Description of behavior**	**Behavior present in Sepedi, Afrikaans or SAE**	**Sound/syllable/ word present**
Eyes	Eye blinking and facial grimaces	Afrikaans South African English	"toe" /p/
Forehead	Frowning	Afrikaans Sepedi	/m/, /d/ /se-/
Hands	Fidgeting	Afrikaans	/v/
Arms	Hand movement and gestures	Afrikaans South African English	/v/, /k/ /k/

Discussion

Nature and frequency of the SLD during the stuttering moments of a PWD across and within Sepedi, Afrikaans, and SAE

The most prominent SLD exhibited by the participant across and within the languages was repetitions of part words. Similar findings have previously been reported regarding repetitions being one of the core SLD in a PWD (NIH, 2017, p. 1). SLD occurred more often at the beginning of a word, and this finding supports previous research done in Saudi Arabia on stuttering severity among students with learning disabilities in English (Khasawneh, 2021, p. 218). The participant experienced more dysfluencies on words beginning with a consonant than on words beginning with vowels. Similarly, this characteristic was evident in the repetitions of sounds and syllables across and within Afrikaans and SAE. The most prominent sound responsible for stuttering in Afrikaans and SAE was the plosive /d/ sound. Furthermore, all repetitions of sounds and syllables occurred on single consonants and

none on vowels. Similar findings were previously reported in a South African multilingual study in Afrikaans, German, and English, stating that phonetic complexity of plosive sounds is a reason for stuttering (Morrish et al., 2017, p. 155). In Sepedi, no repetition of sounds was exhibited by the participant, only three repetitions of the syllable /se-/ in Sepedi were noted. A study done in Harare, Zimbabwe on Bantu languages contradict the assumption that more phonetically complex sounds, such as clicks, which are present in Sepedi, may lead to more dysfluencies in this language (Mhute, 2016, p. 1; van der Merwe & Le Roux, 2014, p. 3). The participant exhibited 21 SLD in Sepedi (the participant's L1), 51 SLD in Afrikaans (the participant's L2), and 62 SLD in SAE (the participant's L3). These findings are in agreement with previous research done in Turkey on Turkish-speaking participants in the analysis of different dysfluencies, which stated that the frequency of the dysfluencies mostly depends on the proficiency of the specific language (Altıparmak & Kuruoğlu, 2018, p. 700).

The participant is more proficient in Sepedi and therefore experiences fewer SLD than in SAE. However, the participant only exhibited 32 (23,3%) stuttering-like repetitions of sounds and syllables across and within Sepedi, Afrikaans, and SAE. This may lead to a general supposition for the present study, which concurs with similar findings in a recent Japanese study on co-occurring disorders in children who stutter, and a second clinical review conducted in the United States. Analysis of the responses to the Japanese checklist for possible cluttering cited in these studies concluded that a PWS experiences more repetitions of sounds and syllables than a PWC (Cable, 2018, p. 5; Miyamoto, 2020, p. 54).

Nature and frequency of the CLD during the cluttering moments of a PWD across and within Sepedi, Afrikaans, and SAE

The most prevalent CLD presented by the participant across and within the investigated languages were repetitions of whole words, repetition of phrases, and interjections of whole words. Similar findings in a study done in the United States on dysfluencies in English clutter speech indicated that

a PWC would exhibit more whole word and phrase repetitions than a PWS (Myers et al., 2012, p. 10). Likewise, more recent research in Hungary concerning Hungarian speakers on typical, fast, and cluttered speech, noted that a PWC will show excessive amounts of interjections in their speech (Bóna, 2019, p. 222). These findings are also in agreement with recent research, which states that a PWC will show the following CLD: repetitions of whole words, phrases, interjections, revisions, incomplete phrases, and pauses (Bangert et al., 2022, p. 955; Bóna, 2018, p. 222; Miyamoto, 2020, p. 54). However, the participant in the current study did not exhibit interjections of phrases across and within all three languages. Rather, in agreement with an older study conducted in the United States on English monolingual speakers on stuttering, cluttering, and phonological complexity, the current study noted that the participant experienced more CLD on content words than function words (LaSalle & Wolk, 2011, p. 288). The American researchers opined that function words are less phonetically complex and shorter in length (LaSalle & Wolk, 2011, p. 288). In this way, the grammatical structure of a language may influence the CLD of a PWD (Byrd, 2018, p. 327).

The participant exhibited 40 CLD in Sepedi, 55 CLD in Afrikaans, and 59 CLD in SAE. Similar findings were noted in previous research in the United States of America on bilingual-speaking children and in a study done in South Africa on multilingual speakers. The studies found that dysfluencies' nature, frequency, and distribution are related to the individual's proficiency in each language (Brundage et al., 2016, p. 120; Morrish et al., 2017, p. 155). The participant may exhibit increased proficiency and, therefore, fewer CLD in Sepedi (L1), and due to a decrease in proficiency in SAE, there will be an increase in CLD in SAE (L3). However, Afrikaans (L2) and SAE (L3) are Indo-European languages belonging to the Germanic language group (Beck et al., 2017, p. 1). Sepedi belongs to the Bantu language family and the Sotho language group (van der Merwe & Le Roux, 2014, p. 1). Languages belonging to different language families and groups have different phoneme inventories and phonological rules. The grammatical structure of Sepedi, Afrikaans, and SAE also differs (Zokirova, 2020, p. 150). Thus, there is more CLD in SAE and Afrikaans due to the participant

being less proficient in those languages and less CLD in Sepedi due to the participant being more proficient in that language.

