STUTTERING CHARACTERISTICS OF OMANI ARABIC-ENGLISH BILINGUAL SPEAKERS

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Abstract

This study examined the reading and conversational speech samples of eight bilinguals who stutter (BWS). The participants spoke Omani Arabic as the first language (L1) and English as a second language (L2). The samples were examined with particular reference to overall disfluency, stuttering-like disfluencies (SLDs), other-disfluencies (ODs) and distribution of stuttering on bare content (BC) and bare function (BF) words. No significant difference was found in the overall amount of disfluency or ODs between the two languages. Significantly more stuttering was found to occur in L2 compared to L1 in the conversational speech sample, while no difference in stuttering was seen for the reading sample. No significant difference in the amount of stuttering on BC and BF words was found in L1 and L2 for either the reading sample or conversational speech sample. Examination of BF found a significantly higher percentage of stuttering on these word types in L2 compared to L1. The results indicate that language proficiency, as well as the phonetic complexity of word types appear to play an important role in stuttering behaviour. The current study is one of the first to examine bilingualism and stuttering in L1 Arabic. The results are in general agreement with past studies examining stuttering in various BWS groups.

Introduction

1. Stuttering: An Overview

1.1. Definition of Stuttering

When a person is able to speak with minimum effort his or her speech is referred to as fluent (Guitar, 2006). Even though some may take speaking fluently for granted, fluency is a complex process. It combines many patterns and features (e.g., rate of speech, pauses within and between words, syllable/word stress, and intonation) (Robb, 2014; Starkweather, 1987; Yairi & Seery, 2014). Any alteration in one or more of these features can result in disfluency (Guitar 2006; Robb, 2014).

Stuttering is perhaps the most readily recognisable communication disorder that receives considerable attention from the general public and professionals. There are many controversies in the literature regarding the cause of stuttering, its nature, and how to measure and assess the disorder (Yairi & Seery, 2014). Stuttering can be defined in many ways. The World Health Organisation (WHO) has defined stuttering as a disorder affecting the rhythmic (prosodic) flow of speech as a person is not able to use speech to express him or herself because of involuntary repetition, prolongation or blocking of sounds, despite the fact that he/she knows the message they want to convey (WHO, 1977). An alternative definition of stuttering is that it is an unintentional interruption of the rhythmic fluent act of a planned speech performance (Yairi & Seery, 2014). Bloodstein (1995) defined stuttering by focusing on behaviours that can be measured. Accordingly, chronic stuttering is characterised by (1) persistence of symptoms for more than 6 months, (2) stutters of more than 3% in 100 syllables, (3) sound, syllable and word repetitions that occur in more than 2 iterations, (4) prolongations of more than 1 second in duration, (5) an increase of pitch or volume, and (6) extreme visible or audible tension is observed along with related physical movements (Bloodstein, 1995; Nicolosi, Harryman & Kresheck, 2004; Natke, 2000; Ochsenkühn & Thiel, 2005; Wendlandt, 1998; Yairi, 1997).

1.2. Characteristics of Stuttering

Stuttering characteristics are generally categorised according to primary and secondary symptoms. Primary symptoms of stuttering include: repetitions, prolongation of sounds or syllables, explosive initiations of syllables, pauses and blocks (Bloodstein, 1993), while secondary symptoms could be bodily movements or psychosocial behaviours (Robb, 2014; Yairi & Seery, 2014). Bodily movements as described by Bloodstein (1993) are

habitual behaviours, such as hands jerking, closing eyes, protruding tongues, fist clenching, gasps or a sudden exhalation of air. Some examples of psychosocial behaviours are word substitutions, avoidance of speech (Bloodstein & Bernstein Ratner, 2008) or associated negative feelings such as fear, frustration, embarrassment (Guitar, 2014), sadness, anger and unusual temperament (Robb, 2014). Furthermore, secondary characteristics are more common in older children than younger because these children have had more experience with stuttering (Robb, 2014). However, each person who stutters (PWS) has different stuttering symptoms from the other as Bloodstein (1993) pointed out, *"it is the subjective experience of stuttering that is by far the most disagreeable aspect of the disorder"*. Many studies have been performed to develop different ways and instruments to measure stuttering but a simple count of the number of moments of disfluency remains the most popular and valid measure (Ambrose & Yairi, 1999).

Ambrose and Yairi (1999) developed a notation system for measuring disfluency by noting the occurrence of stuttering-like-disfluency (SLD) and other disfluencies (ODs). The occurrences of SLDs are more common in PWS, while people with no stuttering (PWNS) show a higher number of ODs (Ambrose & Yairi, 1995, 1999; Yairi & Seery, 2014). The production of ODs includes the types of disfluencies that occur naturally in both PWNS and PWS (Guitar, 2006; Yairi & Seery, 2014). Examples of ODs are natural pauses, hesitancies, multisyllable word (e.g., marginal), and phrase repetitions (e.g., I need –I need to go now), adding extra sounds or words (e.g., I um, need, um, need to go now) and revision-unfinished sentences (e.g., my ca-my vehicle is outside) (Yairi & Seery, 2014). The occurrences of SLDs are more common in PWS. Examples of SLDs are part-word repetitions, single-syllable/words repetitions, dysrhythmic phonation, tense pauses (silent prolongation or blocks) (Yairi & Seery, 2014). However, recent research by Jiang, Lu, Peng, Zhu and Howell (2012) has argued that whole-word repetitions should be categorised as ODs. Their study examined stuttering in 20 PWS using brain imaging (fMRI) and found that word repetitions seem to activate the same regions of the brain that are activated when a person produces ODs or speaks fluently. Therefore, the authors believe these particular types of repetitions should not be considered SLDs.

1.3. Developmental Stuttering

The onset of stuttering is most common between 2 and 5 years of age, with an average age of approximately 33 months (Bloodstein, 1993; Guitar, 2006). Onset may take place suddenly (within a day or several days) or more gradually, but in the majority of cases, occurs

after the emergence of word combinations in children's speech (Bloodstein & Bernstein Ratner, 2008). Stuttering may also be acquired at any age as a result of stroke, head injury, or neurologic disease, but such presentations are not considered to constitute the same disorder as developmental stuttering (Robb, 2014). It is believed that males are three times more likely to develop stuttering then girls (Bloodstein, 1993; Guitar, 2006). Stuttering is found across languages (Robb 2014) and occurs regardless of race or culture (Au-Yeung & Howell, 1998; Bernstein Ratner & Benitez, 1985; Bloodstein, 1995; Jayaram, 1983; Nwokah, 1988; Van Borsel, Maes , & Foulon, 2001).

It is believed that 3% of pre-schoolers will exhibit early patterns of disfluency but as they enter school the percentage will drop to 1% as the majority are expected to recover spontaneously (Guitar, 2006). It has been estimated that 1% of the world's population exhibits stuttering (Bloodstein & Bernstein Ratner, 2008; Guitar, 2006), taking into account there is some variability that could be due to sampling errors or methodological differences between studies (Bloodstein & Bernstein Ratner, 2008). For instance, 1.4 % of school-age children presented with stuttering in New South Wales, Australia (Craig, Hancock, Tran, Craig, & Peters, 2002; Craig & Tran, 2005), and 0.33% of children in primary school (McKinnon, McLeod, & Reilly, 2007), while 0.72% PWS were found in the community (Craig et al., 2002). In addition, the incidence of stuttering is found to be 3 to 10% higher than the 1% of stuttering prevalence (Andrews & Harris, 1964; Craig et al., 2002; Mansson, 2000; Reilly et al., 2009). These inconsistencies between prevalence and incidence figures of stuttering are caused by high natural recovery rate of stuttering (Bloodstein & Bernstein Ratner, 2008; Mansson, 2000; Yairi & Ambrose, 1999). By adulthood, the recovery rate is believed range from 67% to 75% (Craig at al., 2002; Yairi, 2004). In addition, some studies examining the age when natural recovery is more likely to occur suggested that 2 to 3 years post-onset is the likely age of recovery but as PWS get older and stuttering occurs over a prolonged period of time, the chance of recovering decreases (Mansson, 2000; Ryan, 2001; Yairi, 2004; Yairi & Ambrose, 1999).

It is common that PWS will stutter more in a situation that requires more communication demands, such as answering questions, talking to an unfamiliar person or speaking on the telephone (Guitar. 2006; Robb, 2014; Yairi & Seery, 2014). On the other hand, a PWS can be fluent in other situations such as talking alone or to a pet, singing, whispering, imitation of a foreign accent, during choral reading, or speaking in the presence of a loud background noise (Bloodstein, 1993; Guitar, 2014).

1.4. Psycholinguistic Theories of Stuttering

The specific cause of stuttering and its nature remain unknown despite extensive research (Bloodstein, 1993; Guitar 2006). Bloodstein and Bernstein Ratner (2008) made a distinction between theories that are concerned with initial onset of stuttering, and theories concerned with concepts of the moment of stuttering. For the purpose of the present thesis, three theories concerned with moments of stuttering will be discussed briefly. It is important to take into account that most theories of stuttering tend to focus on English-speaking PWS. There have been few attempts to investigate the cause of stuttering as a language-specific phenomenon (Bernstein Ratner & Benitez, 1985; Bernstein Ratner, 2004; Roberts, 2002).

Demands and Capacities Model (DCM). The DCM originated from comparison between language and disfluency in children with stuttering (Starkweather, 1987; Starkweather & Gottwald, 1990). The authors found that stuttering onset often tended to correlate with the time of rapid language development. It was therefore proposed that an environment with high linguistic demand is a common feature during moments of disfluency. Those demands could relate to speech motor control, language formulation, social emotional maturity, and cognitive skills (Manning, 2000b; Siegel, 2000; Starkweather, 1987). The DCM claims that stuttering is a result of these environmental or intrinsic demands that are beyond the child's capacities (Starkweather, 1987). It does not mean there is an abnormality in either demands or capacities, but a mismatch between the two systems (Adams, 1990). So if there is a high expectation from parents for using complex language or a fast rate of speech. the DCM would predict that a child is likely to exhibit a speech disfluency because he/she is not able to cope with the linguistic and motoric demands - even if the child has normal development in these areas. The DCM emphasises the complexity and dynamic nature of demands, capacities, and their interactions (Kelly, 2000; Starkweather & Gottwald, 1990).

There are some researchers who believe the DCM philosophy focuses too much on environmental demands, such as speaking rate and style of conversation of parents, and its relative disregard for internal or intangible demands (Bernstein Ratner, 2000; Curlee, 2000; Manning, 2000b). Although, from a clinical point of view, this theory can be useful when explaining stuttering to the parents of a disfluent child, which will help to form treatment goals and a therapy plan (Curlee, 2000; Manning, 2000a; Starkweather et al., 1990)

Covert Repair Hypothesis. The covert repair hypothesis was proposed by Postma and Kolk (1993). The theory is based on the belief that the phonological planning for a word that comes before the production of speech tends to be disrupted in PWS. The response to these speech planning errors in PWS are not different from PWNS (Kolk & Postma, 1997)

but higher in PWS, which consequently requires more attempts to amend those errors which leads to stuttering. All of this happens unconsciously during the encoding process for words and sentences (Robb, 2014). Furthermore, the encoding process includes the syntactic, lexical, phonological or suprasegmental pattern in speech (Bloodstein & Bernstein Ratner, 2008).

EXPLAN Theory. Howell (2004) defines the execution and planning (EXPLAN) theory as an autonomous model that can be used to explain how spontaneous speech is produced in both PWNS and PWS. He proposed that disfluency is a result of an error occurring during the interaction of the linguistic (planning) and motoric (execution) systems. The linguistic system tends to plan for linguistic segments (one word), while the motoric system takes care of organising the plan for output, therefore, it is vital that the two systems work together to produce fluent speech. Fluent speech is produced when the planning for the upcoming word was finished and at the same time the map for the previous word production is completed. However, if planning for the next word was not present or not completed prior to completion of the previous word then speech disfluency occurs. These errors in timing between the linguistic planning and motor execution systems lead to SLDs or ODs and are likely to increase if linguistic demand was increased or when speaking at a fast rate because these factors could affect the time needed for planning.

1.5. Stuttering and Language Development

Some studies have found that the percentage of people having language and/or phonological impairment is higher in PWS than in PWNS (e.g., Arndt & Healey, 2001; Clark, Conture, Walden, & Lambert, 2013; Wolk, Edwards, & Conture, 1993). A large study of school-age children with stuttering (CWS) found that 46% had articulation/phonology difficulties, while 26% had language disorders (Blood, Ridenour, Qualls, & Scheffner Hammer, 2003). In contrast, some studies investigating the relationship between phonology and stuttering have found that CWS presented with less articulation errors (Morley, 1957) and fewer language and reading difficulties (Reilly et al., 2009) compared to children who did not stutter. Yairi and Seery (2011) believe that even though the incidence and prevalence of phonological disorders in the early stages of stuttering is not as significant as researchers propose, it is higher than average. They also thought that a small group of CWS might be more susceptible to phonological disorders than others (Yairi and Seery, 2011). Paden and Yairi (1999) and Paden, Yairi and Ambrose (1996) found that a subgroup of CWS who continue to stutter scored lower in the phonological performance tasks compared to CWNS

and CWS who recovered naturally. This finding was also supported by Morley (1957). Therefore, it is thought children who persist to stutter have more chances of articulation and phonological problems (Yairi & Seery, 2011).

Studies examining language abilities of PWS have found their performance to fall within the normal range, although they tended to score less on language measures when compared to PWNS (e.g., Anderson & Conture, 2000, 2004; Anderson, Pellowski, & Conture, 2005; Prins, Main, & Wampler, 1997; Ryan, 1992, 2001; Wagovich & Bernstein Ratner, 2007). Furthermore, some studies have found that when examining preschool CWS closer to the onset of stuttering they tended to score above or within norms in language skills measures (Miles & Bernstein Ratner, 2001; Rommel, Hage, Kalehne & Johannse, 1999; Watkins, Yairi & Ambrose, 1999). Watkins et al (1999) found that CWS for whom stuttering persisted showed an 'atypical pattern' of expressive language than CWS who recovered naturally. Many discrepancies in the literature have been recorded on phonology and language disorders among PWS. This could be due to methodological issues (e.g., not comparing to normative data) (Watkins & Johnson, 2004) or the nature of assessments and measures of phonology and language skills (Yairi & Seery, 2011).

1.6. The Content vs Function Words Dichotomy in Monolinguals Who Stutter

There is a body of research that has explored the various factors that contribute to moments of stuttering (Yairi & Seery, 2014). For more than 70 years researchers have investigated the relationship between moments of stuttering and specific language structures (Dworzynski, Howell & Natke, 2003; Yairi & Seery, 2014). Brown (1937, 1945) was one of the first to discover a relationship between moments of stuttering and specific language structures. Results of his studies showed that stuttering occurred more frequently on (1) content words compared to function words, (2) words containing multi-syllables (i.e., 5 or more phonemes), (3) the initial three words of an utterance, (4) words beginning with consonants in comparison to words beginning with vowels and (5) the emphasised syllable in a multi-syllabic word (Bloodstein & Berstein Ratner, 2008; Brown, 1945; Dworzynski et al., 2003; Guitar, 2006).

There are many linguistic factors that are believed to contribute to disfluency in PWS. For example, consonant type, phoneme location within a word, syllable emphasis, context of speech, number of syllables in a word, and lexical category of a word can all contribute to moments of disfluency (Brown, 1937; 1945; Hahn, 1942; Taylor, 1966). A particular variable that was highlighted in some research is the specific location of stuttering events (loci). The

locus provides strong evidence of the relationship between stuttering and language despite its presence in both SLD and OD (Silverman & William, 1967; Yairi & Seery, 2014). Others have argued that the loci can help to understand the nature of stuttering in relation to language rather than stuttering itself. In addition, the loci of stuttering that is found in adults is different from what is found in children (Yairi & Seery, 2014).

A popular area of research has been the influence of lexical category (i.e., content & function words) on moments of stuttering. Content words are described as an "open" word category because it can accommodate new words (e.g., nouns, main verbs, and adjectives), whereas function words are a "closed'' word category because no new words can be added to the class group (i.e. articles, pronouns, and prepositions) (Leow, Compos, & Lardiere, 2009). Content words have more complex properties and contain more lexical meaning compared to function words. Function words are used more frequently in a language than content words (Dayalu, Kalinowski, Stuart, Holbert, & Rastatter, 2002). Furthermore, content words tend to be multisyllabic, have more stress, start with consonants, and therefore are thought to be more phonetically complex than function words (Dayalu et al., 2002; Howell, Au-Yeung & Sacking, 1999). Examples of content words are nouns (e.g., tiger, bus, Mariam), main verbs (e.g., play), and modifiers (e.g., handsome, hot, short). Function words include articles (e.g., the, a, an), pronouns (e.g., his, she, I, it, you, me, these), verbal auxiliaries (e.g., have been + verb, am + verb), and modals (e.g., can, may, will, shall, must), deictics (e.g., over there, up there, down there, right, here), prepositions (e.g., under, next, on, against, like). It has been widely published that children tend to stutter most often on function words, especially at the beginning of a sentence (Bernstein Ratner, 1997; Bloodstein & Grossman, 1981; Buhr & Zebrowski, 2009; Graham, Conture & Camarata, 2004; Howell, 2007; Richels, Buhr, Conture, & Ntourou, 2010), while adults tend to have more disfluency on content words (Au-Yeung & Howell, 1998; Brown, 1945; Dayalu et al., 2002; Howell at al., 1999).

There are three possible reasons for the stuttering dichotomy between function and content words. Au-Yeung and Howell (1998) proposed that disfluencies on function words in children are a stalling mechanism as a result of an incomplete speech plan for the production of content words (which most often immediately follow a function word). Content words are more complex therefore require more planning. The disfluencies on function words are thought to stall for time as the speech plan of the following content word is not ready for execution. Their research findings were supportive of their theory as more disfluencies were documented on function words proceeding content words, which is thought to allow for more time for phonetic planning for content words. According to Howell (2004), as children grow

they tend to drop this stalling mechanism and start stuttering on content words. They described this shift in disfluency in children from function words to content words in adults as an adaptive behaviour for a planning–execution deficit and can be explained by EXPLAN theory, primarily due to the phonetic complexity of content words (e.g., Howell et al., 1999; Howell, 2004). Another possible reason was offered by Dayalu et al. (2002) who believe that the dichotomy is a result of a generalised adaptation effect due to word familiarity and regular use, phonological and semantic simplicity, and the predictable nature of these words (Howell et al., 2004). The researchers proposed this theory after finding that PWS tends to stutter less on words that have a high frequency of occurrence in the language. The third possible reason for the content-function word dichotomy was proposed by Bernstein (1981), Rispoli and Hadley (2001) and Rispoli (2003). They suggested that there is a correlation between stuttering and a child's morpho-syntactic development. Disfluency is commonly found in the early stages of language development but as a child's utterances become longer and more complex disfluency occurs (Rispoli & Hadley, 2001).

