Studies in orthophonia and neuropsychology ISSN 2353–0324

volume : 06 Issue :02 Year : 2021 P P : 158–178

Developmental Language Disorders Across-Languages: A Review and Implications for Practice and Research in Arabic

اضطرابات اللغة النمائية عبر اللغات :مراجعة الأدبيات وخلاصات عملية في اللغة العربية

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Received: 06-07-2021	*Accepted: 29-11-2021*	*Published: 21-21-2021*	*Submitted author:* Layes Smail

Abstract:

Studies of children with Developmental Language Disorders (DLD) in a wide variety of languages revealed diverse clinical linguistic markers, most of which seem to reflect weaknesses in several areas of language including phonological, morpho-syntactic and pragmatic domains. However, the main altered language aspect in DLD across-languages has been most acknowledged in grammar functioning. We review the characteristic manifestations of DLD with focus on the variability of these manifestations as sensitive aspect to the type of language being acquired including Arabic. A summary of relevant research studies is provided showing that the characteristics of DLD can be very different across languages in terms of the types of errors made by children with DLD. These differences are more noticeable between distant orthographic systems as between Indo-European languages and Arabic. We conclude our review by practical implications for assessment and research in Arabic language.

Keywords: developmental language disorders, cross-languages, linguistic markers, Arabic

الملخص

كشفت الدراسات التي أجريت على الأطفال الذين يعانون من اضطرابات اللغة النمائية في عدد من اللغات عن وجود علامات لغوية إكلينيكية مختلفة، يعكس معظمها وجود نقاط ضعف في العديد من مجالات اللغة بما في ذلك المجالات الصوتية، النحوية، الصرفية و البراغماتية. ومع ذلك، فإن أكثر الجوانب اللغوية التي تشهد قصورا بالغا في حالات الاضطرابات اللغوية النمائية عبر اللغات يتمثل في جانب استعمال القواعد. نستعرض في بحثنا هذا، المظاهر المميزة للاضطرابات اللغوية النمائية مع التركيز على تنوع هذه المظاهر بتنوع اللغة موضوع التعلم بما في ذلك اللغة العربية. كما تم عرض خلاصة نتائج الدراسات ذات الصلة التي بينت أن اختلافات واضحة بين اللغات في الخصائص الاكلينية للاضطرابات اللغوية النمائية من حيث أنواع الأخطاء التي يرتكبها الأطفال المصابون بهذا الاضطراب. تتجلى هذه الاختلافات بشكل خاص بين النظم اللسانية المتباينة كما هو الحال بين اللغات الهندو- أوروبية و اللغة العربية. نقدم في الأخير بعض الخلاصات التطبيقية والبحثية المتعلقة بعملية التقييم واللممارسة في البيئة المستعملة للغة العربية.

الكلمات المفتاحية: الاضطرابات اللغوية النمائية، تقاطع اللغات، المؤشرات اللسانية، اللغة العربية

1. Introduction

Developmental language disorder (DLD) is defined as a difficulty with the acquisition of language skills in the absence of an obvious cause (Bishop et al., 2017). The term DLD was proposed following the CATALISE consultation project (Bishop et al., 2016) which was believed to provide a more appropriate diagnostic description of the language difficulties in children which may not be co-morbid with other conditions. The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (American Psychiatric Association, 2013), under the general category of "Neurodevelopmental Disorders" includes the term of "Communication Disorders" which is an umbrella type comprising expressive and mixed receptive-expressive language disorders. Children with DLD often show a delay in language development and have pervasive difficulties in components of language despite their normal non-verbal IQ, without primary physical disabilities, neurological disorder or mental illness (Leonard, 2008; Bishop et al., 2016, 2017), and that are not part of a broader developmental disorder such as ASD, sensorineural hearing loss or Down syndrome (McGregor et al., 2020). These difficulties can be expressed in restricted vocabulary,

understanding difficulties of complex language, tendency to use simplified grammar and sentence structures (Marshall et al., 2010) and phonological difficulties (van Alphen et al., 2004) sometimes associated with immature or deviant production of speech. Developmental language disorders are observed in approximately 5–10% of the population (Law et al., 2000) and endures into middle childhood and beyond, with significant impact on social or educational functions (McGregor et al., 2020).