Secondary stuttering behaviors of a PWD across and within Sepedi, Afrikaans, and SAE

The participant exhibited the following secondary stuttering behaviors across and within the investigated languages: eye blinking, facial grimaces, frowning, fidgeting of the hands, and hand gestures. These findings agree with research on secondary behavior in children who stutter, which states that a PWS will exhibit SLD with associated tension (secondary stuttering behaviors) (ASHA, 2020, p. 1; Frost, 2022, p. 3,4). These secondary stuttering behaviors most often occurred on the fricative /v/ sound and the plosive /k/ sound. Similar findings were previously noted in a South African multilingual stuttering case study, namely, that phonetic complexity is a reason for stuttering and fricative and plosive sounds are phonetically more complex (Morrish et al., 2017, p. 155). There was no difference across and within Sepedi, Afrikaans, and SAE in the number of secondary stuttering behaviors associated with each language in this study. However, the participant did not exhibit many secondary stuttering behaviors in SLD. Furthermore, the participant (as hypothesized) did not show any secondary behaviors associated with CLD. These findings agree with the previously mentioned Hungarian research study as well as others which stated that a PWC would only show a little or no tension (secondary behaviors) associated with CLD (Bangert et al., 2022, p. 955; Bóna, 2018, p. 222; Cable, 2018, p. 2; Miyamoto, 2020, p. 54).

Conclusion

This study described the dysfluencies in a multilingual PWD across and within Sepedi, Afrikaans, and SAE. The participant experienced the most SLD and CLD in SAE, fewer in Afrikaans, and the least in Sepedi. As seen in the results, the participant is more proficient in Sepedi and Afrikaans than in SAE, which is the participant's L3. Thus, CLD and SLD as seen in this study, are influenced by the participant's level of proficiency in each of the three languages. However, the participant exhibited more CLD than SLD in all three languages. The most frequently used SLD across and

within Sepedi, Afrikaans, and SAE were repetitions of part words. The most frequently used CLD across and within these languages were repetitions of whole words. The most prevalent repetition of sounds which was the most difficult and evoked a stuttering moment, was the plosive /d/ sound across and within Afrikaans and SAE. No repetition of sounds in Sepedi occurred, and only three repetitions of one syllable, namely /se-/ was noted. There was no difference in secondary stuttering behavior across and within Sepedi, Afrikaans, and SAE. However, the sounds most responsible for these secondary stuttering behavior across and within Afrikaans and SAE were the fricative /v/ and the plosive /k/. In Sepedi, the /se-/ syllable was responsible for the secondary behaviors. Further research is needed on a larger sample size to generalize the findings to the general population.

Limitations

The study is limited by its single-participant case study design which could only yield descriptive statistics on account of the limited novel multilingual population who display CLD and SLD. Moreover, obtaining a single case during the remnants of the COVID-19 pandemic was challenging.

Recommendations

This study shows the importance and necessity of future research in stuttering and cluttering in multilingual populations as these contexts increasingly form the basis of global speech-language therapy client bases. This study did not investigate CLD and SLD in other African languages. Future research should focus on the analysis of CLD and SLD in other African languages and other language groups, for example, the Nguni language group, more specifically IsiZulu, as it is the most widely spoken African language (van der Merwe & Le Roux, 2014, p. 1). Furthermore, larger samples should be carefully sourced, grouped, and investigated in terms of the number and order of the multilingual context, as well as the opaque or transparent nature of these languages.

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CHAPTER 4
CONCLUSION

"Success is not final, failure is not fatal, it is the courage to continue that counts."

Winston S. Churchill.

The aim of the chapter is to provide a conclusive overview of the research study and results. The clinical implications, study limitations, and future recommendations are also discussed. The chapter closes with a final concluding statement on the research study.

4.1 Overview

This research study aimed to describe dysfluencies in a multilingual PWD. The objectives of this study were: firstly, to describe the nature and frequency of the SLD during the stuttering moments across and within Sepedi, Afrikaans, and SAE of a PWD; secondly, to describe the nature and frequency of the CLD during the cluttering moments across and within Sepedi, Afrikaans, and SAE of a PWD, and thirdly to describe any possible secondary stuttering behaviours of a PWD across and within Sepedi, Afrikaans, and SAE.