It is important to note that the majority of studies examining the function-content word dichotomy of stuttering are based on monolingual speakers of English, German or Spanish PWS (Au-Yeung & Howell, 1998; Au-Yeung, Vallejo Gomez & Howell, 2003; Dayalu et al., 2002; Dworzynski, Howell, Au-Yeung, & Rommel, 2004; Dworzynski et al., 2003; Dworzynski & Howell, 2004a; Howell et al., 1999; Nakte, Sandrieser, van Ark, Pietrowsky & Kalveram, 2004). A pattern similar to English PWS has been found for Spanish-speaking PWS (Howell et al., 2004) and German-speaking PWS (Dworzynski & Howell, 2004a; Dworzynski, Howell & Natke, 2003; Rommel, Häge, & Johannsen, 2004). These studies generally support the finding of an increase of stuttering on content words compared to function words in adults who stutter. There is far less research examining this issue in speakers of Middle Eastern languages. Abdalla, Robb and Al-Shatti (2009) investigated stuttering loci and lexical category in 10 Kuwaiti Arabic-speaking adults with stuttering (AWS) in spontaneous speech, reading and naming task of single words. No noticeable difference in stuttering moments between content words and function words was found, which is different from the stuttering pattern found in other languages. However, a higher frequency of stuttering on combined content-function words (e.g., a unique feature of the Arabic language) was documented in the Arabic reading sample. Attieh (2010) evaluated three groups of Jordanian PWS, ranged in age from 6 to 28 years old. The author categorized stuttered words according to either content or function words and found a higher percentage of stutters on content words throughout all ages in both reading and speaking samples.

Additional research is necessary to validate the findings of Abdalla et al., (2009) and Attieh (2010) studies.

There have been studies examining stuttering in the Persian language. This language is similar to Arabic in regard to consisting of three lexical categories (content, function & content-function word). However, it is important to note that the Arabic language is syntactically, morphologically and phonetically different from Persian language, even though the Persian language is using a modified variation of the Arabic alphabet system in writing. Samadi (2002) examined a group of monolingual Persian CWS aged 6 to 10 years old and found more stuttering on content than function words. Vahab, Zandiyan, Falahi and Howell (2013) examined 12 CWS (7 to 10;6 years) who were speakers of Persian. The authors found significantly more stuttering on content words than function word in conversational speech, which was similar to Samadi's (2002) finding. In addition, a significantly higher frequency of stuttering was found on CF words in a Standard Modern Persian (SMP) reading sample, which is similar to the finding by Abdalla et al. (2009). On the other hand, Bakhatir, Salmalian, Ghandzade and Nilipour (2009) sampled monolingual Persian CWS (46 to 20 months old) and found no difference in the amount of stuttering between content and function words. Mokhlesin (2006) looked at Persian adults and children who stutter found a low number of stuttering on combined C and F words. The author proposed that there is a reciprocal relationship between stuttering on function and content words. In addition, she found a shift from stuttering predominantly on BF words in children to stuttering more on BC words in adults, which supports previous studies of the English and German languages (Dworzynski et al., 2003; Howell et al., 1999) but contradicts Vahab et al.'s (2013) finding of more stuttering on content words in Persian children.

2. Bilingualism and Stuttering

2.1. Bilingualism

Bilingualism is a term used to describe the use of two languages. The use of language covers the areas of language comprehension, language production, reading, and writing. Bilingualism refers to a continuum of proficient (Lee, Robb, Ormond & Blomgren, 2014), ranging from having lower proficiency in one language to having similar proficiency in both languages (Owens, 2005; Roberts, 2011). Millions of people around the world use two languages to communicate (Lee et al., 2014). Two key aspects of bilingualism relate to the age of second language acquisition and language proficiency (Bialystok, 2001; Kessler, 1984; Miller, 1984; Roberts & Shenker, 2007; Romaine, 1989; Shenker, 2004). With regard to age

when the second language is acquired, a person can be a simultaneous or a sequential bilingual. A simultaneous bilingual is a term used to describe a person who was exposed to two languages since birth (Taliancich-Klinger, Byrd & Bedore, 2013). A simultaneous bilingual is exposed to both language at home and school or day-care (Shenker, 2004), while a sequential bilingual is a person who is exposed to one language (L1) and the 2nd language (L2) is introduced later in life (Taliancich-Klinger et al., 2013).

It is not easy to define or measure the language proficiency of a bilingual. According to Roberts and Shenker (2007) the age at which a person may acquire a language may not mirror language proficiency level, as language use/practise is essential to improve language proficiency. There are many factors relating to the four main components of language (Roberts et al., 2007). These components of language tend to vary across individuals and can be affected by many factors such as how and where L2 was learned (e.g., books, music, conversation, radio, TV), the setting in which L2 was acquired and used (e.g., home, friends, school, work), and the frequency of exposure and use (e.g., daily exposure, weekly exposure, every now and then) (Bialystock, 2001; Roberts & Shenker, 2007). Even though language proficiency has a strong correlation to bilingualism, it cannot be used as a stand-alone definition of bilingualism because language proficiency can change from time to time (Bialystok, 2001; Roberts & Shenker, 2007; Romaine, 1989; Scharff-Rethfeldt, 2005).

2.2. Bilingualism and Stuttering

About 1% of the world population have stuttering, while more than half of the world is believed to be bilingual (Bloodstein and Bursnstein Ratner, 2008; Van Borsel et al., 2001). In addition, as we are becoming more open to other cultures and as result of the increase of diversity to other cultures it is expected that the number of the bilingual people who stutter (BWS) will increase (Coalson, Pena & Byrd, 2013). Most research on stuttering has been based on monolinguals and the majority of individuals are speakers of English. Compared to research on monolinguals who stutter, far less is known about stuttering among bilingual speakers. It has been suggested that studies focused on BWS can reveal more about the nature of stuttering, especially the relationship between stuttering and language (Van Borsel et al., 2001).

Research on stuttering and bilingualism remains limited and there is a lack of consistency in the number and age of participants, languages involved, age of L2 acquisition, proficiency and how language is used (Van Borsel et al., 2001). The majority of research focused on BWS has documented variability of disfluency and stuttering severity in the different spoken

languages. Some studies have found higher stuttering in the dominant language (L1) compared to L2 (i.e. Jayaram, 1983; Howell et al., 2004; Meline, Stoehr, Cranfield & Elliot, 2006; Bernstein Ratner & Benitez, 1985). For example, Jayaram (1983) examined 10 adults aged from 19 to 32 years BWS speaking Kannada and English and found more stuttering in Kannada language (L1); however no data on the amount of stuttering or the significance of the stuttering difference was reported. Howell et al. (2004) presented a case study of an 11 year-old boy who was more proficient in Spanish than English. Based on analysis of the child's narrative speech, a higher amount of overall disfluency and stuttering was found in the more proficient language (Spanish). Meline et al. (2006) examined a BWS who spoke Chinese as L1 and English as L2. More stuttering was found in Chinese. However, these participants had recent treatment in English prior to the study, which may have affected the results. Bernstein Ratner and Benitez (1985) reported a case of a 50 year-old Spanish-English BWS of Cuban descent that acquired both languages since childhood and was believed to be "fluent" in both languages (a balanced/simultaneous bilingual). The amount of stuttering in Spanish was higher compared to English.

The vast majority of studies examining stuttering in BWS have found that the amount of stuttering was higher in L2 (less proficient language) compared to L1 (i.e., Ardila, Ramos, & Barrocas, 2011; Dale, 1977; Jankelowitz and Bortz, 1996; Lim, Lincoln, Chan, & Mamdoh & Gumaa, 2015; Mohammadi, Bakhtiar, Rezari & Sadeghi, 2012; Onslow, 2008; Roberts, 2002; Schäfer & Robb, 2012; Watt, 2000).

Dale (1977) studied four Cuban-American adolescent males born in the US speaking English as L1 and Spanish as L2. A greater amount of stuttering was found in Spanish (L2). Jankelowitz and Bortz (1996) reported on the case of a 63 year-old English-African bilingual who was more proficient in English. The participant had more SLDs in Afrikaans (least proficient). Roberts (2002) examined four adult BWS speaking French (L1) and English (L2) in reading and conversational speaking samples. Two participants rated themselves as balanced bilinguals (aged 26 & 52 years), while the other two rated themselves as more proficient in French (L1) (aged 19 & 27 years). Stuttering was higher in English (L2) for the two unbalanced bilinguals, while the balanced bilinguals were almost equal in the amount of stuttering across the two languages. Lim et al. (2008) examined 15 BWS speaking English as L1 and Mandarin as L2, and four BWS who spoke Mandarin as L1 and English L2. The researchers found that the participants exhibited more stuttering in the least dominant language (L2). Ardila et al. (2011) looked at a 27 year-old Spanish-English sequential bilingual who was more proficient in English than Spanish. More SLDs in Spanish (L2) were

documented. Schäfer and Robb (2012) sampled 15 German-English BWS between the ages of 10 and 59 years. They reported a significantly higher percentage of stuttering per words and per syllables in English (L2) than German (L1). Mohammadi et al., (2012) sampled 31 CWS (9 to 13 years) speaking Kurdish as L1 and Persian as L2. More SLDs in Persian (L2) were observed. The authors attributed the high amount of SLDs to the increased language complexity in Persian compared to the Kurdish language. Mamdoh and Gumaa (2015) evaluated stuttering in 31 Egyptian CWS aged from 10 to 11.8 years speaking Arabic as L1 and English as L2. All children acquired English in kindergarten by the age of four years. Speech samples were collected from three different tasks: spontaneous speech, reading a loud and picture description and conversation in both languages. The authors found significantly more stuttering in English than in Arabic. Unfortunately, no details were provided regarding the amount of language use and exposure of L2 among the participants. Watt (2000) evaluated stuttering in a multilingual 19 year-old who spoke four languages. The researcher found more stuttering in the least proficient languages. Stuttering severity was also found to correlate positively with age of language acquisition.

There are also a limited number of studies that have evaluated stuttering in balanced BWS. Lim et al. (2008) examined 11 balanced bilinguals (Mandarin & English). They found that the balanced bilinguals exhibited a similar amount of stuttering in both languages. Roberts (2002) examined reading and speaking samples of two participants who rated themselves as balanced bilinguals (French & English) and found an almost equal amount of stuttering across the two languages. Nwokah (1988) evaluated 16 BWS labelled as balanced bilinguals of English and Igbo languages and reported no difference in stuttering severity per words between Igbo and English.

Finally, there is recent research that has considered overall disfluency (ODs & SLDs) in the evaluation of BWS. Taliancich-Klinger et al. (2013) evaluated the overall disfluency (ODs & SLDs) and stuttering (SLDs) in a 6-year-old CWS who was more proficient in English compared to Spanish. The researchers observed a higher amount of disfluency in English for both conversational and narrative samples; however the amount of SLDs was higher in Spanish (the non-dominant language). The findings by Taliancich-Klinger et al. are intriguing and suggest that more overall disfluency may be apparent in L1 because of a high occurrence of ODs combined with SLDs. The amount of ODs decreases in L2 with a concomitant increase in SLDs. This unique pattern of disfluency needs to be further explored.

2.3. The Content-Function Words Dichotomy in Bilinguals Who Stutter

Recent attempts have been made to examine the content-function word stuttering dichotomy in BWS. This research has been motivated by Howell et al., (2004) who found a single BWS (11;9 years old) speaker to exhibit more stuttering on function words in L2 and an increase in number of stutters on content words in L1 compared to L2. The pattern of stuttering shown in L2 was thought to parallel that found in monolingual CWS, as a result of lower language proficiency (Dayalu et al., 2002; Howell et al., 1999). This pattern has since been replicated by Schäfer and Robb (2012) who examined speech samples of 15 German-English BWS and found more stuttering on content words in L1 (German) and more stuttering on function words in L2 (English). Howell et al., (2004) found that monolingual and bilingual Spanish PWS speakers have been reported to stutter more frequently on function words across all age groups. However, Spanish BWS produced higher number of stuttering on function words in L2, which is similar to the stuttering pattern of Spanish CWS (childlike), while an increase in stuttering on content words was found in L1 representing an adult-like stuttering pattern. Ardila et al. (2011) examined a 27 year-old English-Spanish bilingual who was more proficient in English than Spanish, and reported higher stuttering on function words in both languages, the difference between content and function words was significant in Spanish (L2) but not in English (L1).

These above studies suggest that language proficiency is a key feature in the nature of stuttering on content and function words (Ardila et al., 2011; Schäfer & Robb., 2012). Additional research is necessary to validate whether the content-function word dichotomy observed for BWS is consistent across a wider range of bilingual speakers.

3. The Arabic Language

Arabic is the official language in more than 18 Arab and four non-Arab countries ranging from North Africa to the Middle East (Al-Qenaie, 2011). It is the 6th most widely spoken language in the world and used by almost 200 million people around the world (Newman, 2002; Fahl, 2011; Wilson, 2012). A distinct feature of the Arabic language is the use of phayngealised sounds that have led scholars to believe that it is a unique language. Newman (2002) cited a famous Arabic linguist in the 8th century "*Sibawayh"* who brought attention to the uniqueness of the phayngealised sounds in Arabic. The Arabic language is known also as the language of *'al-dahd* ➡ *ض '* , which refers to the unique voiced pharyngealised dento-alveolar plosive sound in Arabic (Fahl, 2011; Newman, 2002). In

addition, it is believed that the distinctive grammar, vocabulary and structure in the Arabic language add to its uniqueness and exceptionality (Fahl, 2011).

> *"Arabic is the pot of the Arabian Islamic heritage with its various forms: religion, culture, history and so on…"*
>
> (Fahl, 2011, p. 446)

According to Fahl, (2011), classical ancient Arabic is the language that was used in the pre-Islamic era. It has a complex grammar and rich vocabularies that were inspired from nature. It was used in poetry to show pride among Arabs. Classical ancient Arabic is also known as the language of the Qur'an (Muslim's Holy Book) (Fahl, 2011; Wilson, 2012). Muslims believe that God has chosen this language to convey his message to the humans through the "The Holy Qur'an" and therefore it is glorified by Muslims. Nowadays, classical ancient Arabic is only learnt to read the Qur'an and old Arabic text (Fahl, 2011). The modern descendant of the Arabic language is Modern Standard Arabic (MSA). MSA is a formal and simplified type of Arabic that was derived from the classical ancient Arabic (Fahl, 2011; Newman, 2002). MSA correspond to the German Neuarabisch, the French Néo-Arabe, arabe néo-classique, arabe littéraire or arabe moderne, and the Spanish árabe estándar modern (Newman, 2002). It has a high number of inflected grammatical structures (Abdalla et al., 2009; Al-Tamimi et al., 2013; Fahl, 2011). MSA is common between all educated people and is used to exchange knowledge in formal and educational settings (Abdalla, et al., 2009; Al-Tamimi et al., 2013; Fahl, 2011; Kirchhoff, Vergyri, Bilmes, Duh, & Stolocke, 2006).

Arabic is also described as a diglossia - having two versions of a language (Ferguson, 1959; Versteegh, 1997). These versions are MSA and a colloquial Arabic variety. All languages get influenced to some degree by diglosssia that is represented in the difference between standard and colloquial variety (Newman, 2002). Socio-cultural and geographical factors in each nation have a great influence in the way a dialect of language is formed (Newman, 2002). Therefore, it is possible to state that geographical differences in addition to social and cultural factors and in each Arabic nation (e.g., Omani population) have worked together to shape colloquial Arabic (e.g., Omani dialect) making it different in each nation and unique. However, it was noted by many scholars that the differences between MSA and Arabic dialects are so great that if a person is not familiar with MSA he/she would be unable to access official media (i.e., newspapers and television broadcasts) or educational books and publications (Fahl, 2011; Newman, 2002). Dialects are simple varieties of MSA, whereby it is "freed" from some linguistic rules, deleting or skipping of some phonological sound and/or

morphemes (Fahl, 2011, Newman, 2002). Moreover, there are considerable differences between Arabic dialects present in the Arabic-speaking world (e.g., Omani Arabic vs Moroccan Arabic), which sometimes hinders communication, and may require using MSA to convey a message instead of Arabic dialect (Fahl, 2011; Kirchhoff et al., 2006; Newman, 2002; Wilson, 2012).

3.1. Omani Arabic

MSA is more complex than Arabic dialects in regard to phonetics, syntax, words types and styles and social rationales (Holes, 2004, Kirchhoff et al., 2006). For example, the Omani dialect, which is a version of Arabic spoken in Oman is expected to have a simpler syntax (i.e., less dual markers in the verb, adjective, and pronouns, case endings for nouns, and adjectives and mood distinction in the verb) than MSA (Kaye, 1990). Dialects are described as "an indigenous vernacular" that are used to speak in everyday situations (Abdalla, et al. 2009; Fahl, 2011; Kirchhoff et al., 2006; Newman, 2002). They are usually spoken rather than written. Participants in the present study were all Omani and spoke Omani Arabic dialect. There is small amount of information published in the literature about the Omani Arabic dialect. A brief history of The Sultanat of Oman will help to have a better understanding of the different cultural and environmental factors that influenced and shape the Omani Arabic dialect.