The aim of this study is to shed light on the DLD from a cross-linguistic perspective, by focusing on the common DLD profile in different languages, placing emphasis on the grammatical morphology markers. Common cross-linguistic evidence from atypical acquisition of language domains may contribute to enrich the universal properties of DLD studies. Initially, we provide a review of some prominent accounts of the grammatical deficits of DLD and how they might explain some of the cross-linguistic findings. Since little research has previously been carried out on children with DLD in Arabic, one of the main goals of this study is also to summarize some of the recent research on DLD in Arabic and to provide a characterization of language-specific markers for Arabic DLD based on the existing research, which can be useful for testing procedures and intervention practices (Tallal & Benasich, 2002). We conclude with a discussion of some practical implications in assessment and intervention for practitioners.

2. Language Deficits in DLD

It is widely agreed that DLD is characterized by difficulties in various aspects of language: phonology, morphology, syntax, semantics, and pragmatics (Novogrodsky, 2015). However, these different components of language are not impaired to the same degree in all children, indicating that children with DLD have heterogeneous profiles (Spanoudis et al., 2019). In fact, children with DLD are a heterogeneous population, and they show deficits in the development and functioning of multiple domains of language, in both production and comprehension. Yet, the most striking characteristic of the language of children with DLD is its delayed onset of single word production and slow rate of development compared to the typically developing children, with delayed word combinations into longer utterances. Thus, it is common for children with DLD to experience more difficulties with language production than with language comprehension. The language deficits in DLD are usually noticed in four main domains:

2.1. Phonological domain

Children with DLD have been shown to have reduced phonological representations and atypical phonological processing compared to their typically developing peers, in addition to a reduced phonological working memory capacity (for a meta-analysis, see Graf Estes et al., 2007).The phonological-deficit hypothesis held that the language difficulties of children with DLD stem from a perceptual

deficit which hinders the grammatical morphemes processing, such as the verb-tense marker (Leonard, 1998). These deficits in processing the elements of short duration (e.g., “s” sound in “he likes”), suggest that children with DLD would have problems efficiently processing speech, extracting phonological elements of short duration. This hypothesis proposes that phonological deficits link between perceptual and grammatical impairments (Joanisse, 2004) suggesting that morphological impairments in children with DLD not only pertain to the difficulty in perceiving grammatical markers, but also because of the difficulty decoding the phonological code of words which may prevent children from forming stable phonological representations of words (Tomas & Vessers, 2019).

Another phonological related domain is related to phonological short-term memory (STM). Children with DLD have been found to be underachievers in phonological STM assessed by nonword repetition and sentence recall (Spanoudis et al., 2019). English-speaking children with DLD score lower on measures of syllable structure (syllable deletion) and consonant accuracy compared to children of comparable levels of grammatical development. Bortolini and Leonard (2000) reported reduced phonological skills constraints in Italian-speaking children with DLD when compared to morphological and phonetic-inventory matched typically developing children. They also showed that despite some possible influences of grammatical morphology on phonological errors, there was evidence of phonological deficits that were independent of grammatical influence.

2.2. Lexical-semantic domain

Empirical studies found deficits in learning and retaining new lexical items by children with DLD and deficits in the size and depth of their vocabularies and semantic knowledge (McGregor et al., 2013). Most children with DLD are slow in their lexical development and show less lexical diversity compared to their peers, and start to combine words later than normal. Furthermore, there is ample evidence demonstrating that DLD are associated with a broad spectrum of linguistic deficits at both receptive and expressive levels (Leonard, 2014). Studies have shown that children with DLD, when compared to typically developing peers, are less efficient in acquiring a mental lexicon which impact their ability to understand the sentence structures (Spanoudis et al., 2019).

Although it is widely recognised that children with DLD typically lag behind their peers in lexical acquisition, researchers disagree about its causes. Riches and colleagues (2005) showed that children with DLD exhibited poor retaining of these novel verbs compared to language matched children. Conti-Ramsden (2003) attributed poor lexical development in children with DLD to their poor processing skills, indicating that they need more frequent exposure to learn novel nouns

compared with control children in both production and comprehension tasks (Gray, 2003).

2.3. Morpho-syntactic domain

Language development in children with DLD is thought to be selectively affected in the domain of morpho-syntax (Kornilov, et al., 2015). Typically, children with DLD experience particular problems with morphosyntactic information, such as tense and subject-verb agreement marking (Leonard, 1998). Deficits with inflectional morphology are a symptom frequently observed in DLD (Penke, 2009). Children with DLD problems encompass function words, such as articles and auxiliary verbs, and morphemes which encode number, person, case, gender and tense are omitted or used inappropriately, suggesting that they face enormous difficulties in the acquisition of morphology and morpho-syntax rules. The finding showing that children with DLD do not benefit from syntactic cues, is mainly related to their significant problems in acquiring morphosyntactic system of the spoken language. These morpho-syntactic difficulties may be a consequence of slow lexical development (Bishop, 2006).