This study found that the participant experienced the most SLD and CLD in SAE (L3), fewer in Afrikaans (L2), and the least in Sepedi (L1). Thus, the amount of SLD and CLD present in a certain language may be determined by the participant's proficiency in that specific language, as was also established by a similar study by Morrish et al. (2017, p. 154). Another study done on bilingual-speaking Yiddish and Dutch children stated that the SLD were significantly higher in their non-dominant language, which agrees with this study's findings (Eggers et al., 2019, p. 576).

The most prevalent SLD across and within all three languages was the repetition of part words. This statement correlates with research by the National Institute of Health and a study done in Japan on bilingual people who stutter in Japanese who stated that repetition of part words is one of the core SLDs in a PWS (Oea et al., 2020, p. 192).

The participant did experience more dysfluencies at the beginning of consonants than vowels. Similar findings were established by a case study done on sounds affecting the

moments of stuttering in multilingualism and a study done in the United States and the United Kingdom, which stated that consonants are phonetically more complex than vowels and will be stuttered on more (Lu et al., 2022, p. 1). These findings may be due to the most prominent sound responsible for stuttering in SAE and Afrikaans, which was the plosive /d/ sound. In Sepedi, no repetition of sounds was exhibited by the participant. Only three repetitions of the syllable (/se-se-/) in Sepedi were noted. These findings contradict previous research, which stated that African languages contain complex articulatory sounds such as clicks which may increase dysfluencies in a PWS and PWD (van der Merwe & Le Roux, 2014, p. 3). However, Schäfer and Robb (2012) stated that not only complex sounds such as clicks are responsible for dysfluencies, but complex syllable structures also influence the stuttering patterns of a PWD. These findings correlate with a study on speech dysfluencies in Canadian children who stutter, which stated that phonological complexity, for example, syllable structures of a language, may influence stuttering patterns of a PWD (Seth & Maruthy, 2019, p. 4). The most prevalent CLD across and within all three languages was repetitions of whole words. These findings agree with previous research on dysfluencies in cluttered speech (Bangert et al., 2022, p. 958; Myers et al., 2012, p. 10).

The participant exhibited the following secondary stuttering behaviour across and within the three languages: eye blinking, facial grimaces, frowning, fidgeting of the hands and hand gestures. Thus, a PWS will exhibit SLD associated with tension (secondary behaviour). These findings correlate with previous research by the National Institute of Health and a study done in the United States on adults who stutter (Tichenor & Yaruss, 2019, p. 4361). The most prevalent sounds responsible for the secondary behaviours were the fricative /v/ and plosive /k/sounds. These findings correlate with previous research of Morrish and colleagues, which stated that these sounds are more phonetically complex and fricative sounds are more difficult to produce. The participant did not show any secondary behaviour associated with CLD due to a PWC will show a few to non-CLD associated with tension (secondary behaviour). These findings are similar to Bangert and colleagues' findings about CLD, which are not associated with tension.

4.2 Clinical implications

South Africa has 11 official languages, and most of the population is bi- or multilingual (van der Merwe & Le Roux, 2014, p. 1). The South African SLTs are being challenged daily by working with foreign languages, which may lead to a patient's misdiagnosis, or provide

inadequate stuttering and cluttering therapy due to unfamiliarity with the languages (Hoffman et al., 2020, p. 1). This study will benefit the diverse population of South Africa and the global communities as well, as the novel results presented here reflect the multilingual context created by international migration in the past few years. As such, new insight in the nature of dysfluencies and secondary behaviours alike within and across the different languages of a multilingual person may inform new and novel approaches to assessing and treating these diverse populations.

4.3 CRITICAL EVALUATION OF THE STUDY

A critical evaluation is necessary to evaluate the study and ensure an in-depth interpretation of the findings per the strengths and limitations.

4.4 Study Strengths

To the researcher's knowledge, this is the first study in South Africa on the dysfluencies in a multilingual speaker who speaks Sepedi, Afrikaans, and SAE specifically. The only similar study investigated how sounds affected the moments of stuttering in a multilingual speaker (Morrish et al., 2017). Moreover, there is limited research on cluttering in general, and more precisely on multilingual speakers who clutter in African languages. This status quo exists even though the International Cluttering Association was created more than 10 years ago and is growing rapidly (Reichel, 2019, p. 1566). Subsequently, the novelty of this present study lies equally in the stuttering components in three specific languages and cluttering in the same.

4.5 STUDY LIMITATIONS

Some changes had to be made to the protocol due to the results obtained during data collection. However, these changes did not influence the validity and reliability of the data collection procedures. Furthermore, as the results of a case study can generally not be related or generalised to the specific populations, which may also be seen as a limitation.

4.6 RECOMMENDATIONS FOR FUTURE RESEARCH

The study highlights the potential for future research studies. This current study did not investigate SLD and CLD in other African languages. Future research should focus on the analyses of SLD and CLD in other African languages and other language groups, for example the Nguni language group and, more specifically, IsiZulu, due to it being the most widely spoken African language (van der Merwe & Le Roux, 2014, p. 1). Moreover, the study

populations should be larger so that more specific and generalisable deductions and conclusions can be drawn from the results.