According to Shababan (1977) after the collapse of ma'rib dam some Yemenit tribes lead by Malike bin Fahm came to Oman marking the 1st settlement in Oman at about the 1st Century AD and since then more Arabs came to settle. One of the very changing points in Oman history is the acceptance of Islam with a great interest in the religion and enthusiasm (Shababan, 1977). Oman built a great trade empire that "flourished" but also attracted enemies. According to Shababan (1977) the Portuguese occupied the coastal towns of Oman for 150 years in the 16th century but when the Omanis united among themselves and with the help of the British they were able to defeat the Portuguese out of Oman and the Indian Ocean in the early 17th century. As Oman regained its strength it extended its territory to Baluchistan and to Zanzibar. Zanzibar was under the rule of the Imam of Oman for 250 years (Shababan, 1977). Since then, many people speaking Swahili from Zanzibar and Balushi from Baluchistan have come to live in Oman. Another major event in the Omani history was the discovery of oil in 1967 in the Omani land (Shababan, 1977). Sultan Qaboos bin Said (the current Sultan) came to power on July 1970 marking the beginning of a new era as he worked to develop Oman in all fields and spread education throughout the country. He

brought Oman to the modern world after it was kept in the dark ages by his father Said bin Sultan who kept Oman isolated (Shababan, 1977). Major developments in education, health, economic and oil industry resulted to immigrant coming to Oman to help. According to Shababan (1977) many Arabs came from Egypt, Jordan, Syria and North Africa who left a trace on culture and Omani Arabic dialect even though their immigration was temporary. Nowadays, in addition to the Omani Arabic dialect there are five languages that are spoken by minorities. These languages include South Arabic, which is spoken in the south of Oman (i.e., Mihri & Shahri), Swahili (from Africa), Persian (from Iran), Hindi (from India) and Balushi (from Baluchistan) (Shababan, 1977). Furthermore, the Omani Arabic dialect differs from one region to another within the country itself. For example, Omanis living in Muscat use a modernised version of the Omani dialect that is slower in rate and closer to MSA in pronunciation, while Omanis in the Al-Sharqiyah region speak a version that is closer to the other Gulf country dialect in term of pronunciation than to the one spoken by Omanis in Muscat.

3.2. Arabic Language versus English Language

According to Al-Jarf (1994) Arabic is not genetically related to English "i.e. not cognate languages". English derives from the Low German subgroup of the West Germanic family (Garry & Rubino, 2001), while Arabic originates from the Hamito-Semitic family (Abdalla, et al. 2009; ; Al-Tamimi et al., 2013; Fahl, 2011; Newman, 2002; Wilson, 2012). Arabic is written and read from right to left (Wilson, 2012), while the opposite is true for English users. In addition, spelling in Arabic is phonemic as it is written the way it is heard (Wilson, 1996), while English has many spelling irregularities.The Arabic language has very different syntactical, morphological and phonological systems from the English language (Watson, 2012). English contains 24 consonants and 20 vowels (Crystal, 2003), while Arabic has 28 consonants, three short /i, u, a/, three long /i:, u:, a:/ vowels and two diphthongs /au/ and /ai/ (Al-Tamimi et al., (2013). According to Kirchhoff et al. (2006) all vowels in Arabic are oral and voiced. One of the unique features of Arabic is that short vowels are represented with diacritics and not letters (Kirchhoff et al., 2006). In addition, Arabic language is famous among linguistics for having back and emphatic consonant places of articulation (Al-Tamimi et al., 2013; Newman, 2002). These sounds are considered complex and thought to acquired later in childhood (Al-Tamimi et al., (2013). For example, Arabic emphatic consonants e,g., /θ:/ (which is a dental fricative sound) is thought to be acquired around the age of 7-years due to the complexity of the sound (Amayreh, 2003). Syntax and morphology in Arabic tends to

be rule-bound, while in English there are many exceptions from the rules (Wilson, 1996). According Wilson, (2012) there are no copula verbs, auxiliary verbs, model verbs, gerunds, or infinitive forms in Arabic. The common word order in MSA is VSO (Al-Qenaie, 2011), while the common words order in English is SVO (VSO represents verb, subject and object respectively). In addition, other words sequencing is also used less frequently in Arabic, for example: OVS, OSV, VOS and SOV (Al-Qenaie, 2011). However, it is thought that the common word order of colloquial dialects of Arabic is SVO (Anis, 1973; Elgibali, 1993). Furthermore, Arabic has three number forms: singular, dual and plural, while English has singular and plural (Al-Jarf, 1994). Moreover, from a lexical prospective, English has two lexical categories (content words & function words,) while Arabic has an additional third category combining content and function words (Abdalla et al., 2010). Most of the Arabic function words are monosyllabic and divided into two types: free and bound (Al-Tamimi et al., 2013). They either stand by themselves, e.g., from Muscat ➡ من مسقط or they are bound to preceding or following words e.g., the girl ➡ البنت. In addition, function words can occur before and/or after content words. It is possible for more than one function word to be attached to a content word at initial and/or final position (Al-Tamimi et al., 2013). For example, the content word e.g., hospital ➡ مستشفى can be attached to two preposition words eg., in the hospital ➡ بالمستشفى at the initial position and the feminine plural suffix ات to form eg., in the hospitals (feminine) ➡ بالمستشفيات. If function words are attached to content words the word is referred to as function-content word (Abdalla et al., 2009; Al-Tamimi et al., 2013). On the other hand, function words are always free (standing-alone) in English (Al-Jarf, 1994).

3.3 Stuttering in Arabic

There are a limited number of studies that have evaluated stuttering in Arabic. Al-Tamimi et al. (2013) evaluated Arabic speakers aged 11 to 26 years old. The authors developed a phonetic complexity scale on the frequency of stuttering in Arabic. These researchers examined 21 Jordanian Arabic speakers to measure the frequency of disfluencies on word categories, referred to as the Arabic index of phonetic complexity (AIPC). They found that PWS are more likely to stutter on words with a high AIPC score, which represents phonetically more complex words. The features of AIPC that had a higher effect on moments of stuttering were place of articulation, manner of articulation, word length, word shape and consonant length. The researchers believed that the Arabic language was similar to other languages with regard to the influence of phonetic complexity on moments of stuttering. As

previously reported, Abdalla et al. (2009) evaluated stuttering in a group of speakers of Kuwaiti Arabic. The researchers found no significant difference in stuttering moments between content words and function words, which is different from the stuttering pattern found in other languages. In addition, a higher frequency of stuttering on combined content-function words was documented. There are even fewer studies that have evaluated stuttering in BWS who speak Arabic as one of the languages. A recent study by Mamdoh and Gumaa (2015) evaluated stuttering in 31 Egyptian CWS aged from 10 to 11.8 years speaking Arabic as L1 and English as L2. All children acquired English by the age of four years. The authors found significantly more stuttering in English than in Arabic.

Another bilingual study to consider was based on speakers of Pesian-Kurdish (Mohammadi, Nilipour & Yadegari, 2008). Although the study was not focused on Arabic, it included Middle Eastern languages. These researchers examined stuttering behaviours in 31 children who were BWS (9-13 years old). The children spoke Kurdish and Farsi languages. Higher stuttering percentages of stuttering were found in participants than universal prevalence in monolinguals PWS (1%) but lower than other studies on BWS. Authors believe that this is because Kurdish-Farsi languages share many linguistics variables and so less (demand) cognitive load is needed.

Statement of the Problem

Research focused on stuttering in bilingual speakers provides unique insight into the influence of language on stuttering (Van Borsel et al., 2001). While the number of studies examining BWS has increased on the past ten years, there remain a small amount of studies that have considered the Arabic language. Examining BWS speaking languages that are very different from each other (i.e. Arabic vs English) is thought to enrich our understanding of the different linguistic and syntactical factors that could influence stuttering. The purpose of this study was to investigate a variety of characteristics of stuttering in Arabic-English BWS. Specifically, the study was designed to examine the amount of disfluency (SLDs & ODs) in L1 and L2, as well as the content-function word dichotomy of stuttering. The following research questions were posed:

1- Are there more overall disfluencies in L2 compared to L1?
2- Are there more SLDs in L2 compared to L1?
3- Are there more ODs in L1 compared to L2?
4- Is there more stuttering on bare content words compared to bare function words in L2?

5- Is there more stuttering in content-function words compared to bare content words in L1?
6- Is there more stuttering in bare content words in L2 compared to bare content words in L1?
7- Is there more stuttering in bare function words in L2 compared to bare function words in L1?

Methods

Participants

The participants for this study included a group of 8 AWS (7 males, 1 female) from Oman who spoke Arabic as L1 and English as L2. The participants ranged in age from 20 to 39 years-old. The participants were originally recruited by contacting local speech-language therapists, friends, as well as through direct contact with participants who were known to the researcher. All participants reported speaking Arabic as L1 and English as L2. Only one participant reported understanding a few words in a third language "Swahili". All participants lived in Muscat or had been living in Muscat for the last 5 years and spoke typical Omani Arabic dialect. None of the participants had a communication disorder other than stuttering, although one participant had gliding of the /r/ phoneme. All participants were diagnosed previously with stuttering by a speech-language therapist. Sex, amount of previous treatment, perception of stuttering, self-rating stuttering severity in L1, self-rating of L2 proficiency, age of L2 acquisition and percentage of L2 usage during the day as reported by participants were not controlled for in the present study. The general characteristics of the participants are provided in Table 1. All participants provided written consent for their involvement in the study. A copy of the consent form is provided in Appendix A.

Table 1. General characteristics of participants. (M) and (F) refer to the distinction of sex (Male and Female). Results are based on completion of a questionnaire. The overall mean and standard deviation (SD) are provided.

Participant	Sex	Age	Age of stuttering onset	Amount of treatment per session	Self-rating of stuttering severity in L1 (0-10)	Self-rating of L2 proficiency (1-10)	Age of L2 acquisition	Percentage of L2 usage
1	M	21	6	8	8	5	9	10
2	M	22	10	15	7	5	12	20
3	M	27	9	3	3	5	10	40
4	M	24	9	8	7	3	16	3
5	M	39	5	0	4	6	19	30
6	F	31	9	3	3	4	10	5
7	M	24	8	3	6	4	17	5
8	M	20	10	15	4	6	16	20
Mean		26	8	6.8	5	4.7	13.6	16.6
SD		6	1.8	5.6	1.9	1	3.8	13

Data collection

All data were collected in The Sultanat of Oman in Muscat. The data consisted of reading and conversational speech samples obtained in Arabic and in English from each participant. In addition, a questionnaire was completed by each participant prior to the recording of the reading and conversation samples to obtain the participant's views regarding their L2 proficiency, as well as the nature and severity of their stuttering. All of the participant's interviews were recorded in the speech and language therapy clinic in the Sultan Qaboos University Hospital (SQUH), Muscat, The Sultanat of Oman. All interviews were recorded in a quiet setting. Video and audio recordings were both used to record the eight interviews.

Questionnaire. At the beginning of the interview each participant was required to complete a questionnaire, which was presented in Arabic language. The questionnaire consisted of general geographical information, questions regarding age of L2 acquisition and self-rating of L2 proficiency on the four language modalities (listening, speaking, reading and writing) in L2. In the second part of the interview the researcher asked the participants questions in Arabic about L2 proficiency (i.e., age of acquisition and exposure), linguistic and motoric differences between L1 and L2 and effect on stuttering. A copy of the questionnaire is provided in Appendix B.

Reading sample. Each participant was given a short passage to read in Arabic and a short passage to read in English. The English passage consisted of 60 words and the same passage was translated to modern standard Arabic (MSA) and consisted of 46 words. Participants were instructed not to use any fluency techniques during the oral reading of each passage. A copy of the Arabic and English reading samples are provided in Appendix C and D, respectively.

Conversational Speech Sample. A 15-minute conversational speech sample was collected from each participant speaking L1 and L2. The researcher served as the discourse partner for both samples. The topics of conversation included a variety of closed and open questions and different topics (e.g., hobbies, vacation plans, favourite movies or books, university/college, work or opinion on issues in health or education system). During collection of the L2 samples, there was a deliberate attempt to start with a familiar topic and gradually increase language output by asking more open-ended questions. In all cases, the participants were encouraged to produce exclusively English words during their L2 conversation. During those instances, when a participant was unable to recall an L2 word in

their conversation, the researcher allowed time to think and then said "*Do you mean…?"* to give the feeling of a normal conversation.

Fluency analysis

The reading passages and the initial 300 words of each conversational sample in both L1and in L2 were used to determine the total number disfluencies and to identify the type of disfluencies (SLDs & ODs) in L1 and L2. The audio/video recording of each participant's reading and conversational speech sample were replayed by the researcher as many times as necessary to orthographically transcribe the sample then determine moments of disfluency and stuttering. The researcher is a bilingual Arabic-English speaker with over 19 years of experience using English. All the data were summarised for each participant according to language type (L1 versus L2) as well as speaking situation (reading & conversation).

Words Stuttered and Syllables Stuttered. Two quantitative measurements used to calculate the amount of disfluency in L1 and L2. These measures were (1) overall disfluency (ODs + SLDs) and (2) stuttering (SLDs). Bernstein Ratner (2004) found that languages that vary in number of multi-syllabic words (i.e., English and Spanish or English and Arabic) tend to result in different amounts of disfluency and stuttering when calculated according to syllables or words stuttered. That is, calculating the percentage of stuttering per syllables in a speech sample with high number of total syllables will result in a lower percentage of stuttering compared to a speech sample with a lower number of total syllables despite both samples have the same number of words. This was also noted by Dworzynski and Howell (2004b) when examining English and German. Arabic is another language that has a higher amount of multi-syllabic word than English in both reading and conversational samples (Watson, 2012), therefore it is important to calculate the overall disfluency, SLDs and ODs according to both words and syllables in both languages.

Regardless of the number of disfluencies occurring on a single word or syllable (i.e., disfluency clusters), only one SLD or OD moment was counted for each syllable stuttered or word stuttered. ODs such as interjections (e.g., um, ah), revisions (e.g., I want/I like the green bag), abandoned utterances (e.g., she was/all of us are going) and phrase repetitions (e.g., "maybe, maybe", "I would like, I would like to go home") were not included in the overall number of syllables and words comprising the 300-word speech sample.

Content and Function Word Analysis. Only SLDs were considered in the analysis of stuttering on content, function, and content-function words. SLDs were defined as those containing part-word repetitions, prolongations, blocks and/or single syllable word repetitions

(Ambrose, 2006). In English, all SLDs were identified as either occurring on bare content (BC) or bare function (BF) words, while in Arabic SLDs were identified as occurring on BC, BF or content-function (CF) words. The distribution of stuttering on BC and BF in L2 was analysed. BF words included articles (e.g., the, a, an), pronouns (e.g., his, she, I, it, you, me, these), verbal auxiliaries (e.g., have been + verb, am + verb), modals (e.g., can, may, will, shall, must), deictics (e.g., over there, up there, down there, right here), expletives (e.g., there, are, it), particles (e.g., however, if, thus, well, then, no), pro-sentences (e.g., yes, okay), conjunctions (e.g., but, and, for, or, so, yet, although, because, while), and prepositions (e.g., under, next, on, against, like). Content words contained nouns (e.g., mouse, bus), main verbs (e.g., eat), adjectives (e.g., beautiful, cold, tall), and adverbs (e.g., here, today, tomorrow, later).

The distribution of stuttering on BC, BF and CF words in L1 was analysed according to Arabic language rules. There are no copula verbs, auxiliary verbs, model verbs, gerunds, or infinitive forms in Arabic (Wilson, 2012). BF words included pronouns e.g., they ➡ هم, pro-sentences e.g., yes ➡ نعم, conjunctions e.g., but ➡ لكن, and prepositions e.g., under ➡ تحت. Content words contained nouns e.g., bus ➡ باص, main verbs e.g., eat ➡ يأكل , adjectives e.g., beautiful ➡ جميل, and adverbs e.g., today ➡ اليوم .

Some of the linguistic features found in Arabic are linked to feminine and masculine verbs e.g., play for male, play for female ➡ يلعب , تلعب, nouns e.g., student for male, student for female ➡ طالب ,طالبه and adjectives e.g., special for male, special for female ➡ مميز , مميزه. Some words are combined of two function words and were categorized as BF e.g., with that, all of us ➡ بذلك, كلنا . CF words are combined content and function words e.g., the man, she slept, my book ➡ الرجل , نامت , كتابي .

Statistical Analysis. Differences in the overall amount of stuttering in L1 compared to L2 were evaluated using two-tailed Mann-Whitney tests. Relationships between the various stuttering variables and measures of L2 proficiency were also examined using a Pearson Product-Moment correlation coefficient.

Reliability Measures

To evaluate inter-reliability for identification of SLDs and ODs, two bilingual speech and language therapists speaking Arabic as L1 and English as L2 were asked to evaluate the reading and conversational speech samples of two randomly chosen participants (25% of the participant sample). The recordings were listened to as many times as necessary to make adequate evaluations. Their results were then compared to the results of the researcher. Percentages of inter-judge agreement for the identified SLDs in Arabic reading and conversational speech samples were 100% and 94.8%, respectively. The percentages of inter-judge agreement for ODs in Arabic reading and conversational speech sample were 100% and 75%, respectively. In the English reading and conversational speech sample, the percentages of inter-judge agreement for SLDs were 92.8% and 98%, respectively. For the English reading and conversational speech sample, the inter-judge agreements for ODs were 83% and 87.5%, respectively.

Results

The results are presented in three sections. The first section contains individual and group results regarding the amount of disfluency and stuttering in L1 and L2 in reading and conversational speaking samples. The second part contains the frequency of stuttering on content and function words in L1 and L2 in reading and conversational speaking samples. The last section contains results from multiple correlational analyses examining variables of stuttering severity and language proficiency in L1 and L2.

Disfluency and Stuttering Severity in the L1 and L2 Reading Samples

The percentages of overall disfluencies per words in L1 (M = 27%) was higher than in L2 (M =19%). Overall percentages of disfluencies per words in L1 ranged from 2% to 52% (SD =17), while in L2 ranged from 6.6% to 48% (SD=12.8). However, the opposite pattern was found when disfluency per syllables was calculated as it was higher in L2 (M =13.5%) than L1 (M=9%). Overall percentages of disfluencies per syllables in L1 ranged from 0.8% to 20% (SD=7), while in L2 ranged from 2.4% to 35.6% (SD=10). A two tailed Mann-Whitney test was performed to determine whether the group percentage of disfluencies per words differed between L1 and L2. The test was not significant [U = 21, p = 0.27]. The same result found when a two tailed Mann-Whitney test was performed to look at disfluencies per syllables between L1 and L2 [U =25, p = 0.49].

SLDs per words (% SLDs). The percentages of SLDs, ODs and total disfluencies (per words and per syllables) produced by each participant, as well as the group are given in Table 2. A display of two histograms of the percentages of SLDs, ODs and the overall disfluencies represented in words and syllables is provided in Figure 1. In the L1 reading samples, percentages of words stuttered ranged from 2% to 52% and averaged 27% (SD = 17) for the group. In the L2 samples, percentages of words stuttered ranged from 1.6 % to 40% and averaged 16% (SD =11.9) for the group. A two-tailed Mann-Whitney test was performed to determine whether the group percentage of stuttering differed between L1 and L2. The test was not significant [U = 19, p = 0.19]. In the L1 reading sample there were no ODs observed across participants, while in the L2 sample the percentages of ODs ranged from 0 to 8% and averaged 3% (SD =3). It was not possible to compare ODs in L1 and in L2 samples because there were no ODs documented in L1. A display of the percentages of ODs in the L2 reading sample (phrase repetitions & interjections) is shown in Figure 2. Phrase repetition (13%) was the dominant type of ODs in L2 reading sample. A two-tailed Mann-Whitney test was

performed to determine whether the group percentage of stuttering per word (SLDs) in L2 differed from (ODs) in L2. The test was significant [U = 5, p = 0.005], indicating higher SLDs than ODs.