2.4. Pragmatic domain

Pragmatics refers to the use of language in a social-communicative context. Children with DLD are known to have some problems in social communication, for example they tend to participate in fewer peer interactions compared to typically developing children. These difficulties have been shown to vary according to the modality of linguistic deficits (receptive/ expressive) present in children with DLD (Craig & Evans, 1993). However, researchers disagree as to whether pragmatic deficits in children with DLD exist as an independent deficit additional to the observed linguistic deficits, or they are secondary to the primary deficits in the language system. van Balkoma and Verhoeven (2004) demonstrated that children with DLD displayed appropriate social-communicative functions that were not different from their peers, but showed excessive use of some atypical linguistic forms (e.g., ellipsis, imitations, self-repetitions) where their pragmatic functioning was influenced by their limited linguistic knowledge (Boll, 2007). Van Balkom and Verhoeven (2004) found that, in comparison to typically developing children, children with DLD showed a highly significant number of communication breakdowns, decreased discourse coherence and an increased number of parental repairs. This hypothesis of the influence of linguistic aspects on pragmatic skills was supported by the fact that children in the higher functioning DLD group scored significantly better than the lower functioning DLD group on measures of pragmatic functioning.

3. Clinical Markers of DLD

A clinical marker is an "aspect of the linguistic functioning that may uniquely define the phenotype of the disorder" (de Villiers, 2003, p 247). Psycho-linguistic approaches of DLD focus on establishing the various clinical markers of DLD in the language domain, which could be shared by the different languages (Tomas & Vissers, 2019). As a consequence of this dissociation between language domains components, subgroups of children with DLD can present deficits in one of the language domains while another domain is preserved (Novogrodsky, 2015). For example, children with DLD can show lexical retrieval deficit with preserved syntax while others could have syntactic deficit with preserved lexical retrieval. Three types of clinical markers have been highlighted in children with DLD in the literature.

3.1. Word and pseudo-word repetition deficit

A qualitative marker that has attracted great attention of researchers is nonword repetition (NWR), which provides an excellent behavioural marker due to its high sensitivity (Bishop et al., 1996). In fact, nonword repetition task, which tap both short-term phonological memory and phonological processing, has been shown to result in reliable identification measure of children with DLD (van der Lely, 2005), suggesting that a nonword repetition is a sensitive marker for DLD. For example, Coady and Evans (2008) argued that NWR it is a powerful tool for identifying children with language impairments as repetition accuracy depends on many language processes (Novogrodsky, 2015). Furthermore, NWR has shown a low correlation with environmental factors and poor to nonsignificant correlation with nonverbal IQ (Bishop et al., 1996).

Some theoretical accounts suggest that DLD result from a deficit in input processing capacity which requires a temporary storage and processing of phonological information in memory (Gathercole & Baddeley, 1990), and therefore they predict that impaired phonological processing in DLD will result in word/nonword repetition deficits (Saiegh-Haddad & Ghawi-Dakwar, 2017). This hypothesis received strong support in the finding that children with language impairment performed significantly more poorly than their age-matched typically developing peers on repetition tasks, especially when the repetition tasks target long words and non-words (Saiegh-Haddad & Ghawi-Dakwar, 2017). Consequently, children's ability to repeat nonwords seems closely related to the length of real words in their language (Leonard, 2014). Relatedly, it has been shown that non-word repetition is influenced by the word likeness of items. However, some researchers argued that nonwords are predicted to be more severely impaired by a phonological deficit than real words as they extensively on phonology (Joanisse, 2004).

3.2. Sentence repetition deficit

Sentence repetition tasks have also been identified as a clinical marker of DLD across a wide age range, showing high levels of sensitivity and specificity (Klem et al

2014). Sentence repetition has been used to investigate morphosyntactic abilities both in typically developing and in language-impaired children. Jefferies, Lambon Ralph and Baddeley (2004) observed fewer order and morphological errors occurred when recalling sentences than when recalling word lists, showing the impact of morphosyntactic knowledge on sentence retention (Leclercq et al., 2014).