4.7 FINAL COMMENTS

With increasing linguistic and multicultural diverse societies, SLTs are tasked with working with clients who speak different languages. However, there is still a dearth of research exploring the extent to which SLTs can reliably measure dysfluencies and secondary behaviours in other languages (Hoffman et al., 2020, p. 1). Due to the limited research on multilingualism in stuttering and cluttering in African languages in South Africa, this study was crucial and novel in its aim to obtain more information on this important matter and, subsequently, inform clinical contexts.

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APPENDICES

APPENDIX A
-COCAF-4-

Table 6. COCAF-4 Checklist of Cluttering and Associated Features

COCAF-4 Checklist of Cluttering & Associated Features

DOB_____
Test date_____

Name _____

		1	2	3	Reported but not observed	Seen at assessment
Speech rate & speech fluency	Stuttering					
	Perceptually overly rapid speech rate					
	Short bursts of fast speech					
	Unable to maintain natural speech rhythm					
	Inappropriate speech rhythm / pausing					
	Inappropriate breathing patterns					
	Phoneme repetition					
	Part word repetition					
	Word repetition					
	Phrase repetition					
Articulation	Mumbling/low volume indistinct speech output					
	Excessive cooarticulation/overcoarticulation					
	Cluster reduction					
	Weak syllable deletion					
	Festinant speech (speech becomes faster and more mumbled over a sentence or phrase)					
	Transposition of phonemes (spoonerisms)					
	Anticipatory coarticulation errors					
	Mispronunciations					
	Speech characterized by a lack of physical tension					
Language and linguistic fluency	Confused wording					
	Revised sentences/phrases					
	Word retrieval difficulties					
	Use of non – specific words “thing”					
	Use of interjections and fillers, e.g., “um, er, well, you know, like”					

	Poor syntax					
	Empty speech/maze behaviour					
	Repetition and revision of words and phrases					
	Semantic paraphasias (e.g., magazine for paper)					
	Unfinished sentences					
	Possible high-level comprehension difficulties					
Disorganized thinking	Reduced ability to sequence significant events ina story (also may give prominence to unimportant details when storytelling)					
	Gives inappropriate level of detail					
	Goes off-topic/tangential speech					
	Unaware of fluency/speech/language errors					
Writing	Untidy handwriting					
	Written errors mimic speech errors. This may include: missing or transposed characters, lack of consistency in letter height					
	Careless spelling errors					
Attention	Short attention span					
	Easily distracted					
	Forgetful					
Other nonverbal attributes	Poor gross motor control Poor fine motor control Other					

APPENDIX B
-Phonetically balanced word list in Afrikaans -

Table 7. Phonetically balanced word list in Afrikaans

1.	**perd**	**2.**	**blare**
3.	**lepel**	**4.**	**piesang**
5.	**seep**	**6.**	**kat**
7.	**boom**	**8.**	**munte**
9.	**baba**	**10.**	**gogga**
11.	**mielie**	**12.**	**vliegtuig**
13.	**emmer**	**14.**	**ring**
15.	**vurk**	**16.**	**huis**
17.	**olifant**	**18.**	**jas**
19.	**stoof**	**20.**	**gholf**
21.	**water**	**22.**	**masjien**
23.	**kraan**	**24.**	**zebra**
25.	**druiwe**	**26.**	**pleister**
27.	**tafel**	**28.**	**sleutels**
29.	**brood**	**30.**	**kliptrein**
31.	**deur**	**32.**	**gras**
33.	**sjokolade**	**34.**	**swem**
35.	**neus**	**36.**	**kwas**

37. skoene	**38. knoop**
39. rok	**40. spieël**
41. spring	**42. stryk**
43. skryf	**44. skulp**
45. wolke	**46. berg**
47. drink	**48. fiets**
49. boks	**50. seun**
51. glas	**52. fiets**
53. seuntjie	**54. lamp**

Adapted from Lotter (1974, p. 39)

APPENDIX C
-Consonants and Vowels of SAE, phonetically balanced word list in SAE-

Table 8. Phonetically balanced word list in SAE

1. **kit**	**2.** **dress**
3. **trap**	**4.** **lot**
5. **strut**	**6.** **foot**
7. **letter**	**8.** **fleece**
9. **goose**	**10.** **nurse**
11. **thought**	**12.** **bath**
13. **square**	**14.** **face**
15. **goat**	**16.** **cure**
17. **near**	**18.** **mouth**
19. **price**	**20.** **choice**
21. **pen**	**22.** **bed**
23. **did**	**24.** **tea**
25. **cat**	**26.** **got**

27. **fall**	**28.** **violin**
29. **thin**	**30.** **this**
31. **so**	**32.** **zoo**
33. **shoe**	**34.** **vision**
35. **xylophone**	**36.** **hat**
37. **man**	**38.** **no**
39. **sing**	**40.** **wet**
41. **red**	**42.** **leg**

Adapted from Bowerman (2008, pp. 171–172)