SLDs per syllables (%SS). The percentages of SLDs on syllables calculated for each participant in the L1 and L2 samples, as well as the group, are listed in Table 2. In the L1 sample, the %SS ranged from 0.83% to 20% and averaged 9% (SD = 7) for the group. In the L2 samples, percentages of stuttering ranged from 1.2 % to 29.6% and averaged 11% (SD = 9.7) for the group. A two-tailed Mann-Whitney test performed to determine whether the group %SS differed between L1 and L2 samples. The test was not significant with [U = 29, p = 0.79]. A display of %SS in reading sample in L1 and L2, produced as a function of language type, is provided in Figure 1.

Table 2. The number (#) and percentage (%) of SLDs, ODs, SS and overall disfluency per words and per syllables by each participant in the reading sample according to the first language (L1) and second language (L2). The total number of words and syllables collected from each participant is derived from a reading sample 46 words (120 syllables) in L1 and 60 words (81 syllables) in L2. The overall group mean and standard deviation (SD) are also reported.

Participants	**Arabic (L1)**							**English (L2)**							
	Words				Syllables			Words				Syllables			
	SLD / #words	%SLD	%OD	%Disfluency	SS/ #syllables	%SS	%Disfluency	SLD/ #words	%SLD	%OD	%Disfluency	SS/# syllables	%SS	%OD	%Disfluency
1	24/46	52	0	52	24/120	20	20	24/60	40	8	48	24/81	29.6	6	35.6
2	18/46	39	0	39	18/120	15	15	6/60	10	5	15	6/81	7.4	3.7	11.1
3	1/46	2	0	2	1/120	0.8	0.8	5/60	8	1.6	9.6	5/81	1.2	1.2	2.4
4	18/46	34	0	34	18/120	15	15	11/60	18	0	18	11/81	13.5	0	13.5
5	1/46	2	0	2	1/120	0.8	0.8	1/60	1.6	5	6.6	1/81	1	3.7	4.9
6	13/46	28	0	28	13/120	10.8	10.8	15/60	25	0	25	15/81	18.5	0	18.5
7	15/46	32.6	0	32.6	15/120	1.25	1.25	10/60	16	0	16.6	10/81	12	0	12
8	12/46	26	0	26	12/120	10	10	6/60	10	5	15	6/81	3.7	6	9.7
Mean	12.5/46	27	0	27	12.7/120	9	9	9.6/60	16	3	19	9.7/81	11	2.6	13.5
SD		17	0	17		7	7		11.9	3	12.8		9.7	2.6	10

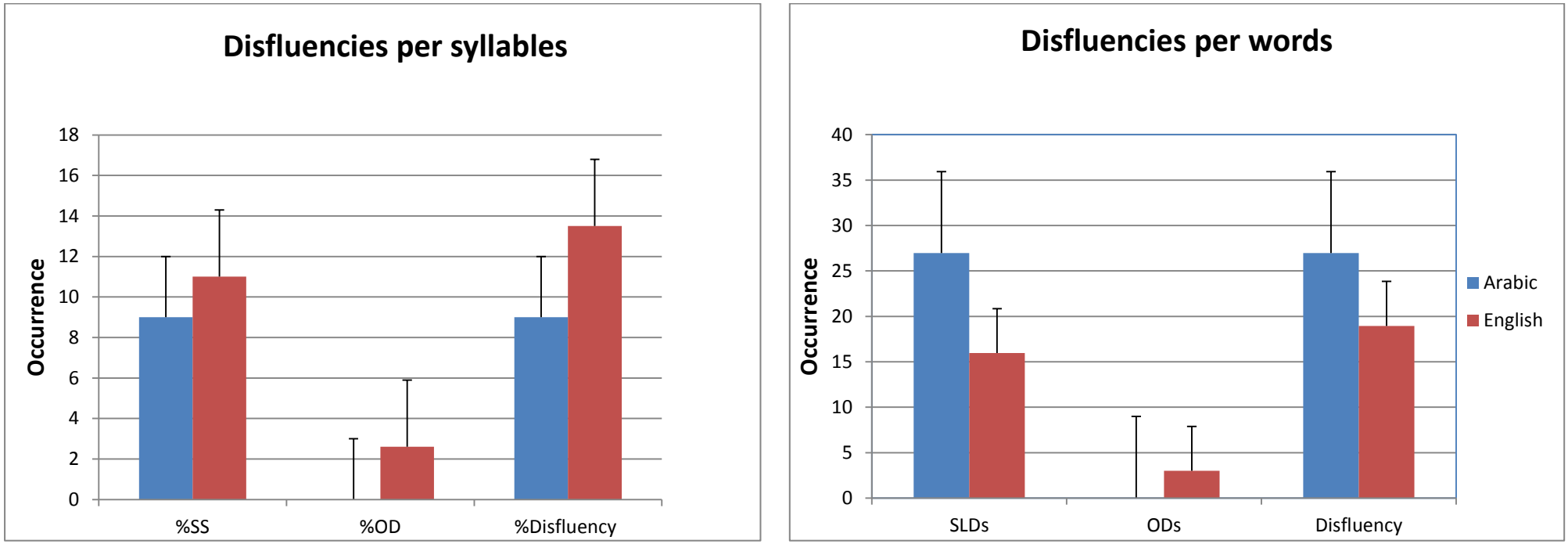


Figure 1. Mean percentages of SLDs, ODs and disfluency per syllables (left panel) and words (right panel) words in the Arabic (L1) and English (L2) reading samples. The upper limits of the standard deviation are also shown.

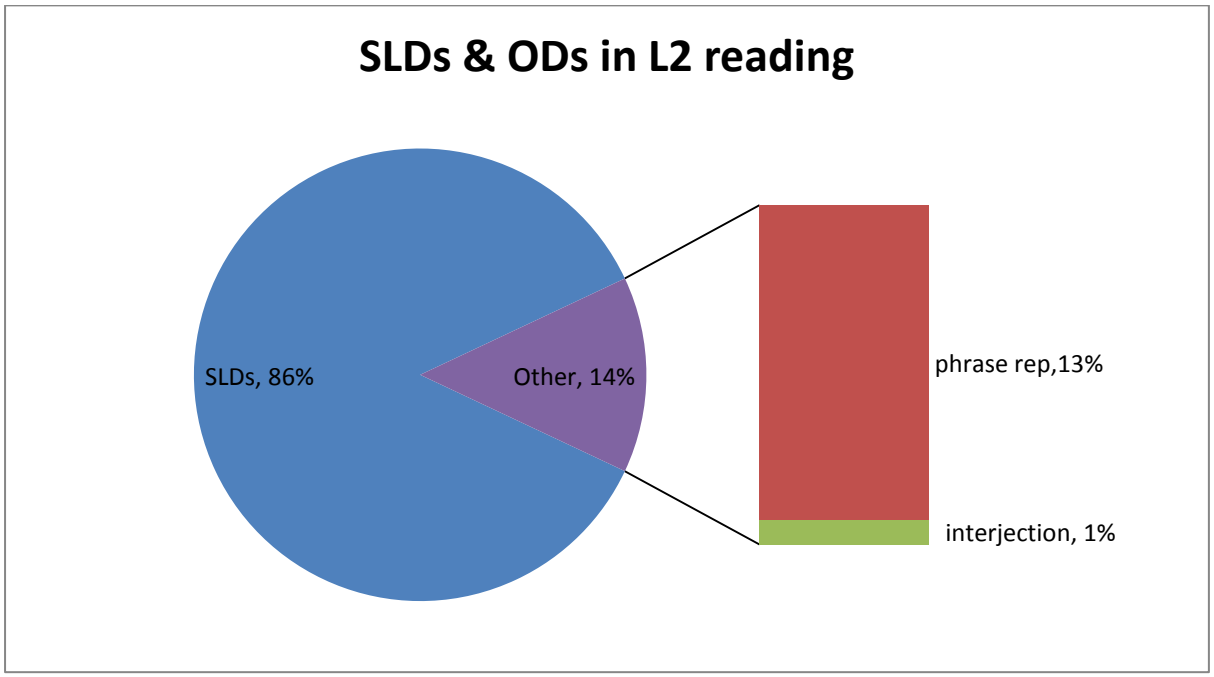


Figure 2. Percentages of stuttering-like disfluencies (SLDs) and other disfluencies (ODs) in the English reading sample (L2). These percentages of SLDs and ODs are out of total disfluency in the L2 reading sample. The two types of ODs seen in the L2 reading are shown.

Disfluency and Stuttering in the L1 and L2 in Conversational Speaking Samples

The percentages of overall disfluencies per words and per syllables were both higher in L2 than L1. The percentage of disfluencies per words in L2 (M =26%) was higher than in L1 (M =21.5%). The percentages of disfluencies per words in L1 ranged from 11.6% to 35.7% (SD =8.5), while in L2 ranged from 11.6% to 44% (SD=11). Similar pattern observed when calculating disfluency per syllables. The percentages of overall disfluencies per syllables in L2 (M =20%) was higher than in L1 (M =12%). Overall percentages of disfluencies per syllables in L1 ranged from 6.2% to 19.6% (SD =6.4), while in L2 ranged from 7.4% to 36% (SD=10). A two-tailed Mann-Whitney test was performed to determine whether the group percentage of disfluencies differed between L1 and L2. The test was not significant when disfluency per words were compared [U =25, p =0.496], however it approached significance when disfluency per syllables were compared [U =14, p =0.06]. The percentages of SLDs, ODs and total disfluencies produced by each participant, as well as the group are listed in Table 3. A display of the overall percentages of disfluencies, produced as a function of language type, is provided in Figure 3.

SLDs per words (%SLDs). In the L1 speaking samples, %SLDs ranged from 7.6% to 31.7% and averaged 17 % (SD = 7.9) for the group. In the L2 samples, %SLDs ranged from 8.6 % to 37 % and averaged 22 % (SD =10.7) for the group. A two-tailed Mann-Whitney test was performed to determine whether the group %SLDs differed between L1 and L2 in their conversational speaking samples. The test was not significant [U = 22, p = 0.3]. In the L1 sample, the percentages of ODs per words ranged from 0 to 8% and averaged 4.5 % (SD =3).The percentages of ODs per words for the L2 sample ranged from 2 to 7% and averaged 4% (SD =1.9). In the L1 sample, the percentages of ODs per syllables ranged from 0 to 4.9% and averaged 2% (SD =1.4), while in L2 sample, percentages of ODs per words ranged from 1.4 to 5.5% and averaged 2.7% (SD =1). No significant difference was found between ODs in L1 and L2 using the Mann-Whitney test [U = 27, p = 0.6]. A Mann-Whitney test was performed to determine whether the group %SLDs in L1 differed from percentage of ODs L1. The test was significant [U = 0.5, p = 0.001], indicating higher SLDs than ODs. Similarly, a Mann-Whitney test identified a substantial difference between SLDs and ODs in L2 [U = 0, p = 0.0009], indicating higher SLDs than ODs. In the L1 conversational speaking sample, percentages of interjection (12%) were the highest type of ODs followed by unfinished phrases (4%). The highest percentages of ODs documented in the L2 speaking sample were interjections (12%) followed by phrase repetition (2%). A display of

percentages of the types of ODs documented in L1 and L2 conversational speaking samples is provided in Figure 4.

SLDs per Syllables (%SS). The %SS calculated for each participant's conversational speaking in the L1 and L2 samples, as well as the group, are listed in Table 3. A higher number of syllables were produced in the L1 sample (M= 539 syllables) compared to the L2 sample (M= 340 syllables). In the L1 samples, %SS ranged from 4.2 % to 17.6 % and averaged 8.4% (SD = 4.8) for the group. In the L2 conversational speaking samples, %SS ranged from 5.7 % to 30.5% and averaged 17% (SD = 8.9) for the group. A two-tailed Mann-Whitney test was performed to determine whether the group %SS differed between L1 and L2 samples. The test was significant with [U = 11.5, p =0.035], indicating more stuttering occurred on L2 speaking sample. A display of %SS in the conversational speech samples in L1 and L2 is provided in Figure 3.

Table 3. The number (#) and percentage (%) of SLDs, ODs, SS and overall disfluency per words and per syllables by each participant in their conversational speech according to L1 and L2. The total number of words and syllables collected from each participant is derived from their conversational speech sample. The overall group mean and standard deviation (SD) are reported.

Participants	**Arabic (L1)**								**English (L2)**							
	Words				Syllables				Words				Syllables			
	SLD/# words	% SLD	% OD	% Disfluency	SS/# syllables	% SS	% OD	% Disfluency	SLD/# words	% SLD	% OD	% Disfluency	SS/# syllables	% SS	% OD	% Disfluency
1	39/205	19	7	26	39/284	13.7	4.9	18.6	33/88	37	7	44	33/108	30.5	5.5	36
2	81/255	31.7	4	35.7	81/459	17.6	2	19.6	72/271	26.5	4.4	30.9	72/349	20.6	3.4	24
3	23/300	7.6	4	11.6	23/542	4.2	2	6.2	25/300	11.6	2	13.6	25/410	6	1.4	7.4
4	47/300	24.5	7	31.5	47/612	17.6	3.4	21	95/300	31.6	4.6	36.2	95/404	23.5	3.4	26.9
5	32/300	10.6	8	18.6	32/660	4.8	3.6	8.4	26/300	8.6	3	11.6	26/450	5.7	2.2	7.9
6	51/300	17	0.3	17.3	51/658	7.7	0.15	7.85	82/300	27	2	29	82/360	22.7	1.6	24.3
7	37/252	14.6	0	14.6	37/573	6.4	0	6.4	44/165	27	3	30	44/227	19.3	2.2	21.5
8	29/255	11	6	17	29/530	5.4	2.8	8.2	32/300	10.6	6.6	17.2	32/414	7.7	4.8	12.5
Mean	42/270.8	17	4.5	21.5	42/539	8.4	2	12	51/253	22	4	26	51/340	17	2.7	20
SD		7.9	3	8.5		4.8	1.4	6.4		10.7	1.94	11		8.9	1	10

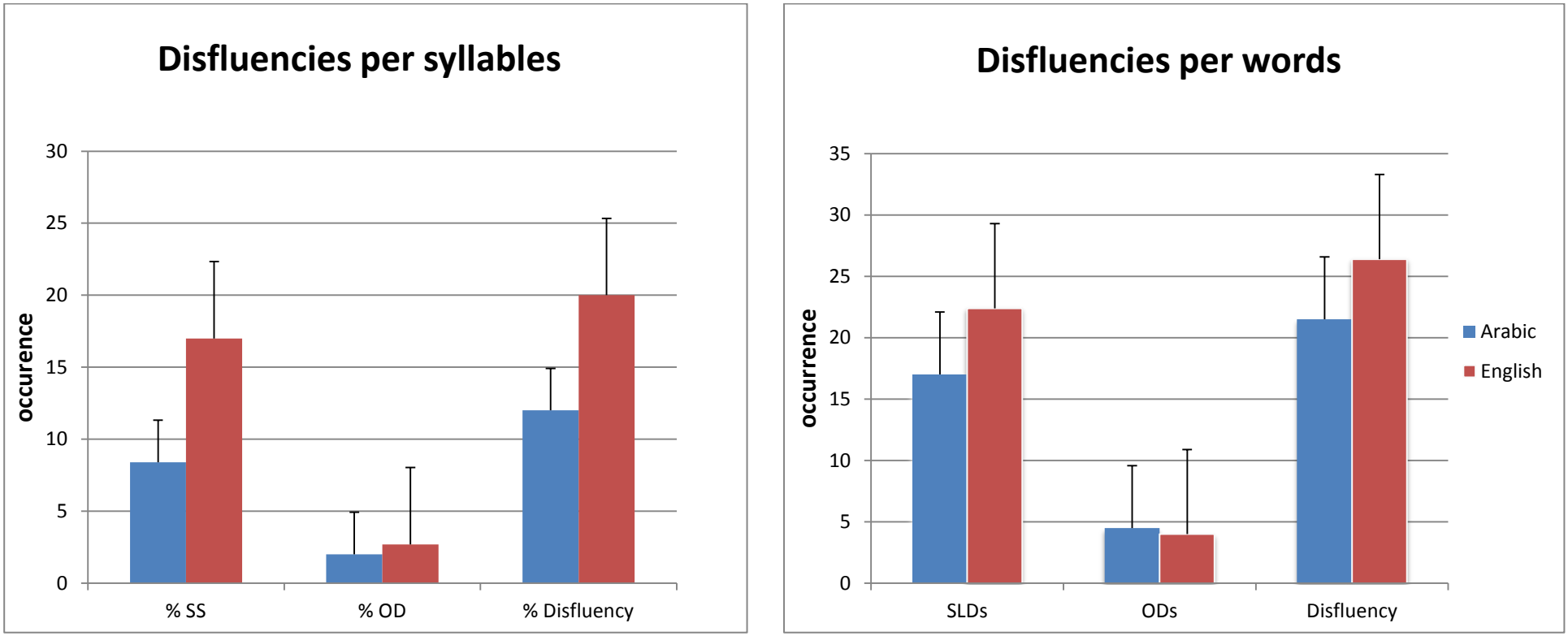
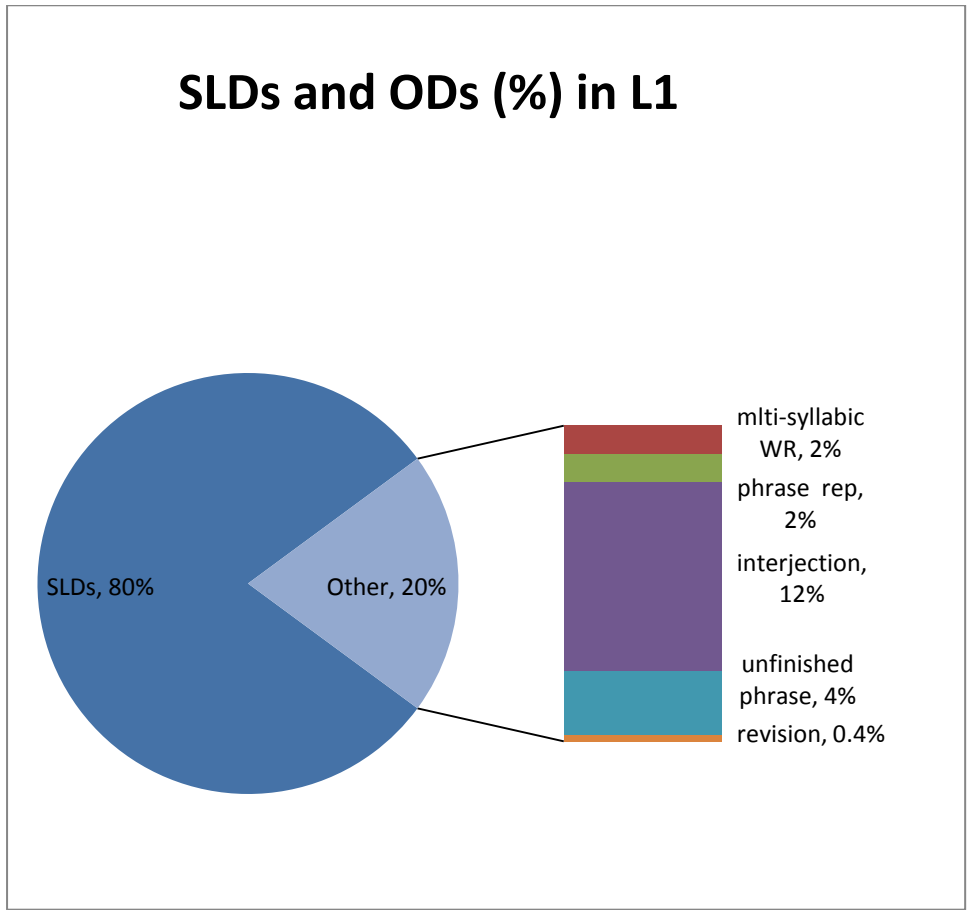


Figure 3. Mean percentage of SLDs, ODs and total disfluencies per syllables (left panel) and per words (right panel) in Arabic (L1) and English (L2) conversational speech. The upper limits of the standard deviation are shown.