However, language processing accounts have argued that sentence repetition engages all aspects of language processing and therefore is best seen as one measure of language ability (Klem et al., 2014). Sentence repetition can be expected to be influenced by a wide range of language skills including speech perception, vocabulary knowledge, grammatical processing and speech production. Thus, sentence repetition has shown to be challenging for children with DLD is probably because it heavily recruits several linguistic processing abilities such as morphological, syntactic, and lexical abilities that correspond to weaknesses in these population (Leclercq et al., 2014). In fact, in order to repeat a sentence correctly, at a minimum the words in the sentence have to be perceived correctly and the words articulated in the correct order (Klem et al., 2014). Therefore, sentence repetition is best seen as a reflection of an underlying language abilities, rather than as tapping a separate component of memory (Alloway & Gathercole, 2005) or simply a measure of a separate construct with a specific role in language processing (Klem et al., 2014).

3.3. Grammatical deficits

Most studies of children with DLD report significant deficits in areas of inflectional morphology and syntax which persist into the school-age years (Rice et al., 2009). These two grammatical components are undeniably the most investigated in the linguistic profiles of children with DLD (Bishop, 1997; Leonard, 1998). The grammatical deficit appears to be a particularly marked area of difficulty which manifests itself as a deficit in acquiring appropriate tense marking resulting in the omission of tense and person markers (suffixes). Therefore, tense-marking morphemes may serve as a clinical marker of DLD (Moyle et al., 2011) as children with DLD have particular difficulty in producing and comprehending morphologically complex words, such as the past tense and plural inflections (e.g., in English: baked, books).

Children with DLD seem to be able to understand the concepts of pastness and plurality, but their ability to express these concepts using grammatical morphemes is impaired. They have also deficits in the use of morphology such as omissions or incorrect use of morphological forms and complex syntactic structures (Friedmann & Novogrodsky, 2011). Marchman et al.'s (1999) analysis of the error patterns on past-tense production indicated that children with DLD may display oversensitivity to the phonological features of word stems, which may result in inefficient lexical processing, which in turn could contribute to deficits in the production of inflectional

morphology. Grammatical deficits accounts in DLD that highlight the role of lexical development in tense marking, suggest that the difficulties in tense marking exhibited by children with DLD could be the result of decreased sensitivity to the lexical aspect features of verbs (e.g., Leonard et al., 2007).

4. DLD Across-Languages

Most of the studies investigating DLD have been predominantly conducted with English speaking children. However, recent investigations on DLD in other languages added meaningful contributions in the investigation of the theoretical accounts initially proposed for English speaking children with DLD. It is though that children with DLD obey characteristics of their input language regardless of the difficulties they face. Thus, the manifestations of a language deficit, as in phonological processing or grammatical morphology, can be influenced by the specific language that is learned, suggesting that the language being learned determines how cognitive impairments present (Bishop & Snowling, 2004). However, cross-linguistic differences can be described in two interdependent ways. Where languages differ structurally, this leads to descriptive differences in the characterization of symptoms. However, typological differences (e.g., morphology) have implications in the number of features that are morphologically encoded and therefore in the processing strategies implemented by children. Thus, cross-linguistic studies of DLD contribute to better understanding of the nature of DLD and how it manifests differently across languages. Therefore, the cross-linguistic variation between children with DLD can be explained by the difference in processing requirements of the languages and also by constraints on development of any given language system by the particular grammar that the child is acquiring. The main aspects that could be raised from the studies across languages are related to three principal linguistic skills.

4.1. Phonological and lexical processing

Most of the evidence available in the NWR literature comes from European languages, such as English (Bishop et al., 1996; Botting & Conti-Ramsden, 2001) and Italian (Casalini et al., 2007). Research on pseudoword repetition task performance focusing primarily on the structural linguistic factors has shown that language-specific linguistic factors, such as syllabic length and phonological similarity with real words influence repetition performance (Gathercole, 2006). Studies of nonword repetition of English-speaking children with DLD documented that children with DLD had deficits in phonological short-term memory (Archibald & Gathercole, 2006), however, Cantonese speaking children with DLD revealed no significant difference between children with DLD and age and language controls on nonword repetition (Stokes et al., 2006). Typically developing children in Spanish and Italian, for example, have greater success with nonwords containing four

syllables than typically developing children acquiring English (Dispaldro et al., 2011).