APPENDIX D
-Vowels and Consonants in Sepedi, phonetically balanced word list in Sepedi-

Table 9. Phonetically balanced word list in Sepedi

1.	go leka
2.	go duša
3.	loka
4.	go fôra
5.	go fêra
6.	go fara
7.	pitša
8.	phuputso
9.	go bitša
10.	go mamaretsa
11.	go fofa
12.	bofsa
13.	go pshikologa
14.	bofša

15.	mpša
16.	phša
17.	bjang
18.	go myemyela
19.	sewa
20.	cecece
21.	nce-nce-nce
22.	botala
23.	tharollo
24.	tseba
25.	tshipi
26.	go rora
27.	sesotho
28.	lenaneo
29.	nqwaa
30.	go tšea
31.	go tšhaba
32.	go ššoma
33.	go ja

34.	go tla
35.	ntlha
36.	nxanxae
37.	hlotla
38.	go leka
39.	go dula
40.	go tsamaya
41.	go nyaka
42.	go huma
43.	koloi
44.	go khutša
45.	kgale
46.	go gama
47.	ngaka
48.	go hema

Adapted from Kotze (1989, p. 62,63)

APPENDIX E
-The North Wind and the Sun in Afrikaans, English, and Sepedi -

The North wind and the Sun in Afrikaans - Reading passage

Die Noordewind en die Son betwis oor hul magte en besluit om die palm toe te gee aan die een wat 'n reisiger van sy klere gestroop het. Die Noordewind het eerste begin en met geweld gewaai; en die man druk sy klere teen hom, en die Noordewind val toe met meer krag aan; maar die man, vererg deur die koue, trek 'n ander rok aan. Die Noordewind, verslaan, het dit aan die Son gegee. Dit het sag begin lig, en die man trek sy tweede rok uit; dan stuur die son stadigaan sy warmste strale na hom toe, totdat die man nie meer die hitte kan weerstaan nie, sy klere uittrek om in die naburige rivier te gaan bad.

The North Wind and the Sun English – Reading passage

The Wind and the Sun were disputing which was the stronger. Suddenly they saw a traveller coming down the road, and the Sun said: “I see a way to decide our dispute. Whichever of us can cause that traveller to take off his cloak shall be regarded as the stronger. You begin.” So, the Sun retired behind a cloud, and the wind began to blow as hard as it could upon the traveller. But the harder he blew the more closely did the traveller wrap his cloak round him, till at last, the Wind had to give up in despair. Then the Sun came out and shone in all his glory upon the traveller, who soon found it too hot to walk with his cloak on.

The Northwind and the Sun in Sepedi – Reading passage

Phefo le Letšatši di be di ngangišana gore ke efe go tšona yeo e nago le maatla go fetiša ye nngwe. Di sa le gare di ngangišana tša bona moeti a tšwelela mmileng, gomme Letšatši la re: “Ke bona tsela ye re ka phethago ngangišano ya rena ya yona. Yo gare ga rena a ka dirago gore moeti a apole kobo ya gagwe o tla tšewa go ba yo a nago le maatla go fetiša yo mongwe. A go thome

wena.” Ka go realo Letšatši la ya go dula ka morago ga maru, gomme, Phefo ya thoma go foka ka maatla a magolo go moeti. Eupša ge e foka bjalo ka maatla go fetišiša, moeti a itatetša ka kobo ya gagwe ka go tiiša, go fihlela Phefo e itlhoboga. Ka morago Letšatši la tšwelela gomme la fiša kudu mo moeti a ilego a bona gore go fiša ka moo a ka se sepelego a apere kobo ya gagwe.

Adapted from Roach (2004, pp. 239–245)

APPENDIX F
-Dysfluency Index-

Table 6. Dysfluency Index checklist

Type of dysfluency	Frequency	Example
Repetitions		
Part Word		
Whole Word		
Phrase		
Prolongations		
Silent		
Sound/Syllable		
Interjections		
Sound/syllable interjection		
Whole Word		
Phrases		
Silent Pauses		
Silent Pauses		
Incomplete Phrases		
Incomplete Phrases		
Revision		

Revision		
Blocks		
Pauses		

Adapted from Shipley and McAfee **(2016, p. 399)**

APPENDIX G
-Assessment of Associated Motor Behaviour-

Table 11. Associated motor behaviour checklist

Associated Motor Behaviour	**Description of behaviour**	**Behaviour present in Afrikaans or SAE or Sepedi - Please tick**	**Sound present**
Eyes		**Afrikaans** **SAE** **Sepedi**	
Nose		**Afrikaans** **SAE** **Sepedi**	
Forehead		**Afrikaans** **SAE** **Sepedi**	
Head		**Afrikaans** **SAE** **Sepedi**	
Lip		**Afrikaans** **SAE** **Sepedi**	
Tongue		**Afrikaans** **SAE** **Sepedi**	

Teeth		**Afrikaans** **SAE** **Sepedi**	
Jaw		**Afrikaans** **SAE** **Sepedi**	
Neck		**Afrikaans** **SAE** **Sepedi**	
Fingers		**Afrikaans** **SAE** **Sepedi**	
Hands		**Afrikaans** **SAE** **Sepedi**	
Arms		**Afrikaans** **SAE** **Sepedi**	
Legs		**Afrikaans** **SAE** **Sepedi**	
Breathing		**Afrikaans** **SAE** **Sepedi**	

Adapted from Shipley & McAfee (2016, pp. 401–404**)**

APPENDIX H
-SSI-

Stuttering Severity Instrument

TEST FORM

by Glyndon D. Riley, Ph.D.