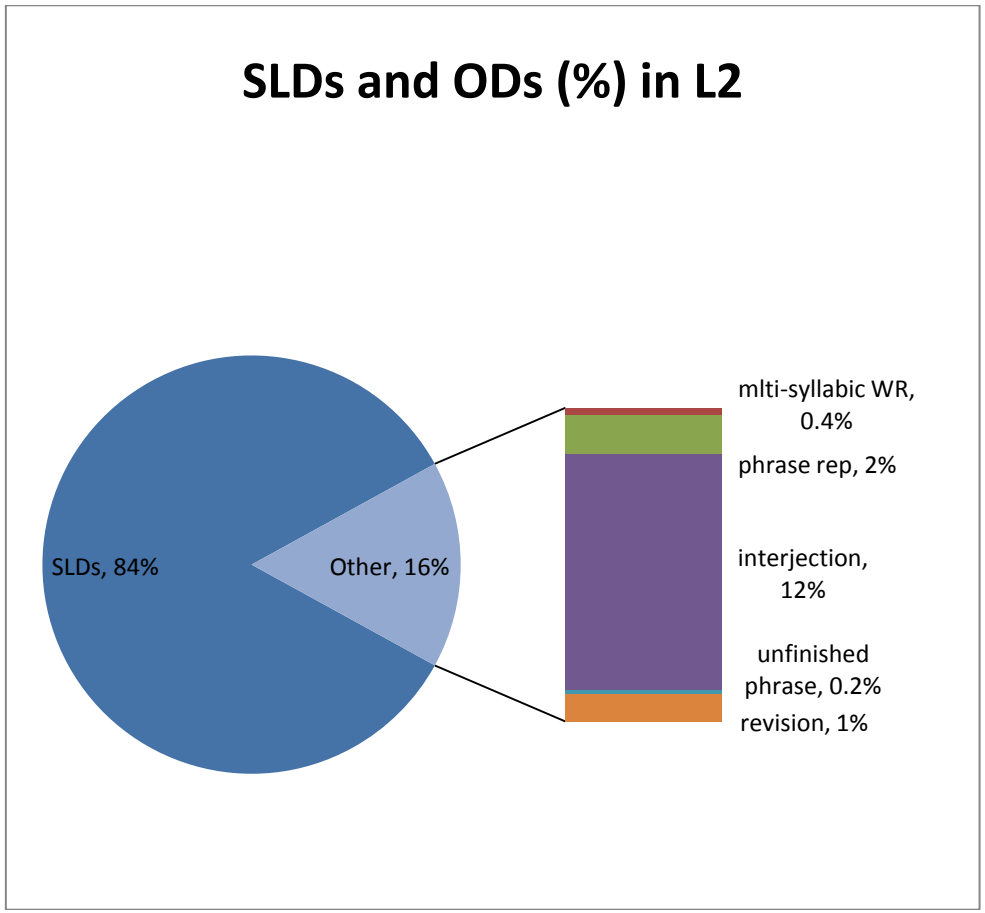


Figure 4. Percentage of SLDs and (ODs) in Arabic (L1) and English (L2) conversational speech samples. These percentages of SLDs and ODs are out of total disfluency. The types of ODs noted in L1 and L2 conversational speech samples are shown.

Content and Function Word Analysis of the Reading Sample

L1 reading sample. The numbers of stuttered BC, BF and CF words in the reading sample for each participant and as a group in L1 and L2 are listed in Table 4a. The percentages of stuttering on BC, BF and CF words out of total SLDs (both per words and syllables) for each participant and as a group in L1 and L2 are listed in Table 4b. Similarities were observed in the findings between SLDs per words and per syllables in reading sample according to lexical category; therefore the results will focus on SLDs per words. Percentages of stuttering per words on CF words ranged from 0 % to 33.3 % and averaged 19 % (SD=13) for the group. Percentages of stuttering on BC words ranged from 13.3 % to 100 % and averaged 47 % (SD = 34) for the group. Percentages of stuttering on BF words ranged from 0% to 62% and averaged 33% (SD = 23) for the group. In order to determine whether the percentage of stuttering on CF and BC words differed in L1, a two-tailed Mann-Whitney test was performed. The result was not significant in SLDs per words [U =16, p =0.103] and in SLDs per syllables [U =16, p =0.103]. Similarly no difference was found between CF and BF in SLDs per words [U =17, p =0.128] and in SLDs per syllables [U =20, p =0.22]. A Mann-Whitney test also indicated no difference between BC and BF words in L1 in SLDs per words [U =29, p =0.79] and in SLDs per syllables [U = 17, p =0.37].

L2 reading sample. Percentages of words stuttered in BC words in the L2 reading sample ranged from 0% to 66.6% and averaged 39% (SD = 20.8) for the group. Percentages of words stuttered in BF words ranged from 33.3% to 100% and averaged 61.8% (SD = 21.6) for the group. Results of a Mann-Whitney test between BC and BF in the L2 reading sample was not significant for SLDs per words [U =14.5, p = 0.07] or for SLDs per syllables [U = 17, p =0.12].

L1 versus L2 reading sample. A Mann-Whitney test revealed no difference (both SLDs per words and syllables) between BC words in L1 and in L2 [U=30, p =0.87]. A significant difference was found between the number of SLDs on BF words in the L1 and L2 reading samples when a Mann-Whitney test was applied [U =11, p =0.031] and in SLDs per syllables [U = 11, p =0.03], indicating higher stuttering in BF words in L2. A display of the percentage of content and function words stuttered in the L1 and L2 reading samples is shown in Figure 5.

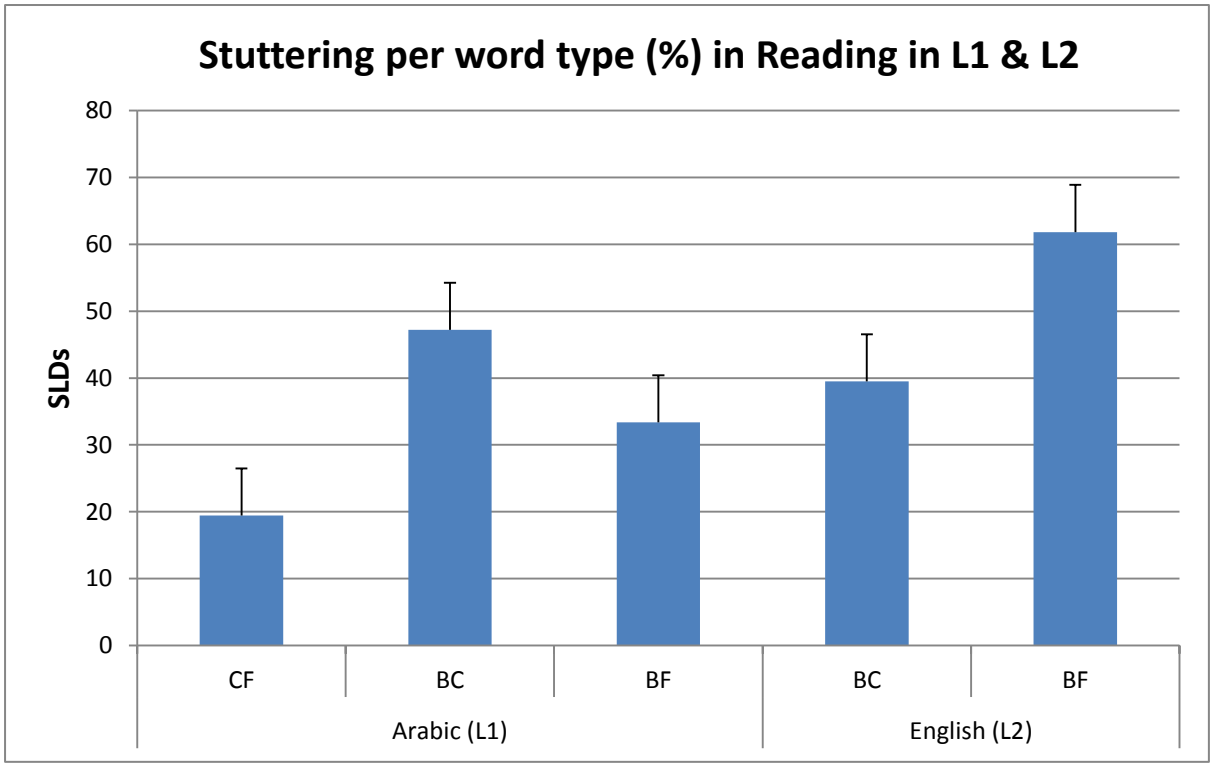
Table 4a. The number of words stuttered according to lexical category in L1 (BC, BF & CF) and in L2 (BF & BC) in each participant's reading sample. The overall mean and standard deviation (SD) are provided.

Arabic (L1)	Minimum	Maximum	Total	Mean	SD
BC	1	8	32	4	2.8
BF	0	9	42	5.25	3.3
CF	0	7	26	3.25	2.4
English (L2)	Minimum	Maximum	Total	Mean	SD
BC	0	11	35	4.3	3.4
BF	1	13	44	5.5	4.2

Table 4b. The %SLDs per words and per syllables according to lexical category in L1 (BC, BF & CF) and in L2 (BF & BC) in each participant's reading sample. The overall mean and standard deviation (SD) are provided.

	Arabic (L1)						**English (L2)**			
Participants	SLDs per words			SLDs per syllables			SLDs per words		SLDs per syllables	
	CF	BC	BF	CF	BC	BF	BC	BF	BC	BF
1	29	29	42	30.4	30.4	43.4	45.8	54	45.8	54
2	22	44.4	33.4	22.2	44.4	33.3	66.6	33.3	71.4	28.5
3	0	100	0	0	100	0	40	60	40	60
4	31	43	26	33.3	44.4	22	63.6	36.4	63.6	36.3
5	0	100	0	0	100	0	0	100	0	100
6	15	23	62	15.3	23	61.5	33.3	66.6	33.3	66.6
7	33	13.3	53.4	33.3	13.3	53.3	33.3	77.7	33.3	77.7
8	25	25	50	25	25	50	33.3	66.6	33.3	66.6
Mean	19	47	33	19.9	47.5	32.9	39	61.8	40	61
SD	13	34	23	13.7	34	23.6	20.8	21.6	21.7	22.6

Figure 5. Mean percentage of words stuttered in the reading sample according to lexical category in the group of participants' first language (L1) and second language (L2). The upper limits of the corresponding standard deviations are also shown.



Content and Function Word Analysis of the Conversational Speaking Sample

L1 speaking sample. The numbers of stuttered BC and BF words and CF words in the conversational speaking sample for each participant and as a group in L1 and L2 are listed in Table 5a. The percentages of stuttering on the various lexical categories (per words & per syllables) for each participant and as a group in L1 and L2 are listed in Table 5b. Due to similarities in findings between SLDs per words and per syllables in the conversational speaking, focus will be on SLDs per words when reporting mean and SD results. Percentages of stuttering on CF words ranged from 7.7% to 48.6% and averaged 19.8% (SD=14) for the group. Percentages of stuttering on BC words ranged from 30.8% to 59.4% and averaged 39% (SD = 11.9) for the group. Percentages of stuttering on BF words ranged from 16% to 61.5% and averaged 41% (SD = 16) for the group. In order to determine whether the percentage of stuttering on CF and BC words differed in L1, a two-tailed Mann-Whitney test was performed. The result was significant in both SLDs per words [U= 6, p =0.007] and SLDs per syllables [U= 6, p =0.007]. Similarly a difference was found between CF and BF words in L1 in SLDs per words [U= 9, p =0.018] and SLDs per syllables [U= 11, p =0.03]. Another Mann-Whitney test revealed no difference between BC and BF words in the L1 speaking sample in SLDs per words and per syllables respectively [U =28, p =0.71; U=30, p =0.8].

L2 speaking sample. Percentages of words stuttered in BC in the L2 conversational sample ranged from 38% to 66.4% and averaged 45.7% (SD = 9). Percentages of words stuttered in BF words ranged from 33.6% to 62% and averaged 54% (SD = 9) for the group. Results of a Mann-Whitney test between BC and BF in the L2 sample was not significant on SLDs per words [U = 15.5, p = 0.09] and SLDs per syllables [U =15.5, p = 0.09].

L1 versus L2 conversational speaking sample. A Mann-Whitney test approached significance when it was used to test for a difference between the number of SLDs in BC words in L1 and in L2 [U =13, p =0.06]. No significant difference was found when the SLDs per syllables on BC were calculated between the two languages [U =17.5, p =0.14]. There was no significant difference between the SLDs in BF words in L1 and L2 [U=15, p =0.08]; however there was a difference when BF words were examined according to SLDs per syllable [U =13, p =0.03]. A display of the percentage of stuttering according to lexical category in the conversational speaking sample of both languages is shown in Figure 6.

Table 5a. The number of words stuttered in the conversational speech sample according to lexical category in L1 (BC, BF & CF) and in L2 (BF & BC) for the group of participants. The overall mean and standard deviation (SD) are provided.

Arabic (L1)	Minimum	Maximum	Total	Mean	SD
BC	9	34	144	18	8.4
BF	7	32	133	16.6	8.9
CF	3	37	89	11	11
English (L2)					
BC	10	63	200	25	17
BF	16	51	219	27	12.7

Table 5b. The percentage of SLDs per words and per syllables according to lexical category in L1 (BC, BF & CF) and in L2 (BF & BC) in each participant's conversational speech sample. The overall mean and standard deviation (SD) are provided.

	Arabic (L1)						**English (L2)**			
Participants	SLDs per words			SLDs per syllables			SLDs per words		SLDs per syllables	
	CF	BC	BF	CF	BC	BF	BC	BF	BC	BF
1	7.7	30.8	61.5	7.6	30.7	61.5	45.5	54.5	45.4	54.5
2	7.7	30.8	61.5	18.5	41.9	39.5	44.5	55.5	43.8	54.7
3	13	56.5	30.5	13	56.5	30.4	40	60	40	60
4	48.6	35	16	48.6	35	16.2	66.4	33.6	64	31
5	9.3	59.4	31.3	9.3	59.3	31.2	38.5	61.5	38.4	61.5
6	22	31	47	21.5	31.3	47	38	62	37.8	62
7	29.8	37.8	32.4	29.7	37.8	32.4	43.2	56.8	43	56.8
8	20.7	31	48.3	20.6	31	48.2	50	50	50	50
Mean	19.8	39	41	21	40	38	45.7	54	45.3	53.8
SD	14	11.9	16	13	11	13.8	9	9	8.5	10

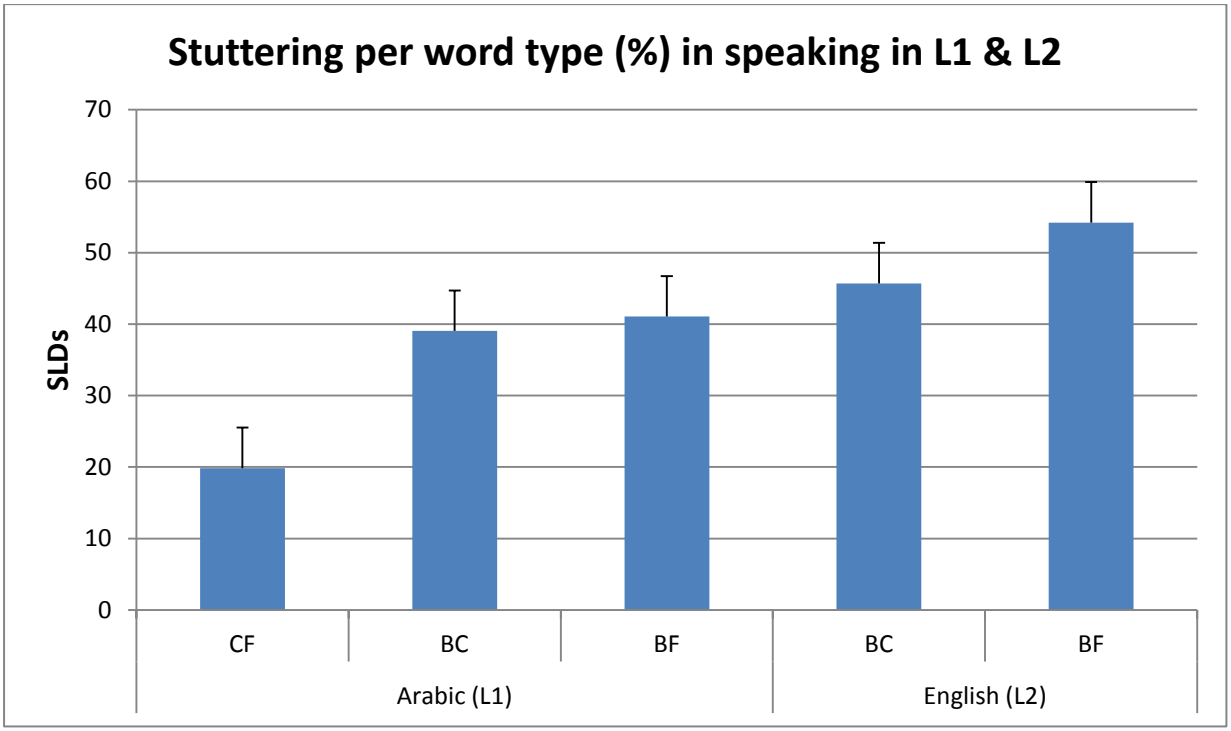


Figure 6. Mean percentage of words stuttered in conversational speech samples according to lexical category in the group of participants' first language (L1) and second language (L2). The upper limits of the corresponding standard deviations are also shown.