However, regarding the non-word repetition in Arabic, studies are scarce. For example, Jaber-Awida (2018) examined monolingual pre-schoolers phonological memory and phonological awareness by asking them to repeat various non-words. A non-word repetition experiment was conducted, using non words ranged from 2 to 4 syllables. Half of the non-words were target-like and half were non-target-like. Results showed that long non-words were repeated less accurately than short non words (Jaber-Awida, 2018). In addition, word-likeness influenced the accuracy of repetition, where non-words with high word likeness displayed more errors by children. Similar to previous studies which established that high word likeness positively influences the performance of children in repeating non-words, phonological similarity with real words influences repetition performance in Arabic children (Jaber-Awida, 2018). In addition, consistent to the studies in other languages (e.g., Girbau & Schwartz, 2008; Willis & Gathercole, 2001), results of the Jaber-Awida, (2018) showed that the longer the non-word, the higher the chances are for repetition errors, suggesting that word length impacts children's memory capacities. Interestingly, the nature of errors made in both groups of non-words (i.e., target like and non-target like) in Jaber-Awida's study varied, with substitution errors as the most prevalent type of errors in both groups of targets like and non-target like non-words. The substitution errors type was committed more frequently as the length of non-words increased. For example: in the three syllables length the most prevalent error was substitution. Many researchers attribute this kind of errors to the effect of word likeness (Coady et al. 2005). Therefore, this task might be a useful tool in the early identification of children at risk of language impairments, especially with the paucity of assessment tools in Arabic (Shaalan, 2009).

However, less research was reported in the literature about the use of sentence repetition in DLD compared to NWR. Leclercq et al. (2014) assessed the diagnostic accuracy and construct validity of a sentence repetition task for the identification of French children with DLD in school-aged children and age matched controls. Results showed that sentence repetition is a valuable tool to identify DLD in French children, suggesting that the ability to repeat sentences correctly is supported by morphosyntactic and lexical factors. Similarly, Stokes et al. (2006) compared the performance of Cantonese children with DLD to typically developing age-matched controls and typically developing younger matched controls. The sentence repetition task clearly discriminated between children with DLD and their typical peers. These findings demonstrated that sentence repetition test can be used as a clinical a marker for DLD in different languages regardless their degree of consistency.

Scarce studies were conducted to examine sentence repetition ability in Arabic-speaking children with DLD. For example, Wallan (2018) examined the clinical utility of a sentence repetition test and verbal short-term memory (VSTM) test targeting morphosyntactic structures of Arabic. Results showed that in the typical group, the lexical morphemes were easier to repeat than grammatical morphemes; the digit span was scored higher than word span and nonword span. However, regular sentences were easier to repeat than semantically and syntactically irregular sentences. The results showed that younger typical children displayed weakness on the sentence repetition comparably to children in the clinical sample. The author concluded that the results are consistent with cross-linguistic evidence demonstrating that sentence repetition tests are sensitive to developmental change and language difficulties, and consequently are informative about children's language processing abilities. These findings demonstrate the need of the elaboration of standardized sentence repetition as an assessment tools for Arabic-speaking children with DLD.

4.2. Grammatical and morphological processing

Cross-linguistic research shows that verb morphology is differentially impaired across languages. For example, children with DLD acquiring Germanic languages are reported to be less accurate than their typically developing peers in marking tense and agreement, and especially past tense marking, yet their accuracy of using verb inflections is higher than that reported for English-speaking children with DLD (for a review, see Leonard, 2014). For children with DLD acquiring Romance languages, such as Spanish and Italian, verb morphology is not as problematic; the main difficulties seem to be using function words, such as articles, and unstressed direct object pronouns (e.g., Bedore & Leonard, 2001). Deficits in inflectional morphology have been found in several languages such as Italian (e.g., Bortolini et al., 2002) and Hebrew (Dromi et al., 1993). These data clearly show that DLD is strongly associated with morpho-syntactic and morpho-phonological impairments. However, comparative studies of inflectional morphology in languages suggest that language-impaired children learning morphologically rich languages such as Arabic, Hebrew or Italian generally perform better than children with DLD, learning a language with a sparse morphology such as English (Dromi et al., 1993). These findings demonstrate that children learning highly synthetic languages characterized by salient morphemes, are more able to perform inflectional morphology tasks than children speaking other languages (Ravid et al., 2003).