NAME _____ SEX M F GRADE _____

SCHOOL _____ DATE OF BIRTH _____

EXAMINER _____ DATE _____ AGE _____

READER _____ NON-READER _____

FREQUENCY Use *Readers Table* 1 and 2 or *Non-Readers Table*, not both.

READERS TABLE

1. Job Task Percentage	1. Job Task Task Score	2. Reading Task Percentage	2. Reading Task Task Score
1	2	1	2
2-3	3	2-3	4
4	4	4-5	5
5-6	5	6-9	6
7-9	6	10-16	7
10-14	7	17-26	8
15-28	8	27 and up	9
29 and up	9		

NON-READERS TABLE

3. Picture Task Percentage	3. Picture Task Task Score
1	4
2-3	6
4	8
5-6	10
7-9	12
10-14	14
15-28	16
29 and up	18

Frequency Task Score 1 and 2 or 3 _____

DURATION

Estimated Length of Three Longest Blocks	Score
Fleeting	1
One half second	2
One full second	3
2 to 9 seconds	4
10 to 30 seconds (by second hand)	5
30 to 60 seconds	6
More than 60 seconds	7

Duration Score _____

PHYSICAL CONCOMITANTS

Evaluating Scale: 0 = none; 1 = not noticeable unless looking for it; 2 = barely noticeable to casual observer; 3 = distracting; 4 = very distracting; 5 = severe and painful looking.

Distracting Sounds:	Noisy breathing, whistling, sniffing, blowing, clicking sounds	0 1 2 3 4 5
Facial Grimaces:	Jaw jerking, tongue protruding, lip pressing, jaw muscles tense	0 1 2 3 4 5
Head Movements:	Back, forward, turning away, poor eye contact, constant looking around	0 1 2 3 4 5
Movements of the Extremities:	Arm and hand movement, hands about face, torso movement, leg movements, foot tapping or swinging	0 1 2 3 4 5

Total Physical Concomitant Score _____

Total Overall Score _____

CHILDREN'S SEVERITY CONVERSION TABLE (I)

Instructions: To convert the total overall score to a percentage, circle the appropriate number below.

Total Overall Score (circle one)	Percentile	Severity
0-5	0-4	Very Mild
6-8	5-11	Mild
9-13	12-23	
14-15	24-40	
16-19	41-60	Moderate
20-23	61-77	
24-27	78-89	Severe
28-30	90-96	
31-45	97-100	Very Severe

ADULT'S SEVERITY CONVERSION TABLE (II)