Correlational Analysis

In order to determine whether there were any relationships between stuttering behaviour and language proficiency, a series of Pearson correlations were calculated. Major findings of the multiple correlational analyses are provided in a matrix format in Table 6. All correlations were performed as two-tailed tests. Correlations were considered to be significant at the 0.05 level if $r \geq 0.666$. Upon examination of the correlation matrix, a number of relationships were identified. These relationships can be organised into three general categories (1) stuttering behaviours, (2) severity rating in L1, (3) stuttering and L2 proficiency. The major relationships for each of these categories are presented below.

Stuttering Behaviours. Strong correlations between %SLDs and %SS in both reading and speaking samples were found. For example, in the L1 reading sample the correlation between %SLDs and %SS was r =0.8, while in the L1 speaking sample the correlation between the two was r =0.9. Similarly in the L2 reading sample the correlation between SLDs and %SS was r =0.98, while in the conversational speaking sample the correlation was r =0.9. These correlations indicate that if stuttering in reading or conversational speech was high (or low) then %SS was also high (or low). The positive correlations between SLDs and %SS expands across both L1 and L2, indicating that if stuttering in L1 was high (or low) it was also high (or low) in L2. In L2, the amount of ODs in the reading sample correlated with ODs in the conversational speaking sample (r= 0.69), indicating that if ODs were high (or low) in reading then it was high (or low) in conversational speech.

Severity rating in L1. Severity rating by participants in L1 correlated positively with SLDs in L1 reading and conversational speech, respectively (r= 0.8 and r= 0.8). Similarly, severity rating in L1 correlated with SLDs in L2 conversational speech (r= 0.75); while in the L2 reading sample the correlation approached significance (r= 0.498). A similar relationship was found between severity rating in L1 and %SS in conversational speech across L1 (r=0.8) and L2 (r=0.7), while in the reading sample it approached significance in L1 (r=0.663) and L2 (r=0.566). These correlations support that severity rating in L1 is strongly related to the amount of stuttering across L1 and L2.

Stuttering and L2 proficiency. Participants' self-rating of their L2 reading proficiency correlated negatively with %SLDs and %SS in L2, respectively (r= -0.72, r= -0.7). This indicated that if an individual's self-rating was low in L2 reading skill proficiency then they were likely to exhibit higher stuttering in L2. Another negative correlation was found between self-rating in overall L2 proficiency and SLDs in their L2 conversational speech (r=

-0.68), indicating that higher self-rating on the language proficiency scale was related to overall lower stuttering in L2. These significant correlations also serve to validate the use of self-report scales of language proficiency in L2. Participants rating on overall proficiency in L2 scale correlated positively with their L2 speaking skill rating (r= 0.67), indicating that the speaking skill proficiency measure could be a good indicator of overall language proficiency.

Table 6. Correlation matrix showing the relationship between stuttering characteristics and Language proficiency factors for bilingual Arabic (L1) – English (L2) PWS. Language proficiency factors are participants rating in (severity rating (SR) in L1, in the 4 skills of L2: reading, listening, speaking and writing) and overall proficiency in L1 and L2. Stuttering characteristics in L1 and L2 including: percentages (%) of SLDs, OD, SS in reading (Re) or speaking (Sp) samples, Correlations in bold were those exceeding $r = 0.666$ and were significant at $p < 0.05$.

SLDs Reading L1	**0.830**	1.000										
%SS Speaking L1	**0.813**	**0.767**	1.000									
SLDs Speaking L1	**0.693**	**0.677**	**0.942**	1.000								
ODs Speaking L1	0.273	-0.086	0.138	-0.002	1.000							
LI proficiency	0.535	0.262	0.250	0.230	-0.231	1.000						
%SS Reading L2	**0.694**	**0.803**	0.495	0.350	-0.111	0.363	1.000					
SLDs Reading L2	**0.684**	**0.771**	0.426	0.249	-0.109	0.427	**0.982**	1.000				
ODs Reading L2	0.398	0.245	0.329	0.070	0.621	-0.140	0.150	0.169	1.000			
%SS Speaking L2	**0.753**	**0.874**	**0.724**	0.651	-0.189	0.374	**0.918**	**0.872**	0.006	1.000		
SLDs Speaking L2	**0.718**	**0.874**	**0.726**	**0.673**	-0.189	0.289	**0.884**	**0.828**	-0.044	**0.992**	1.000	
ODs Speaking L2	**0.693**	0.634	0.438	0.249	0.557	0.009	0.378	0.412	**0.696**	0.294	0.288	
L2 proficiency	-0.236	-0.372	-0.281	-0.428	0.396	-0.269	-0.439	-0.388	**0.726**	-0.633	**-0.683**	1.000
L2 reading skill	-0.415	-0.244	-0.008	0.189	-0.327	-0.317	**-0.700**	**-0.725**	-0.293	-0.427	-0.359	0.056
L2 listening skill	-0.631	-0.423	**-0.721**	-0.591	-0.226	-0.367	-0.570	-0.539	-0.199	**-0.689**	-0.661	0.372
L2 speaking skill	0.077	-0.184	0.166	0.094	**0.758**	-0.340	-0.515	-0.513	0.665	-0.478	-0.468	**0.677**
L2 writing skill	-0.558	-0.489	-0.624	-0.600	-0.339	0.040	-0.426	-0.286	-0.481	-0.446	-0.429	-0.050
SR in L1	0.663	**0.802**	**0.808**	**0.713**	0.267	-0.197	0.566	0.498	0.344	**0.711**	**0.759**	-0.313
	%SS Re L1	*SLDs Re L1*	*%SS Sp L1*	*SLDs Sp L1*	*ODs Sp L1*	*LI proficiency*	*%SS Re L2*	*SLDs Re L2*	*ODs Re L2*	*%SS Sp L2*	*SLDs Sp L2*	*L2 proficiency*

Summary of Results

The primary results of the present study were as follows:

(1) No significant difference was found in the percentages of overall disfluency (both per words and per syllables) in L1 and L2, however, disfluency per syllables in the conversation speech sample approached significance with higher disfluency in L2.

(2) A significantly higher percentage of SLDs in syllables (%SS) in L2 compared to L1 was found for the conversation speech samples. There was no significant difference in SLDs for words in either reading or speaking samples in L1 and L2.

(3) More ODs were documented in the L2 reading sample, while no significant difference was found between ODs in L1 and L2.

(4) Significantly higher percentages of SLDs per words than ODs were found in the L1 and L2 reading and conversational speaking samples.

(5) No significant difference was found between stuttering (both per words and per syllables) on BC words and BF words in the L2 reading and conversational speaking samples.

(6) There were significantly lower percentages of stuttering in L1 (both per words and per syllables) on CF words compared to BC and BF words in the conversational speaking sample.

(7) No significant difference was found between the amount of stuttering (both per words and per syllables) on BC words in the L1 and L2 reading samples,

(8) A significantly higher percentage of stuttering was found for BF words in L1 compared to L2 (both per words and per syllables) in the reading sample. In the conversational speaking sample, SLDs per syllable on BF words in L2 were significantly higher compared to L1.

(9) Language proficiency correlated negatively with amount of stuttering in L2.

Discussion

The purpose of the present study was to investigate the relationships between disfluency and language in Arabic-English speaking PWS. Based on examination of the fluency behaviour of sequential Arabic-English BWS, seven research questions were posed. A discussion of each question is provided below.

Research Question 1: Are there more overall disfluencies in L2 compared to L1?

In the present study, the amount of overall disfluency (i.e., combined SLD and OD) was evaluated according to the percentage of disfluency that occurred per words and per syllables. These measures of disfluency were determined for reading and conversational speech samples. Evaluation of disfluency according to words and syllables indicated no significant differences between L1 and L2 for both reading and conversational samples. However, distinct patterns of disfluency were observed. In the reading sample, there was a higher disfluency per words in L1 compared to L2. Yet, the opposite pattern was found when disfluency per syllables was calculated for the reading sample, with high disfluency observed in L2 compared to L1. In the conversational sample, higher disfluency was found in L2 compared to L1.

The present study used two measures of disfluency (per words and per syllables) as recommended by Van Borsal (2011). A similar approach was taken by Schäfer and Robb (2012) in their evaluation of German-English BWS. By considering both words and syllables in the measurement of disfluency, a more accurate assessment of disfluency is obtained due to phonetic differences in languages (e.g., phonetic complexity, word occurrence). For example, a language that contains a low number of multisyllabic words is likely to result in an equal number of disfluencies for both words and syllables (Bernstein Ratner, 2004; Dworzynski and Howell, 2004b; Van Borsel, 2011). A language that contains a high frequency of multisyllabic words (such as Arabic & German) would likely result in an unequal number of disfluencies for both words and syllables, notably a lower percentage for syllables. In addition, a word that has a low frequency of occurrence within the language is likely to be produced disfluently compared to a word that occurs with high frequency (Dayalu et al., 2002). In the present study, the total number of words comprising the Arabic and English reading and conversational speech sample were roughly the same. However, the number of syllables comprising the Arabic reading and conversational samples was

considerably larger. Therefore, it is not surprising to find an overall lower level of disfluency in the L1 (Arabic samples) according to %SS compared to L2.

There is limited research that has examined overall disfluency in bilingual speakers. To date there have been no studies of BWS that have looked at disfluencies associated with reading, aside from Roberts (2002) and the present study. Roberts (2002) examined disfluency in reading and speaking among four French-English adult bilinguals (2 balanced bilinguals and 2 participants who are more proficient in French (L2)). In the reading sample, similar disfluency was observed among three participants, while the fourth participant (Balanced bilingual) disfluencies in L2 was two times more than L1. This result is not consistent with the current study, which found more disfluency per words in Arabic (L1). Roberts (2002) looked at Indo-European languages (French & English) that share many phonetic features, while this study looked at Arabic and English languages which share less similar phonetic features. It would appear that the phonetic complexity of Arabic, as shown in the reading syllables, resulting in a higher percentage of overall disfluency at the word-level compared to English (L2). Detailed analysis of the present results found an absence of ODs in the Arabic reading sample for all of the participants. Yet, ODs were present in the English reading sample. Furthermore, ODs were present in both Arabic and English conversational speech samples. A possible reason for the absence of ODs in the reading sample is that the reading sample in L1 was in MSA, which is a unique form of Arabic that is only spoken and written in academic and formal settings. The highly structured nature of MSA may have introduced additional complexity to the reading task by preventing participants from using stalling techniques (e.g., interjections) that are a common feature of ODs (Wierzbicka, 1992).

Studies examining overall disfluency according to conversational speech have provided mixed results. Some studies have found higher disfluency in the dominant language of BWS. For example, Howell et al. (2004) reported a case of a 11;9 year-old bilingual CWS who was more proficient in Spanish than English and showed higher overall disfluency in L1. Taliancich-Klinger et al. (2013) evaluated the speech fluency of a 6-year-old CWS who was more proficient in English compared to Spanish. The researchers observed a higher amount of disfluency in English for both conversational and narrative samples. On the other hand, other studies looking at conversational speech sample have found higher disfluency in the less proficient language. Roberts (2002) examined four BWS French-English adult bilinguals (2 balanced bilinguals and 2 participants who are more proficient in French (L2) than English) found greater disfluency in L2 in the unbalanced BWS while similar disfluency was

observed in balanced bilinguals. Bernstein Ratner and Benitez (1985) evaluated a 50-year-old Spanish-English BWS and found the number of disfluencies in L2 were nearly twice that of the disfluencies in L1. Dale (1977) studied four Cuban-American adolescent males born in the US speaking English as L1 and Spanish as L2. A greater number of disfluencies were found in L2. Jankelowitz and Bortz (1996) reported a case of 63 English-African simultaneous bilingual who was more proficient in English. The study found that the participant had twice the number of disfluencies in the Afrikaan language than in English.

The results of the present study support those of past studies finding greater overall disfluency in conversational speech samples for the less dominant language. A possible reason for the differing results between Howell et al. (2004) and Taliancich-Klinger et al., (2013) compared to other studies may relate to the difficulties associated with determining language proficiency. Language proficiency is a term often used to indicate general ability in a language. It is not simply confined to spoken language but includes the four language modalities listening, speaking, reading, and writing (Lim et al., 2008). It is possible that past studies have not adequately assessed language proficiency.

Research Question 2: Are there more SLDs in L2 compared to L1?

In the present study, the amount of stuttering was evaluated according to the percentages of words stuttered (%SLDs) and syllables stuttered (%SS) in reading and conversational speech samples. Evaluation of stuttering based on %SLDs indicated no significant differences between L1 and L2 for both reading and conversational speech samples. Although the difference was not shown statistically, it is interesting to note that for 7 of the 8 participants, there was a higher stuttering according to %SLDs for reading in L1 compared to L2. This was the same pattern reported for overall disfluency and is likely due to the finding of no ODs for reading in L1, and the complexities of reading in MSA. A significant difference in SLDs between L1 and L2 was not apparent until stuttering was evaluated according to %SS. Using this measure, a significant difference was found between %SS in L1 and L2 for the conversational sample; with a higher amount of stuttering found for L2. However, no difference was found in %SS for the reading samples.

There is a growing body of research that has evaluated the occurrence of stuttering in L1 compared to L2 in conversational speaking samples. The majority of research is suggestive of higher stuttering in L2 (Ardilaet al., 2011; Dale, 1977; Jankelowitz & Bortz, 1996; Lim et al., 2008; Roberts, 2002; Schäfer & Robb, 2012; Taliancich-Klinger et al.,

2013). Similar to those studies examining overall disfluency, the general conclusion is that the amount of stuttering is linked to language proficiency. The least proficient language (in these cases – L2) is most vulnerable to increases in stuttering. The present results obtained for the conversational speech samples are supportive of these past results suggesting that stuttering is most likely to occur in the least proficient language.

Although the results obtained according to %SS for conversational speaking are supportive of past research indicating more stuttering in the less proficient language, it is interesting to note the lack of difference between L1 and L2 when considering SLDs per words for reading. Although L2 was the less proficient language, there was actually a higher occurrence of stuttering in L1 during the reading task. As noted earlier, Arabic (MSA) was used for the reading task. Arabic is a Semitic language that has two versions of the language (i.e., formal & informal) (Ferguson, 1959; Versteegh, 1997). In the present study MSA was used in the reading sample, while the Omani dialect of Arabic was used in the conversational speaking sample. MSA is believed to be a more linguistically, phonetically and grammatically complex than Arabic dialects (Abdalla et al., 2009; Holes, 2004; Vahabe al., 2013). In addition, MSA does not represent day-to-day speech as it is commonly used in written format in formal settings and for educational purposes (Abdalla et al., 2009; Al-Tamimi et al., 2013; Kirchhoff et al., 2006). Based on these two variables related to MSA (phonetic complexity and frequency of usage), a higher percentage of stuttering per words was observed in L1 reading sample.

The suggestion that the phonetic complexity of a language may influence stuttering is not new. Howell (2004) and Howell et al. (2004) reported that the amount of stuttering was linked to the phonetic complexity of the languages that can be related back to the EXPLAN theory, with a more complex language (e.g., Spanish) likely to result in higher stuttering. Other studies looking at monolingual people with stuttering have also emphasized the role of phonetic complexity in Persian (Vahab et al., 2013) and Arabic (Abdalla et al., 2009; Al-Tamimi et al., 2013) languages. The idea of stuttering associated with phonetic complexity has been further reported in bilingual studies like German (Dworzynski & Howell, 2004b) and Persian (Mohammadi, Bakhtiar, Rezaei, Sadeghi, 2012).

Another consideration is the use of reading and conversational speaking samples as measures for disfluency and stuttering. Bernstein Ratner and Benitez (1985) and Fodor, Bever and Garrett (1974), have suggested that it may not be appropriate to compare the disfluent speech produced by BWS in reading and conversational speech contexts because they represent different forms of speech production. They recommend evaluating only

conversational speech. It was noticed in the present study that there were considerable variations in the amount of disfluency obtained from the participants as a function of the speech sample (reading & conversational speech). In some cases, more disfluency was observed in reading (e.g., L1 vs L2 according to %SLDs), while in other cases there was more disfluency in conversational speech (e.g., L1 vs L2 according to %SS). By considering both reading and conversational speech samples, the present study was able to provide additional detail regarding the nature of stuttering in BWS.

Research Question 3: Are there more ODs in L1 compared to L2?

This question was developed based on the results of Taliancich-Klinger et al. (2013). These researchers found that their bilingual CWS produced more overall disfluencies (SLDs & ODs) in the language used most often English (L1) and more ODs in L1 compared to Spanish (L2). The results obtained in the current study did not agree with the results of Taliancich-Klinger et al. (2013). In the reading sample there were no ODs found in L1 and only 3 in across all of the L2 samples. In the conversational speech sample there were 4 ODs found for both L1 and L2. No significant differences in the amount of ODs were observed in L1 compared to L2.

There is limited research examining the use of ODs in BWS. Roberts (2002) evaluated reading and speaking of four BWS speaking French-English. Two participants showed more ODs in L1, one participant more ODs in L2, and one participant had similar amounts of OD in L1 and L2. Nwokah (1988) examined use of ODs in 16 Nigerian adults (16 to 40 years old) who were sequential bilinguals speaking Igbo as L1 and English as L2. More word fillers eg, "*mm"* (ODs) were found in English (L2) than Igbo (L1). Jankelowitz and Bortz (1996) reported a case of a 63-year-old speaking English-African BWS who was more proficient in English language (L1). More ODs were documented in the Afrikaans language (L2) than L1. None of these previous studies, including the present study, would appear to support the contention by Taliancich-Klinger et al. (2013) that a greater number of ODs should occur in the most dominant language. A possible reason for the difference is that these researchers only examined a single bilingual CWS speaking English-Spanish, while the present study (and others) has focused on adults who speak a variety of different languages. In addition, differences related to the use of ODs in BWS might be due to differences in language characteristics or other factors related to culture.