Furthermore, cross-linguistic research has found that the differences in the complexity of the inflectional system between languages affect the precise manifestation of the morphological deficit (Kornilov et al., 2012). Studies that targeted the morpho-syntactic domain in languages other than English showed some different morphosyntactic markers (Novogrodsky & Friedmann, 2010). English-

speaking children with DLD are reported to omit inflections or substitute them with morphologically simpler forms (Rice et al., 2000). For example, the tendency to omit grammatical markers (e.g., third person singular 's') is common among English-speaking children with DLD, but far less noticeable in Italian, in which these markers are stressed (Leonard, 1998). In addition, it was found that the rate of substitution errors depends on the size of the inflectional paradigm, so that the more forms a paradigm contains, the higher the rate of substitution errors (Dromi et al., 1999).

Another line of DLD research has been comparing children's performance in regular versus irregular inflections, with respect to such phenomena as English past tense. In Indo-European orthographies, some derived words are regular and transparent in their structure and could be analysed by rules (derived by a rule application, e.g., bravely), whereas others are opaque and irregular stored in the lexicon (van der Lely & Pinker, 2014). The traditional claim is that children with DLD have a greater deficit with regular forms than irregular ones (Kornilov et al, 2012). This generalization, however, has not been supported by research in other languages, such as Dutch, German, Italian, and Spanish.

Verb morphology, in particular past tense, has been reported to be a particular area of difficulty across languages (Vang Christensen & Hansson, 2012) including Arabic-speaking children with DLD (Abdalla & Crago, 2008). However, cross linguistic differences have been reported. Whereas in English-speaking children have particular difficulty in verb tense use (Bedore & Leonard, 1998), in languages that are morphologically richer with more highly inflected languages, a different pattern of production problem emerges (Fahim, 2017). Children with DLD in these languages are seen to omit verbs rather than produce verb forms with non-target marking for tense and agreement as their English-speaking peers (Leonard, 2000). In fact, as morphological regularities often have irregular phonology in English, for example, the past tense (ed) which can be pronounced with three forms -t, -d and -id, difficulty analysing the phonological structure can impact the acquisition of morphological patterns as they affect generalisation (Joanisse et al., 2000). Thus, which form is appropriate for a given verb is entirely determined by the identity of the final phoneme and children must be able to analyse phonologically this alternation.

Research suggested a relatively weak perceptual salience of the morpheme resulting in weak phonological representations, which would weaken the ability to analyse and learn how subtle aspects of phonology govern the realization of the past tense inflection (Joanisse & Seidenberg, 1998). With this regard, Leonard and Eyer (1996) showed that impaired perception of speech interferes with the development of phonological representations, which in turn affects other aspects of grammatical development. Consistent with this account, many language-impaired children exhibit poor phonological awareness, as measured by tasks requiring them to analyse a word

into its constituent segments or by poor repetition of nonsense words, deleting phonemes from words, or have difficulty in identifying words with similar phonemes (Joanisse & Seidenberg, 1998).

5. DLD in the Context of Arabic Language

A unique aspect of Arabic grammar that makes it particularly interesting for the study of DLD is its prevalent morphological aspects, such that nearly all words are morphologically compound, containing at least two templatic morphemes: a tri-consonantal root, which encodes the semantic meaning (Holes, 2004), and a vocalic pattern, which denotes grammatical information (e.g., part of speech, tense, number). As a non-concatenative root and pattern language, one root is manipulated extensively to produce various items that are semantically related to the root. For example, the root "k-t-b" (writing) is used to derive the verb "katab" (he wrote), "maktab" (office or desk), "kitaab" (book), "kaatib" (writer), "maktaba" (library)…etc. The combination of root and pattern into a word is termed nonlinear affixation, related by the consonantal skeleton constituting root k-t-b (write). This structural core appears discontinuously in the word, since it is interdigitated by vowels provided by the complementary vocalic structure of the pattern. The root morpheme k-t-b typically appears in the center as a sequence of consonant letters, while the rest of the letters preceding and following it represent affixal function elements — in this case, two conjunctions, a preposition, a pattern prefix, and a genitive suffix. Such is the concept of "discontinuous morpheme" proposed by those determined to account for pattern variations (Haj Salah). Patterns have classificatory functions indicating features of syntactico-semantic nominal and verbal classes (Ravid et al., 2003).

The abstract templates (i.e., consonantal roots and the vocalisms) constitute separate morphemes that have to be acquired separately by the child (Rakhlin et al., 2019). Therefore, a child with good morphological and grammatical skills may identify the word "maktaba" (library), based on its semantic root, even though she or he may not have encountered it before. Moreover, deriving words from roots and patterns requires efficient morphological and phonological skills in order to manipulate these roots and patterns. These manipulations require efficient working memory in order to facilitate long term representations of these derived words. Children with DLD acquiring such languages will be at great disadvantage due to their well-attested deficits in morphosyntax, morphology, phonology, and working memory. Therefore, Arabic children may rely more on morphological processing instead of phonological processing.