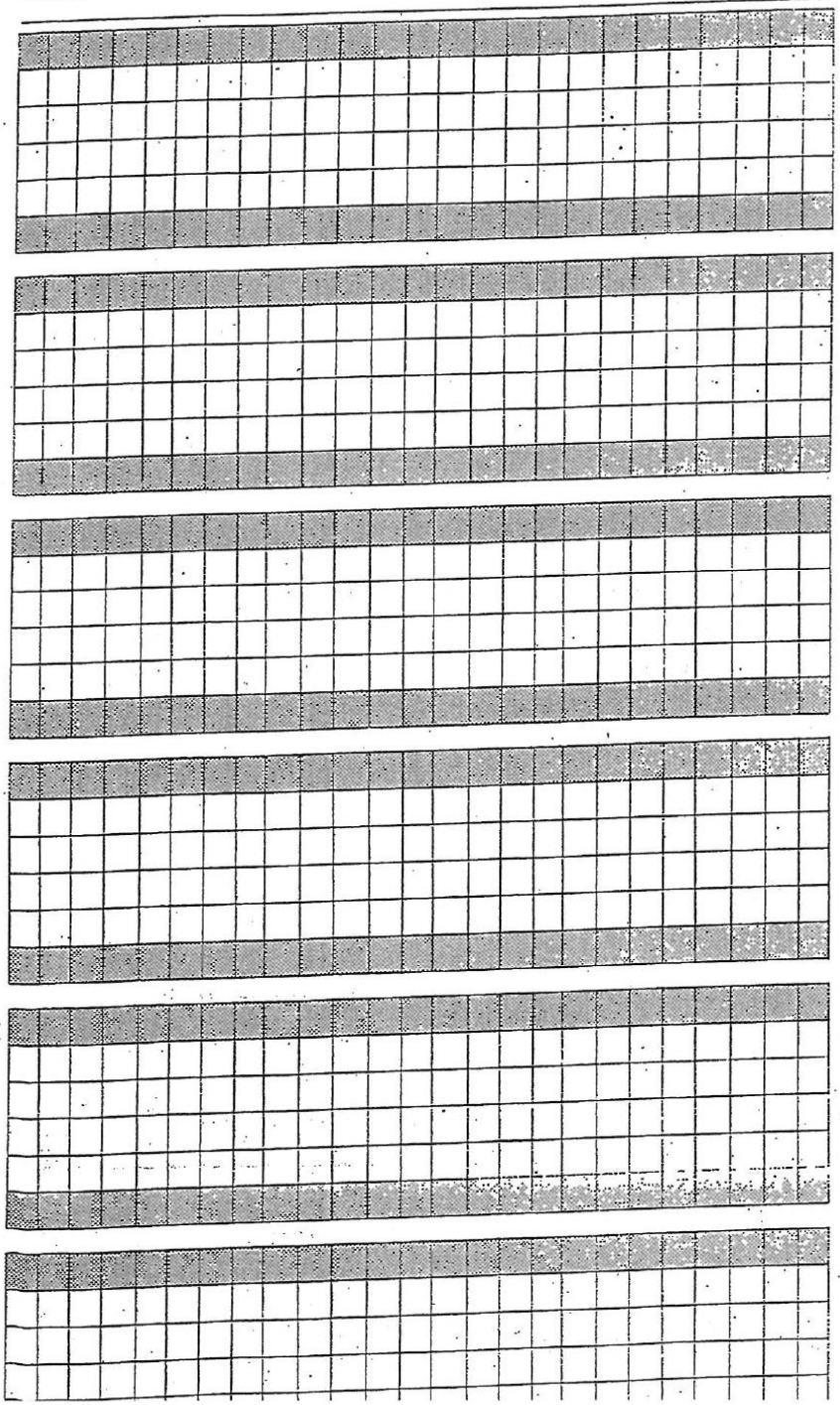
Instructions: To convert the total overall score to a percentage, circle the appropriate number below.

Total Overall Score (circle one)	Percentile	Severity
0-16	0-4	Very Mild
17-19	5-11	Mild
20-21	12-23	
22-24	24-40	Moderate
25-27	41-60	
28-30	61-77	
31-33	78-89	Severe
34-36	90-96	
37-45	97-100	Very Severe

FREQUENCY TRACKING FORM

Job Task = #1
Reading Task = #2
Picture Task = #3

Scoring:
Fluent word = 0
Stuttered word = /



Task #_____
_____ %

Task #_____
_____ %

Task #_____
_____ %

Task #_____
_____ %

Task #_____
_____ %

Task #_____
_____ %

APPENDIX I
-Case history form-

Table 12. Background Case History Form

Please fill in this form and return it to the researcher (Talitha Nel) as soon as possible.

General Information	
Name	
Surname	
Date of birth	
Age	
School/Occupation	
Highest qualification	
Phone number	
Email Address	
Preferred method of communication	

Communication Information	
Home language	
Second (and/or third) language (s)	

Is there a family history of speech, language or hearing impairment, as well as a history of hereditary diseases or hospitalisation? *(Please describe below)*

Briefly describe your communication problem:
How long have you been struggling with this problem?
Has the problem changed since it started (improved or deteriorated)?
Have you received any intervention for this problem? *(Please describe)*
Do you see any other professionals regarding this problem?

Do you have difficulty with any of the following? *(Please tick)*			
	Hearing		**Chewing**
	Soft sounds		**Swallowing**
	Loud sounds or noise		**Tongue movements**
	Hearing in noisy environments		**Oral movements**
	Listening		**Secretion management**
	Attention/ concentration		**Avoidance of certain foods**

Have you had a hearing test?		**Yes**
		No
If so, by whom?		
Results:		

Medical History		
Are you taking any medication?		**Yes**

		No

Name	**Dosage**	**Reason**

Have you had any surgery? ***(If so, please list below)***	
Date	**Surgery**

Additional information
Please provide any additional information that may be helpful in the evaluation or remediation of your speech and language deficits:

Name of person completing the form:	
Relation to client	

Signature: _____ **Date:** _____

Adapted from Shipley and McAfee **(2016, p. 83)**

APPENDIX J
-Informed consent form-

PARTICIPANT INFORMATION SHEET AND INFORMED CONSENT FORM

Dysfluencies in a multilingual speaker: A case study

Dear Participant,

INTRODUCTION

You are invited to participate in a research study from the Department of Speech-Language Pathology and Audiology, Faculty of Humanities, University of Pretoria. This information sheet will aid in your decision regarding participation in this study. Before you agree to take part in this study, you should fully understand the aims of the study and your involvement in part-taking. Should you have additional questions, do not hesitate to contact the researcher, Talitha Nel, at 079 3943 776.

NATURE AND PURPOSE OF THE STUDY

This study will aim to describe the dysfluencies in a multilingual PWD.