It is interesting to note that in the current study only a very small percentage of ODs were produced in both L1 and L2 conversational speech samples. This amount is considerably lower compared to other studies (e.g., Jankelowitz & Bortz, 1996; Roberts, 2002; Taliancich-Klinger et al., 2013). One possible reason is offered to explain the small percentages of ODs produced in both samples. It is possible that the use of ODs is not a common occurrence in the speech of Omanis. A study by Wierzbicka (1992) looking at the use of interjections (e.g., a common type of OD) reported that they differ significantly from one language to another and some believe that interjections could be one of the common atypical characteristics of different cultures (Karcevski, 1968; Wierzbicka, 1992). It is thought that interjections do not follow a universal law and are mostly based on culture-specific conversation, for example, the interjection *"nu"* can be used by Yiddish speakers to replace the question "Are you Jewish?" (Wierzbicka, 1992). In addition, Wierzbicka suggests that interjections are used with great variability and frequency between cultures and languages. Interjections are used less in societies that encourage more formalities as opposed to other societies where emotions are expressed in a more spontaneous way (Wierzbicka, 1992). Therefore, it is not unreasonable to speculate that less frequent use of some interjections in the Arabic language (notably the Omani dialect of Arabic) may be a result of cultural influences on speaking. In addition, Wierzbicka (1992) reported that second language learners need to learn the meaning of interjections and how to use them in L2. This can be done with clear instructions on their use and a prolonged immersion in an English-speaking society. Participants in the present study learned English as L2 in Oman and so some of the features of Arabic (L1) use of ODs may have generalised to English, such as the infrequent use of interjections. Therefore, it is not surprising to find a low occurrence of ODs in both L1 and L2.

Research Question 4: Is there more stuttering on bare content words compared to bare function words in L2?

This question was based on past research findings that monolingual AWS exhibit more stuttering on BC words, while CWS show more stuttering on BF words (Au-Yeung & Howell, 1998; Bernstein Ratner, 1997; Bloodstein & Grossman, 1981; Brown, 1945; Dayalu etal., 2002; Dworzynski et al., 2003; Dworzynski & Howell, 2004a; Dworzynski, Howell, Au-Yeung, & Rommel, 2004; Graham et al., 2004; Howell, 2007; Howell et al., 1999; Nakte et al., 2004). In the present study it was hypothesised that the stuttering pattern in L1 among

the group of adult BWS would represent a more mature form of stuttering (i.e., similar to what is found in monolingual AWS). That is, there would be significantly more stuttering on BC compared to BF. However, the nature of stuttering in L2 would be typical of the pattern found for monolingual CWS, where there is more stuttering on BF compared to BC. Assuming L2 is the least proficient language, the nature of stuttering would reflect less mature stuttering characteristics (i.e., childlike).

No difference was found between stuttering (%SLDs & %SS) on BC words and BF words in L2 in both reading and conversational samples. In general there was more stuttering (based on both %SLDs & %SS) on BF words in both reading and conversation. The results of the present study confirm those of past studies examining the content-function word dichotomy in the conversational speech of BWS. These studies suggest that language proficiency is a key feature in the nature of stuttering on content and function words (Ardila et al., 2011; Schäfer & Robb., 2012). Schäfer and Robb looked at the spontaneous speech of 15 BWS speaking German as L1 and English as L2. They found no significant difference between BC and BF words in L2 even though higher stuttering on BF than BC words was observed. Ardila et al. (2011) examined a 27 year-old English-Spanish simultaneous bilingual who was more proficient in English than Spanish, and found no significant difference between BC and BF words in L2 but also reported higher stuttering on BF words.

No prior study has examined the content-function word dichotomy in BWS based on a reading sample. Instead, past studies have focused on conversational speaking samples. This may be due to the reported difficulty in evaluating natural speech production from a reading sample (Fodor et al., 1974). The results obtained for the reading sample were similar to those for the conversational speech sample. Therefore, it is reasonable to conclude that past findings of no significant difference between BC and BF words in the conversational speech of L2 can also be extended to reading samples.

Research Question 5: Is there more stuttering in content-function words compared to bare content words in L1?

This question was developed based on the Abdalla et al. (2009) study that looked at 10 Arabic-speaking AWS from Kuwait. Their study examined the frequency of occurrence of stuttering on CF words and BC words in Arabic reading and speaking samples. The authors found significantly more stuttering on CF words compared to BC words on the reading sample. No significant difference was found between the word types for the conversational

speaking sample. The higher stuttering on CF words in the reading sample was attributed to the phonological complexity of MSA in the reading sample, which would not be evident in conversational speech. During conversational speech, it is possible that AWS would avoid phonetically complex CF words; however these same words cannot be avoided in a reading sample. Vahab et al. (2013) reported similar findings for a group of Pesian CWS who were speakers of the Persian language. A higher frequency of stuttering was found on CF words in Standard Modern Persian (SMP). However, it is important to note that the Arabic language is syntactically, morphologically and phonetically different from Persian language, even though the Persian language is using a modified variation of the Arabic alphabet in writing.

The present study found no significant difference in the amount of stuttering between CF and in BC in the reading sample, while there was a significantly lower percentage of stuttering (%SLDs and %SS) on CF compared to bare C words in the conversational speech sample. These findings were the opposite to what was found by Abdalla et al. (2009). One possible reason for the lower stuttering on CF words in the reading sample is due to the specific Arabic reading sample used in the present study. The Arabic reading sample used in the present study was a translated passage of an original English passage that was short and easy to read. In addition, it was observed that the CF words in the Abdalla et al. (2009) were phonetically more complex than in the present study. The Arabic version of the passage used in the present study contained CF words that comprised less than 10% of the entire words in the passage. On the other hand, the passage used in the Abdalla et al. (2009) study was longer in overall length of text and with a higher number of CF words (almost 18 % of total words). On the other hand, the conversational speaking sample in the Abdalla et al. study was shorter (100 words) compared to the present study sample (about 300 words).This might explain why the present study found a significant difference in the amount of stuttering on CF compared to BC. The small conversational speech sample used by Abdalla et al. may not have been sufficient to detect differences in stuttering between CF and BC. In addition, the percentage of stuttering exhibited by the participants in the Abdalla et al. study was lower than those reported in the present study. Furthermore, comparing monolinguals to bilinguals who are stuttering may be difficult as many factors come to play due to the influence of bilingualism. Some argue that this comparison is inaccurate because knowledge of a bilingual language is shared by both languages unlike a monolingual (Taliancich-Klinger et al., 2013). Each language may be influenced by different experiences like the size of vocabulary a person holds in each language (Grosjean, 1998; Kohnert. 2010).

Another possible reason for the differences observed in the present study compared to past studies is to consider the influence of Arabic dialect. The participants sampled by Abdalla et al. (2009) spoke Kuwaiti Arabic, while the present study recruited BWS who spoke Omani Arabic. The dialectical differences between these two forms of Arabic might have played a role in the function and content words dichotomy. There is not much known about the phonetic and syntactic differences between the two dialects to draw any conclusions on the effect of dialect differences on stuttering and lexical category. However, there are distinct features of the two dialects that may differentially affect stuttering. For example, Al-Qenaie (2011) found that affrication fronting of /q/ sound is a very common process in Kuwaiti Arabic dialect. Some Kuwaitis replace the voiceless uvular plosive /q/ with a voiced velar plosive /g/, while other Kuwaitis (especially who are city dwellers) prefer the affrication process whereby the voiceless uvular plosive /q/ is replaced of by the voiced post-alveolar affricate /j/. On the hand, the /q/ sound is pronounced accurately by the majority of Omanis speaking Omani Arabic dialect with the exception of a small number of Omanis who adapted the affrication process. In addition, Omanis tend to have a faster speaking rate than Kuwaitis.

Finally, Howell and Van Borsel (2011) suggested that languages that have different syntactic patterns and form (e.g., Persian, Arabic, Turkish and Hindi) need to be examined carefully because of the effect of word position and word frequency on lexical category. For example, verbs are placed in final position of sentences in Persian languages, which means there is less chance of stuttering even though the category of words is actually complex and likely to result in more stuttering in other languages. It is suggested the use of cross-linguistic words would help to control for some of these factors (Van Borsel, 2011).

Research Question 6: Is there more stuttering in bare content words in L2 compared to bare content words in L1?

Based on a previous study of BWS speaking German-English (Schäfer & Robb, 2012) it was expected that more stuttering on BC words would be found in L1 compared to L2. In the present study, no significant difference was found in the amount of stuttering (%SLDs and %SS) on BC in L1 compared to L2 in the reading sample or the conversational speech sample. However the amount of stuttering on BC (% SLDs) between L1 and L2 approached significance with higher stuttering on BC words in L2.

A likely reason for lack of difference in stuttering on BC words between L1 and L2 is due to the number of lexical categories. It is important to take in to consideration that L1 in this study was evaluated according to three lexical categories, while L2 contained two lexical categories. Therefore, the percentages of stuttering assigned to each lexical category out of the total SLDs represented in L1 would likely be lower than those in L2. This is also the likely reason why the present results did not align with those of Shafer and Robb (2012). If the total amount of stuttering on CF words for the reading and conversational speaking samples were combined with BC words, the total percentage of stuttering would have been more than *58%* of the total percentage of SLDs. Assuming that CF and BC words, which are more phonetically complex than BF words, represent a broad category of content words, it could be concluded that the pattern of stuttering in L1 was similar to pass studies examining the content-function word dichotomy (Au-Yeung & Howell, 1998; Bernstein Ratner, 1997; Bloodstein & Grossman, 1981; Brown, 1945; Dayalu et al., 2002; Dworzynski et al., 2003; Dworzynski & Howell, 2004a; Dworzynski et al., 2004; Graham et al., 2004; Howell, 2007; Howell et al., 1999; Nakte et al., 2004).

Research Question 7: Is there more stuttering in bare function words in L2 compared to bare function words in L1?

This question was based on the past results by Schäfer and Robb (2012) who found significantly more stuttering (per words and syllables) on BF words in L2 compared to L1. A similar result was reported by Ardila et al. (2011) of more stuttering in BF words in L2 than L1 but the authors did not report if the difference was significant. The current study agreed with these past studies by finding a significantly higher percentage of stuttering on BF words in L2 compared to L1 for both reading and conversational speech samples.

The present findings are in general agreement with the suggestions made by Howell (2004) of L1 representing a more mature form of stuttering (adult-like), while L2 reflect less mature stuttering characteristics, resulting in more frequent stuttering on BF words. It is also important to note that, similar to the results obtained for comparing BC words in L1 to L2, the differences in the overall number of lexical categories used for L1 may have influenced the present findings.

Clinical Implications

More than half of the people around the world speak more than one language (Van Borsal, 2011). Grosjean (1982) reported over 30 years ago that bilingualism is likely to become the norm rather than the exception across the world. There is a shortage of bilingual speech-language therapists (SLTs) in comparison to the high number of BWS as reported in many countries (i.e. United States, Canada, Australia & South Africa). Therefore, regardless of whether a SLT is bilingual or not he/she will be faced with a client who speaks a different language and comes from a different culture (Roberts & Shenker, 2007). It is important for SLTs to consider many factors when assessing and treating BWS. In addition, knowledge of the client's culture may help to achieve the best possible outcome.

Assessment

The typical scenario presented to a SLT when faced with a client who is bilingual is to diagnose stuttering in a foreign language. In addition, it can be difficult to differentiate between disfluencies that are due to limited language proficiency or due to stuttering. There is a growing body of research related to assessing the communication abilities of bilingual speakers who may have a communication disorder (Gutiérrez -Clellen & Simon-Cereijido, 2010; Gutiérrez -Clellen, Simon-Cereijido ,& Wagner, 2008; Mayo, Holt & Zajaz, 2007; Munoz & Marquardt, 2008). Most of the research is related to suspected speech and language disorders in bilingual speakers. There seems to be less research related to assessing suspected stuttering in bilingual speakers.

Some of the factors outlined by Van Borsel, Maes and Foulon (2001) that may aid in diagnosing stuttering in an unfamiliar language are that (1) stuttering tends to be found in both languages, (2) secondary behaviours and attitudes about speaking should be evident in both languages, and (3) there may be a family history of stuttering. In addition, it was found that it is common to find that PWS tend to stutter more in one language than the other and according to Van Borsel et al., (2001) this is due to many reasons like language ability, psychosocial and cultural factors or linguistic factors. There are studies that have addressed the ability of individuals to identify various features of stuttering in non-native languages. Humphrey (2004) found no significant difference between English speaking monolingual and English-Spanish bilingual judges at identifying disfluencies. On the other hand, Van Borsel and Britto Pereira (2005) found that language familiarity has an effect on

identification of stuttering. Judges participating in the study reported that they were not confident and found it difficult to identify stuttering in a foreign language. Furthermore, Van Borsel, Leahy and Britto Pareira (2008) argue that if the native language of the SLT (e.g., English) and client (e.g., German) belongs to the same family tree (e.g., the West Germanic family tree), the likelihood of identifying true stuttering increases. In a recent study by Lee, Robb, Ormond and Blomgren (2015) 19 SLTs speaking English as their sole language examined the speech of two adults with stuttering speaking Spanish as L1 and English as L2 in a reading sample (*The Rainbow Passage*). Their results were then compared to three Spanish-English bilingual SLTs. All SLTs agreed on the overall stuttering severity in English and Spanish, however some specific details of stuttering characteristics were missed in the language that SLTs were less familiar. Based on the results from these various studies, it seems that even though a clinician may not be familiar with a foreign language he/she is still be able to assess and diagnose stuttering in bilinguals, especially in severe stuttering cases. In addition, instances where SLTs need to identify detailed stuttering behaviours of a BWS to form a suitable management plan, it may be necessary to recruit the services of a bilingual SLT (Lee et al., 2015).

Treatment

There are no formal protocols to follow when treating stuttering in BWS. Clinicians are usually not sure which language they should treat when working with BWS. By default, the SLT is likely to only treat the language he/she speaks themselves. Results of the present study, and confirmed by past studies (Ardila et al., 2011; Dale ,1977; Jankelowitz & Bortz, 1996; Lim et al., 2008; Roberts, 2002; Schäfer & Robb, 2012; Taliancich-Klinger et al., 2013), indicate that stuttering is likely to be more severe in the second language. So should the most severe form of stuttering be treated? Some researchers recommended treating stuttering in both languages (Bakhtiar & Packman, 2009; Harrison Luck, Feld & Sykes, 2010; Gutmann & Shenker, 2006; Roberts & Shenker, 2007); while others suggest that therapy should be sequential by introducing one language first to therapy and the second language later (Drapeau, Lacroix, Bagilishya, Heusch, 2005; Roberts & Shenker, 2007; Rousseau, Drapeau, Lacroix, Bagilishya, Heusch, 2005).

Comparison between the above studies has found that fluency increased in both languages regardless of whether languages were introduced simultaneously or sequentially to therapy (Van Borsel et al., 2001). However, treating both languages might be difficult due to

financial issues, shortage of time and lack of SLTs speaking all of the client's languages (Roberts & Shenker, 2007). The common practice by clinicians is to focus on the language that is shared by both the SLT and client (which is usually the client's L2). Some studies have examined the effect of generalisation on L1 stuttering severity when only treating stuttering in L2 (Humphrey, 2004; Humphrey, Natour & Amayreh, 2001; Lim et al., 2007; Rousseau et al., 2005). All studies reported spontaneous improvement in fluency in the untreated language at variable degrees. The same treatment approaches that are used to treat monolingual PWS are used to treat BWS (Roberts & Shenker, 2007). This is because it was found that many treatments, like fluency-shaping or stuttering modification methods, are used to treat stuttering in many languages. It was also found that there is no difference in long-term therapy outcome between monolingual and bilingual PWS when the same treatment approach is used (Debney & Druce, 1988; Druce, Debney, & Byrt, 1997)

Finally, results of the present study found more stuttering in the less proficient language (L2) with underscores the role of language ability/proficiency in the treatment of stuttering. Sieff and Hooyman (2006) reported the results of a treatment study involving a bilibual CWS (8 years old) who spoke Chinese as L1 and English as L2. The results of the study found that when improving syntactic skills of the less proficient language, stuttering severity was reduced. Bernstein Ratner (2005) has also pointed to the role of language competency in reducing stuttering. Therefore, it is expected that improving basic language skills of the least proficient language may be an effective goal in the client's intervention plan and may shorten the length of therapy and improve therapy outcomes.

Cultural Considerations

Van Borsel et al. (2001) and Van Borsel (2011) have pointed out that speakers of two languages are also part of two cultures, which emphasises that language and culture tend to correlate with each other. Diversity in culture can negatively influence assessment and treatment of BWS if the SLT and client do not share the same cultural values (Van Borsel et al., 2001). Leith (1986) reported a number of cultural factors that could influence the clinical setting. For example, in some cultures the father always speaks for the family, which may not allow the SLT to ask other members directly or privately when performing an assessment or undertaking therapy. In addition, maintaining eye contact may be seen as a sign of aggressiveness or hostility by some cultures. In addition, SLTs need to know that due to cultural differences some treatment programs may not be acceptable (Bernstein Ratner, 2004; Kathard, 1998). Furthermore, it is recommended that if SLTs were not able to work on both languages then they can develop a home programme to help parents address the native language. In addition, materials that are culturally suitable should be used in therapy aiming for best outcome (Roberts & Shenker, 2007; Shenker, 2004). Family members or friends who are familiar with the L1 spoken by the client could be part of the therapy.

Waheed-Khan (1998) found that bilingual children who stutter were initially less successful in achieving fluency compared to monolingual children with stuttering. However, when the treatment program was adapted for bilingual children, the therapy outcomes of monolingual and bilingual children with stuttering were similar. Even though it is important for SLTs to familiarise themselves with the client's culture it is also important to avoid cultural stereotypes (Leith, 1986) because people are different even if they share the same country or background. Consideration of microcultural factors (e.g., education, occupation, sex, religion and urban verse rural) is also essential (Gollnick & Chin, 1990). For example, an Omani doctor who is 45 years-old might have more in common with a 42 year-old engineer from the UK than he does with a 20 year-old fisherman from Oman.

> As clinicians "*we need to see the client not the culture*"
>
> (Roberts & Shenker, 2007, p. 187).