There are few published studies of the acquisition of morphology by Arabic-speaking children. Published studies focused on plural noun inflection (Abdalla et al., 2013) and tense and agreement (Abdalla & Crago, 2008). The findings of Shaalan

(2010) using the Expressive Language test showed that children with DLD between the age of 4;6 and 9;4 years old did not have significant problems with agreement markers. Moreover, analysis of the performance of these children on the comprehension of sentences showed that they benefitted from gender agreement. Similarly, Egyptian Arabic-speaking children with DLD were found to have difficulty with production of present tense verbs. However, agreement for number, person and gender were not greatly affected. They also displayed less problems in producing past tense verbs (Fahim, 2017). The non-linear root-and-pattern attributives could be expected to be more difficult than the linear stem-and-suffix denominals, as root-and-pattern morphology is more abstract and difficult to process than the linear attachment of suffixes onto stems (Ravid et al., 2003). Each of the components of the non-linear template occurs at a different representational tier or plane, which makes them less accessible to speakers than linear segments.

However, Abdalla (2002) examined spontaneous language samples of ten Saudi Arabic speaking children with DLD aged between 4 and 5 years old and found that they had difficulties using tensed verbs (past and present) in comparison to both age and language matched groups of typically developing children. Moreover, she examined the production of subject-verb agreement markers in the spontaneous speech of these children and compared their performance to typically developing age and MLU matched groups. In Arabic, subject agrees with verb in person, number, and gender. Results showed that children with DLD used correct verb agreement markers 77% of the time, while both age and language-matched typical groups were performing near ceiling (93% and 99.80% respectively). There was no significant difference in performance on past or present agreement inflections. However, there was a significant difference on both person and gender. Thus, Arabic speaking children with DLD presented with problems in both agreement and tense, compared to their controls. Age differences and test procedure may explain such inconsistencies, suggesting the need for further investigation of this topic to clarify the developmental trajectory of agreement markers across different ages in Arabic speaking children with DLD.

More recently, Taha, Stojanovik and Pagnamenta (2020) investigated the production of tense and subject-verb agreement in Palestinian Arabic-speaking children with DLD aged from 4 to 8 years in comparison to their typically developing peers in terms of performance accuracy and error patterns. Children were asked to complete a picture-based verb elicitation task, designed to measure the production accuracy of tense and subject-verb agreement inflections in Arabic. The DLD group scored significantly lower than the typical group on the verb elicitation task and in marking tense, specifically present tense. They were also less accurate in marking agreement in general, with specific difficulty in using feminine verb forms. The DLD

and typical groups differed in their tense error patterns, but not in agreement error patterns. The results indicate that the DLD group present with deficits in the production of verb morphology with more difficulty in the marked verbs (i.e., present tense and feminine forms) than less marked ones (i.e., past tense, and masculine verb forms). The most frequent tense and agreement error patterns included omissions of the target morphemes for both groups. The omission of target morphemes often resulted in the children producing structurally simpler (less marked) verb forms instead of marked verb forms.

6. Implications for Practice and Research

6.1. Implication for practice

In the practice settings, the principle of language-based identification tasks emphasizes the manipulation of linguistic material rather than knowledge of specific linguistic items, thus reducing the role of experience in task performance (Ebert & Pham, 2019). The first language-based processing task as an identifier of DLD is nonword repetition. This task has been shown to separate children with DLD from non-impaired speakers across-languages (Graf Estes, Evans, & Else-Quest, 2007). A potential component of an identification for DLD that aims to be suitable across diverse linguistic varieties in Arabic (dialects), consists of adopting an approach seeking to find general features that can help identify DLD instead of seeking specific linguistic characteristics that inherently vary across diverse vernaculars. Nonword repetition is less influenced by linguistic varieties and therefore less to bias than other conventional language measures (Ebert et al., 2008). For example, effort to develop valid tools for the diagnosis of DLD in Arabic (Armon-Lotem, de Jong, & Meir, 2015) should focus on the development of nonword repetition and sentence repetition tasks, which could be a potential solution of the difficulty to elaborate standardized tools in Arabic. Findings resulting from tasks exploring the ability of repetition tasks to identify DLD in Arabic has been conclusive (e.g., Jaber-Awida, 2018).