RISK AND DISCOMFORT INVOLVED

There are no risks involved in participating in this current study. No physiological and psychological harm will be brought to you as a participant during any point of the study. To alleviate possible fatigue, you will have 10 minutes rest periods in between every hour. You may also withdraw at any moment should you no longer feel comfortable with the assessment procedures or participation in the research study in general.

POSSIBLE BENEFITS OF THIS STUDY

You will not be paid to participate in this current study. If you choose, the researcher will write a confidential referral letter in hardcopy or via email for possible further treatment at the Department of Speech-Language Pathology and Audiology at the University of Pretoria. Certain intervention strategies for the different languages will be addressed in

such therapy sessions. General knowledge about these different moments of stutter may also lead to informed changes in treatment protocols for other clients with similar profiles. You may also have access to the results of this study in the format of a scientific article.

WHAT ARE YOUR RIGHTS AS A PARTICIPANT?

Participation in this current study is completely voluntary. You may, therefore, withdraw at any time if you wish to do so.

HAS THIS STUDY RECEIVED ETHICAL APPROVAL?

The researcher will apply for ethical approval for this study from the Research Ethics Committee of the Faculty of Humanities, telephone number: (012) 420 850, at the University of Pretoria. No assessment procedures will commence until such time that the researcher receives ethical clearance from this committee.

COMPENSATION

You will not receive any financial compensation for participating in the study. However, travel costs to and from the University will be reimbursed by the researcher.

CONFIDENTIALITY

You will in all written and stored documentation, as well as audio-visual files, only be referred to as “the participant” to ensure that your identifying information is kept confidential. Research reports and articles in scientific journals will also not include any information that may identify you. All data collected will be securely stored in hard copy and electronically for research and archiving purposes. The hard copies will be kept under lock in a room with restricted access (Room 3-1, Communication Pathology Building, University of Pretoria). Electronic copies will be kept in a password-protected file on a computer in this same room. Additionally, the content of this research study will be uploaded and stored in the access-protected UP repository. The storage will be for a minimum of 15 years. The researcher and supervisors acknowledge and adhere to ethical and confidentiality principles

regarding the identification of individuals in research, and the subsequent management of their data, as per POPIA.

CONSENT TO PARTICIPATE IN THIS RESEARCH STUDY

If you are willing to participate in this current study, please sign the consent form that is attached. If you have any further questions, please contact me at (079) 394 3776.

Kind regards

Ms Talitha Nel

Dr Mia le Roux

Supervisor

Dr Salomé Geertsema

Supervisor

INFORMED CONSENT FOR PARTICIPANT

I hereby confirm that I have been informed by the researcher about the nature, process, risks, discomforts, and benefits of this study. I have also received, read, and understood the above-written information (information sheet and informed consent form) regarding the study. I am aware that the results of the study, including personal details, will be processed, and presented in research reports without disclosing any identifying information from me as a participant; thus, keeping all information confidential.

I am giving consent to participate willingly. I have the contact details of the researcher should I have any questions. I have no objection to participating in this current study. I understand that I will not be penalised in any way should I wish to discontinue the study.

Please mark whether you permit the data collected and stored may be used for future research and video and audio recordings to be made. Herewith I give consent that the information that was obtained in this study may be used for:

Yes □ No □ Future research Yes □ No □ Video and audio recording

Participant's name:_____(Please print)

Participant's signature:_____Date: _____

Researcher's Name: Talitha Nel

Researcher's signature:_____Date: ___

Witness's Name: _____Date:_____Signature:

APPENDIX K
-Ethical clearance application-

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities
Fakulteit Geesteswetenskappe
Lefapha la Bomotho

Humanities 100
Since 1919

26 July 2022

Dear Miss T Nel

Project Title:	Dysfluencies in a multilingual speaker: A case study
Researcher:	Miss T Nel
Supervisor(s):	Dr S Geertsema
Department:	Speech Language Pathology and Audiology
Reference number:	15008292 (HUM006/0422)
Degree:	Masters

I have pleasure in informing you that the above application was **approved** by the Research Ethics Committee on 30 June 2022. Please note that before research can commence all other approvals must have been received.

Please note that this approval is based on the assumption that the research will be carried out along the lines laid out in the proposal. Should the actual research depart significantly from the proposed research, it will be necessary to apply for a new research approval and ethical clearance.

We wish you success with the project.Sincerely,

Prof Karen Harris
Chair: Research Ethics CommitteeFaculty of Humanities UNIVERSITY OF PRETORIA
e-mail: tracey.andrew@up.ac.za

APPENDIX L
-Submission slip -

Submission Confirmation

Print

Thank you for your submission

Submitted to
Communication Disorders Quarterly

Manuscript ID
CDQ-077-Nov-22

Title
Dysfluencies in a multilingual speaker: A case study

Authors
Nel, Talitha
Geertsema , Salome
le Roux, Mia
Graham, Marien

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17-Nov-2022