Limitations and Directions for Future Research

Findings of the present study have indicated a difference in disfluency and stuttering severity that occurred in L1 compared to L2. However, there are a number of limitations to the present study that need to be considered. One of the major drawbacks of this study is the limited chances to compare the present results with previous findings due to a shortage of studies that have looked at BWS. At present, there are no studies of BWS speaking Arabic-English. Establishing guidelines on the differences between monolingual people who stutter and BWS might provide more understanding of stuttering and how it presents across languages. This will also add to our understanding of the cause of stuttering and contribute to making more accurate comparisons between studies on stuttering.

Another drawback of the present study relates to data analysis. The occurrences of OD and SLDs were noted and compared across L1 and L2. There were no attempts made to evaluate specific disfluency types (e.g., repetitions, prolongations).Thus, comparison to monolingual studies of the distribution of stuttering in various languages, such as English and German (Ambrose & Yairi, 1999; Natke et al., 2006) cannot be made. Further, the present study only examined stuttering associated with function and content words. No other type of linguistic analysis was performed. Further detailed examination of various linguistic aspects (i.e. the types of consonant, sound position in a word, contextual speech, words length and position in sentence) of stuttering may provide additional insight into the influence of linguistic factors on stuttering in BWS. Some argue that the formulation and production of sentences and morpho-syntactical rules correlates strongly with stuttering loci (Bernstein Ratner, 1981, 1997; Bernstein Ratner & Benitez, 1985). More research is needed in these areas in the evaluation of BWS.

Another limitation might relate to the reading sample used in the present study. The reading sample was short and easy to read in both Arabic and English so as to avoid influence of reading difficulties and minimise the effect of low proficiency in reading skill. However, use of a simple reading passage made it difficult to compare to other Arabic studies because number of CF words in the reading sample was smaller than BC and BF (Abdalla et al., 2009). In addition, it was not possible to make a reliable comparison between the percentages of stuttered words according to lexical words when compared between L1 and L2. This is because English has two lexical categories that were calculated as a percentage out of the total number of SLDs in English; while in Arabic the percentage of SLDs in L1 was divided

between three lexical categories. This can be resolved by having a reading sample with an equal number of words in each lexical category or e to combine Arabic categories according to phonetic complexity.

High emphasis has been given to the age of L2 acquisition (i.e., simultaneous verses sequential) as a label for language proficiency. Sequential bilinguals are thought to be less proficient in L1, whereas simultaneous bilinguals are believed to be equally proficient in both languages. However, age of language acquisition does not mirror language proficiency (Evans, 2002; Halsband, 2006; Van Borsel et al., 2001). When it comes to understanding the concept of language proficiency, it is important to remember that bilingualism is a continuum of language ability (Roberts & Shenker, 2007). Many factors related to learning strategy and language use and exposure when examining language proficiency need to be considered (Bialystock, 2001; Roberts et al., 2007). Therefore it is highly recommended to consider other influential factors in addition to the four language modalities (listening, speaking, reading, and writing) (Van Borsel, 2011). A possible drawback of the present study is related to lack of formal assessments of L2 proficiency. In this present study, all of the proficiency estimates were based on self-report, and thus possibly affected by socio-psychological factors. For example, the participants who had been away from any English speaking education for a longer period of time might have felt less self-confident in speaking English and rated themselves lower as was reported verbally by 2 participants. However, results of the correlation analysis in the present study indicated that stuttering severity ratings by participants in L1 correlated with self-report of language proficiency. Therefore, the L2 estimate used in the present study is likely to be valid. In addition, according to Roberts (2002) the use of self-rating scales of language proficiency by adults is supported in the literature (e.g., Albanese, 1985; de Groot & Poot, 1997; Paivio, Clark, & Lambert, 1988; Roberts & Bois, 1999; Roberts & Le Dorze, 1997; Schwanenflugel & Rey, 1986; Segalowitz & Poulin-Dubois, 1990; Soares & Grosjean, 1984). Furthermore, the use of consistent assessments of language proficiency and defining bilingualism will aid in future research in BWS.

The data analysis in this study focused only on words that were stuttered and no consideration was given to fluent words. This approach was chosen to allow for a more thorough interpretation of the data in comparison to past research. The methodological design of the study has a great influence on the various findings of a study and may be a reason for some of the inconsistencies in the past research. For example, Samadi (2002) and Bakhatir et al. (2009) both looked at monolingual Persian CWS but obtained different findings. Samadi's

(2002) study found a high number of stuttering on BC words compared to BF words, while Bakhatir et al., (2009) found no difference between BC and BF words. This discrepancy might be due to the different methodology used by the researchers. Bakhatir et al. counted the number of stuttered BC words out of the total amount of disfluency, while Samadi counted the number of stuttered BC words out of the total number of BC words produced.

This is likely to be the first study to examine stuttering in Arabic-English BES. Yet, only eight sequential BWS participated in the present study, which makes it difficult to generalise to the entire Arabic BWS population. This study had fewer participants compared to some studies (i.e., Schäfer & Robb, 2012; Nwokah, 1988), but more than other studies looking at single cases of BWS (i.e., Howell et al., 2004; Taliancich-Klinger et al., 2013; Jankelowitz & Bortz, 1996; Ratner & Benitez, 1985) or four BWS (i.e., Roberts, 2002; Dale, 1977). It is possible that the present results may have differed in a larger (or smaller) sample size had be collected. Therefore, the present findings should be interpreted with caution in regard to the Arabic population in light of the small speech samples, age of participants and type of bilingualism. Still, it is important to note that the present results align with the results of past studies of BWS.

There are few studies that have evaluated simultaneous BWS and the pattern of stuttering found in these participants does not parallel that found for sequential BWS (Lim et al., 2008; Roberts, 2002). An important area of future research is to consider the nature of stuttering in sequential compared to simultaneous BWS.

Conclusions

The present study is one of the first to examine bilingualism and stuttering with Arabic as L1.The results of the present study align with most of the past reports which suggest that stuttering in adult bilingual speakers is closely related to language proficiency. The least proficient language is likely to show more instances of stuttering than the proficient language. In addition, the least proficient language is likely to mirror the stuttering behaviour exhibited by monolingual children who stutter. Future research evaluating BWS speaking Arabic as L1 and English as L2 and comparing results to BWS speaking English as L1 and Arabic as L2 may unravel more about the relationships between stuttering and language in these two particular languages.

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Appendices

Appendix A

Consent Form in Arabic and English

اقرار موافقة

أقر أنا/ .....

أنه ليس لدي مانع من التقاط صور شخصية لي أو أشرطة

فيديو لاستعمالها في البحوث العلمية و تعليمية مع الإخصائية فتحية العامريه

إسم الشخص أو القريب المسؤل:.....

رقم الملف بالمستشفى ان وجد: .....

التوقيع:.....

إسم الباحثه: فتحية العامريه

I, hereby agree that photograph and video taken can be used for teaching and research purposes.

Name:

File number if present:

Signature:

Name or researcher: Fathiya Al'Amri

Appendix B

Arabic Questionnaire used in the interview and a translation of the Questionnaire in English

نموذج استبيان

Questionnaire in Arabic

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

الاسم:_____

العنوان: _____

رقم الهاتف: _____

البريد الاكتروني: _____

تاريخ الميلاد: _____

الجنس: (ذكر – انثى)

الجنسية: _____

مكان الميلاد: _____

هل تعاني من أية مشاكل صحية؟ إذا كانت الاجابة نعم وضح ذلك؟

اعلى شهادة او تحصيل علمي: _____

ماهي لغتك الام: _____

هل تتكلم اكثر من لغة: _____

عدد اللغات التي تستطيع ان تتكلم بها: (حسب درجة الاتقان)

هل عشت في بلد اجنبي استخدمت فية اللغة الانجليزية لمدة لاتقل عن ثلاثة اشهر: _____

ادا كانت الاجابه نعم, فعدد الدول ومدة الاقامه:----------

متى بدات تتعلم اللغة الانجليزية (العمر) وخصوصاً في مجال:

الاستماع: (القدرة على استيعاب وفهم اللغة المسموعة في مواقف في المواقف الرسمية وغير رسمية)----------

الكلام: (القدرة على المشاركة في محادثة كلامية في مواقف في المواقف الرسمية وغير رسمية)----------

القراءة: (القدرة على استيعاب وفهم اللغة المكتوبة والرموز بطلاقة في المواقف الرسمية وغير رسمية)----------

الكتابة: (القدرة على استخدام الكتابة في التواصل في المواقف الرسمية وغير رسمية)----------

AGE OF FIRST EXPOSURE TO ENGLISH				Number of years spent learning
Listening	Speaking	Reading	Writing	

هل سبق لك ان اجريت اختبار للغة الانجليزية مثل IELTS ,TOFEL ؟؟

كم كانت اللنتيجة؟

اختر مستوى الطلاقه\السلاسه المناسب لكل مهاره من المهارات اللغويه الاربعه لللغه الانجليزيه؟

الاستماع: (القدرة على استيعاب وفهم اللغة المسموعة في مواقف في المواقف الرسمية وغير رسمية)----------

الكلام: (القدرة على المشاركة في محادثة كلامية في مواقف في المواقف الرسمية وغير رسمية)----------

القراءة: (القدرة على استيعاب وفهم اللغة المكتوبة والرموز بطلاقة في المواقف الرسمية وغير رسمية)----------

الكتابة: (القدرة على استخدام الكتابة في التواصل في المواقف الرسمية وغير رسمية)----------

ENGLISH PROFICIENCY			
Listening	**Speaking**	**Reading**	**Writing**
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10

مستويات الطلاقه\السلاسه:

1. قادر على استخدام كلمات بسيطة فقط من اللغة الانجليزية.

2. امكانية التواصل باللغة الانجليزية في المواقف اللمألوفة باستخدام كلمات او جمل بسيطة ولاكن هناك صعوبة كبيرة في فهم اللغة المتحدثة والمكتوبة.

3. امكانية الفهم وايصال الفكرة الاساسية عند التواصل باستخدام اللغة الانجليزية في المواقف المألوفة ولكن هناك انقطاع في سلاسة التواصل في اغلب المواقف الغير المألوفة.

4. قادر على استخدام اساسيات اللغة الانجليزية في المواقف اللمألوفة الغير رسمية بشكل جيد ولكن غير قادر على استخدام اللغة الانجليزية المعقدة.

5. قادر على استخدام اللغة الانجليزية بشكل جيد جداً خصوصاً في المواقف المألوفة ولكن تحدث اخطاء كثيرة.

6. قادر على استخدام اللغة الانجليزية بشكل ممتاز بالرغم من وجود بعض الاخطاء. وبشكل عام قادر على استخدام وفهم اللغة المعقدة بمستوى جيد وخصوصاً في المواقف المألوفة.

7. قادر عاى استخدام اللغة الانجليزية البسيطة والمعقدة في المواقف اللغير رسمية مع وجود اخطاء بسيطة وفي بعض الاحيان قادر على استخدام اللغة في المواقف الرسمية ولكن بشكل محدود.

8. قادر على استخدام اللغة في المواقف الغير رسمية مع ندرة حدوث الاخطاء وايضاً قادر على استخدام اللغة المعقدة في المواقف الرسمية في اغلب الاحيان.

9. القدرة على استخدام اللغة الانجليزية بسلاسة وطلاقة في كل المواقف مع وجود اخطاء بسيطة في بعض المواقف الرسمية التي لا تؤثر على التواصل.

10. قادر على اتقان مهارات اللغة (الاستماع والتحدث والقراءة والكتابة) بمستوى عالي يقارن باللغة الام.

-ما هي اللغات التي تتحدث بها ؟.

-ما هي اللغة التي تعلمتها اولا؟....

-متى تعلمت لغتك الثانية؟....

-ما هي نسبة تحدثك بلغتك الام؟....

-مع من وأين؟...

-مستوى او درجة طلاقتك في اللغة الام؟...

1 2 3 4 5 6 7 8 9 10

1 = low proficiency; 10 = high proficiency

-نسبة تحدثك باللغة الثانية؟...

-مع من واين؟....

-درجة طلاقتك في اللغة الثانية؟(1 – 10)

1 2 3 4 5 6 7 8 9 10

1 = low proficiency; 10 = high proficiency.....

-ما هي اللغة التي ترتاح عندما تستخدمها؟....

-هل تلاحظ اختلاف بين اللغتين من حيث مخارج الحروف؟ اذا كانت الاجابة نعم فأيهما اسهل؟...

-هل تلاحظ اختلاف بين اللغتين من حيث النطق ؟ اذا كانت الاجابة نعم فأيهما اسهل؟.....

-هل تلاحظ اختلاف بين اللغتين من حيث تكوين الجمل؟ اذا كانت الاجابة نعم فأيهما اسهل؟....

-هل تلاحض اختلاف بين اللغتين عند التعبير عن افكارك؟ اذا كانت الاجابة نعم فأيهما اسهل؟....

-هل تعتبر التأتأه في كلامك متشابهه بين اللغتين؟ ايهما اكثر؟...

-هل تختلف اعراض التأتأه بين اللغتين؟....

-هل تستخدم طريقة معينة للتغلب على التأتاه ؟ اذا كانت الاجابة نعم هل تختلف هذه الطريقة بين اللغتين؟....

-هل تتضايق من التاتاه في لغة معينة اكثر من الاخرى؟.....

-هل لاحظت اي ردة فعل من الناس عند حدوث التأتاه ؟...

-اذا كانت الاجابة نعم فمتى تلاحظ هذا اكثر وهل يحدث في لغة معينة اكثر؟...

-تحديد درجة وحدة التاتأه في اللغة الام (العربية) (0 – 10)....

0 2 3 4 5 6 7 8 9 10

-هل هناك اناس معيننين تفكر كثيرا قبل ان تتكلم معهم بسبب التأتاه في لغة معينة؟...

-هل تعطي اهتمام اكثر للمهارات اللغوية والكلامية للغة معينة دون الاخرى ؟.....

-ما هي اللغة الام لوالديك؟...

-ماهي اللغة التي كنت تتحدث بها كثيرا في البيت عندما كنت صغيرا؟....

-متى بدات تلاحظ تاتأتك ؟...

-هل عانيت من اي اصابة عصبية؟....

-هل توجد حالات تأتأه في عائلتك ؟....

-هل تعاني من اي صعوبة اخرى في التواصل غير التاتاه؟

-هل حصلت على علاج بخصوص التاتاه ؟....

-منذ متى واين ؟....

-ماهو نوع العلاج وما هي اللغة التي ركز عليها العلاج؟....

Thank you!

شكرا

Translation of the Questionnaire in English

Name……

Address.....

Phone.....

e-mail.....

Date of birth.....

Sex: (M, F)... .....

Nationality.....

Place of birth.....

Do you have any significant medical conditions? If yes, what medical conditions do you have?.....

What is your highest qualification/education.....

What is your mother tongue... .....

Do you speak more than language? .....

if yes name them according to proficiency.....

Did you live in a foreign country for more than 2 years? if yes what country and how long?

When did you start learning English (age according to each language skill)

AGE OF FIRST EXPOSURE TO ENGLISH				**Number of years spent learning**
Listening	Speaking	Reading	Writing	

Have you done an English Exam? What was the grade?

IELTS ,TOFEL

Language proficiency rating for each language skill (listening, speaking, reading and writing)

Brief descriptions of each level (1 to 10) are provided below in Arabic

ENGLISH PROFICIENCY			
Listening	**Speaking**	**Reading**	**Writing**
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10

Interview Questions

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

-How often do you speak your first language? (in percentage)

-When (where and with whom) do you speak your first language?

-How proficient do you feel in your first language? (Scale from 1-10)

1 2 3 4 5 6 7 8 9 10

1 = low proficiency; 10 = high proficiency

-How often do you speak your second language? (in percentage)

-When (where and with whom) do you speak your second language?

-How proficient do you feel in your second language? (Scale from 1-10)

1 2 3 4 5 6 7 8 9 10

1 = low proficiency; 10 = high proficiency

-Is there a language you feel more comfortable speaking in?

-If yes, which one?

Arabic:

English:

-Do you notice a difference in the degree of difficulty concerning the motoric characteristics of the two languages?

-If yes, which language do you consider easier to speak in regards to motor skills?

Arabic:

English:

-Do you find a difference in the easiness of pronunciation of the languages?

-If yes, which language is easier to pronounce?

Arabic:

English:

-Do you notice a difference in the degree of difficulty creating sentences in the two languages?

-If yes, which language do you consider easier to speak in regards of creating sentences?

Arabic:

English:

-Do you find formulating your thoughts more difficult in one language than in the other?

-If yes, which language do you consider easier to formulate your thoughts in?

Arabic:

English:

-Do you consider your stuttering to be the same in both languages?

If not:

- Which language do you feel you stutter more?

Arabic:

English:

-Do your stuttering symptoms vary in the two languages?

-If yes, how?

-Do you use coping strategies to overcome your stuttering?

-If yes, do these coping strategies differ in the two languages?

-Does the stuttering bother you more in one language than the other?

-If yes, which one?

Arabic:

English:

-Have you ever noticed any reactions to your stuttering from other people?

-If yes, in which language?

Arabic:

English:

-Stutter Severity Rating Scale in L1

-Please circle the number that corresponds to your severity of stuttering:

0 1 2 3 4 5 6 7 8 9 10

1 = no stuttering; 9 = extremely severe stuttering

-Are there people you feel more self-conscious to talk to because of your stutter?

-If yes, can you give examples? (both languages)

-Do you or your family regard the importance of language and speaking skills differently in the two languages?

-If yes, how would you describe the difference?

-What is the native language of your parents?

- As a child, which language did you speak most at home?

- When did you first notice your stuttering? Do you know of any neurological injury?

-Do you know of any other cases of stuttering in your family?

-Do you have any other communication disorder other than stuttering?

-Have you received treatment?

When?

Where?

How long?

What type of treatment?

Thank you!

Appendix C

Arabic Reading Sample

الرجل الآلي (الروبوت)

الربورت هو عبارة عن آله و لكنه ليس بآله عاديه ,هو عباره عن اله مميزة تستطيع التحرك , و قادره على اتباع التعليمات , هذه التعليمات تصدر من جهاز الحاسوب ولأنه آله فإنه لا يرتكب أية اخطأ و لا يتعب. و لا يشتكي الا اذا أمرته بذالك.

Appendix D

English Reading Sample

Robots

A robot is a machine. But it is not just any machine. It is a special kind of machine. It is a machine that moves. It follows instructions. The instructions come from a computer. Because it is a machine, it does not make mistakes. And it does not get tired. And it never complains. Unless you tell it to!