As mentioned above, the majority of available research concerning the assessment of language abilities pertains to English speaking children. This presents a challenge for creating a language development assessment, as it needs to be adapted to Arabic. This is the first challenge faced by practitioners dealing with this population having crucial need of research based standardised or criterion-referenced tests for diagnosing children with DLD. In fact as shown above, clinical markers of DLD can vary across different languages, depending on the characteristics of each language. Thus, it is crucial for practitioners and researchers in our linguistic context to know which aspects of a language are typically compromised in children with DLD during language development. Therefore, it is important for assessment measures to be developed in light of the linguistic characteristics of the language

being acquired. Overall, studies which examine children with DLD demonstrated the complexity of the picture of DLD showing the array of deficits in children with DLD.

However, it is agreed that general language tests with limited number of tasks may not be sufficient to identify children with DLD who are known to have a heterogeneous profile. However, if these tests are combined with more specific tasks that have been indicated in research in a specific language as a major area of deficits in children with DLD; this may reduce the number of false negatives. Thus, the very heterogeneous linguistic characteristics in children with DLD, studies indicated serious problems in processing the internal structure of words using morphological cues in Arabic. This highlights the importance of derivational morphology in testing linguistic abilities in children with DLD. Therefore, in order to identify children with DLD more reliably, clinicians and researchers must administer a variety of tests tapping into different areas of language skills and focusing on morphological abilities. Thus, pseudoword repetition could be associated by measures targeting morphosyntactic structures of Arabic as sentence repetition test which is reported to be a measure of great clinical utility in the literature. Results showed that in the typical sample, the lexical morphemes were easier to repeat than grammatical morphemes in Arabic (Wallan, 2018).

6.2. Implications for Research

Relatedly, the types of accounts of DLD are grounded in theories of normal language acquisition that focus on what language structures a child has at any stage in development. As such, theories of DLD currently focus on what aspects of language knowledge (e.g., vocabulary, morphology, syntax, and pragmatics) the child with DLD does or does not (Evans, 2001). However, there are few studies of DLD in Arabic which consider the morphosyntactic deficits in children with DLD acquiring Arabic language. Herein lies the second problem for clinicians who are faced to the luck of systematic investigation tools of language acquisition in this population. This emphasis on characterizing the state of the child's underlying linguistic knowledge, provides clinicians with a great deal of information regarding intervention goal setting for children with DLD (Evans, 2001). One needs to further explore the linguistic characteristics of the deficits presented in children with DLD within the same language and across languages for a more understanding of the universal cognitive factors underpinning DLD. Additional research in this area, would have significant educational and practical implications and would contribute to a suitable assessment tools for students with DLD. In addition, number of recommendations have to be highlighted. Teachers should provide a clear speech model using simple sentences for children with DLD, and show support to them.

7. Conclusion

The reviewed studies demonstrate that children with DLD do not display uniform grammatical profiles across languages, and the cross-linguistic differences found in children with DLD appear to depend on various language-specific grammatical characteristics of the different languages examined (Fahim, 2017). Morphology and grammar being the most vulnerable parts of the language system, the precise grammatical structures that are most vulnerable vary across languages. These findings indicate that there are no universal cross-linguistic characteristics of DLD, suggesting that the underlying deficit causing this disorder interacts with features of the target-language input. Importantly, where multiple morphemes have been examined in one language, children with DLD do not have equal difficulties with all of them, but instead certain morphemes tend to be highly problematic, and constitute clinical markers. In a majority of the languages surveyed, children with DLD displayed mild to severe difficulties with verb-related morphemes marking person, number, tense, aspect, direct objects or voice. There is also a tendency for omission to be more frequent than substitution errors where inflectional paradigms are impoverished, as in English, as opposed to more richly inflected languages like Italian and Semitic languages. Attention to morpheme aspect has not been a particular focus in the DLD literature partly due to the language types examined (Fletcher, Leonard, Stokes & Wong, 2005). However, Arabic is a morphologically rich language, characteristically different from other morphologically rich European languages (e.g., Italian, French, Spanish) that have been used to investigate some accounts of DLD. A consideration of the language patterns observed in Arabic speaking children with DLD as compared to previously documented patterns from other languages, may contribute to examining different theoretical accounts of DLD, which in turn contribute to the theory and clinical practice in assessment of DLD.

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