

Verb Morphology in Egyptian Arabic Developmental Language Impairment

Arab Journal of Applied Linguistics
e-ISSN 2490-4198
Vol. 2, No. 1, January 2017, 49-73
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<http://www.arjals.com/>

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Abstract

This paper presents an investigation of verb morphology in the spontaneous productions of three preschool Egyptian Arabic- (EA) speaking children with language impairment (LI) and a group of typically developing children. The typological characteristics of Arabic, such as its rich morphology, lack of infinitival form and complex verb system, make it an interesting test case for determining both language specific and universal features of specific language impairment (SLI). The children's use of both tense and agreement was examined. The group with language impairment had particular problems with verb morphology. Use of default verb forms resembling the imperfective-stem and imperative was a frequent substitution error in the children's language productions. In contrast to previous cross-linguistic observations of SLI, although there was difficulty with subject-verb agreement for gender, number and person, marking for tense and aspect was not found to be as problematic for these children. The findings are examined in the context of cross-linguistic research and theories proposed for error patterns in SLI.

Keywords: *Specific language impairment, Arabic, cross-linguistic research, inflection, developmental language disorder*

Theoretical Background: Cross-linguistic research on SLI

Specific Language Impairment (SLI) is a developmental disorder in which the acquisition of typical linguistic abilities is impaired relative to other cognitive domains. The etiology of SLI is not clearly identified and it is diagnosed by exclusion where no known neurological damage, sensory or motor deficit, general learning difficulty, severe personality disorder, or environmental factors can be found (Conti Ramsden & Windfuhr, 2002; Leonard, 2000; Van der Lely, 1996).

1

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A great deal of research has focused on the manifestation of SLI in English-speaking children (Leonard, 2000; Oetting & Horohov, 1997; Rice, Wexler & Cleave, 1995; Rice & Wexler, 1996; van der Lely, 1994). In an effort to understand the underlying nature of SLI and to distinguish between universal and language specific features of SLI, efforts have been made to investigate the characteristics of SLI in other languages and consider the cross-linguistic similarities and differences. Children with SLI who were speakers of Romance, Germanic and to a lesser extent Semitic and Asian languages have been investigated. Particular difficulty with the use of grammatical morphology for children with SLI has been documented in a largenumber of languages: Italian (Bortolini, Caselli, Deevy, & Leonard 2002), French (Le Normand & Chevrie-Muller, 1991, Le Normand, Leonard & McGregor, 1993), Spanish (Merino, 1983; Bedore & Leonard, 2001), German (Clahsen, Bartke & Gollner, 1997; Clahsen & Richman, 1991; Grimm & Weinert, 1990), Swedish and Dutch (Hansson, Nettelbladt & Leonard 2000; Hansson & Leonard, 2003); Japanese (Fukuda & Fukuda, 1994), Greek (Dalalakis, 1994), Inuktitut (Crago & Allen, 1994) and Hebrew (Leonard & Dromi, 1994; Dromi, Leonard & Shteiman, 1993; and Dromi, Leonard, Adam & Zadunaisky-Ehrlich, 1999). Verb error patterns, focusing on tense in particular, have been a consistent area of interest in cross-linguistic SLI research (Abdalla & Crago, 2008; Hamann, Penner & Lindner, 1998; Hansson, Nettelbladt & Leonard, 2000; Leonard, Dromi, Adam & Zadunaisky-Ehrlich, 2000; Van der Lely, 1994). However, the structural characteristics of any given language will influence the aspects of the grammar that prove problematic for children with SLI.

Regarding verb morphology, English-speaking children with SLI are reported to have more difficulty with finite verb inflections when compared with their mean length of utterance (MLU) controls (Leonard, 2000; Rice & Wexler, 1996). They either omit inflections or substitute them with morphologically simpler non-finite forms (Bishop, 1994; Rice, Wexler & Cleave, 1995; Rice & Wexler, 1996; Rice, Wexler & Hershberger, 1998; Rice, Wexler, Marquis & Hershberger, 2000). For example, English-speaking children with SLI will produce utterances such as, “She walk” instead of “She walks” (Serratrice, Joseph & Conti-Ramsden, 2003). In addition, they have particular difficulty in mastering production of the regular past tense *-ed* form and the irregular forms of the third person singular, i.e., *has* and *does* (Bedore & Leonard, 1998).

In languages that are morphologically richer, such as Italian, Hebrew and Spanish, a different pattern of production problem emerges. Children with SLI who speak these more highly inflected languages are seen to omit verbs rather than produce verb forms with non-target marking for tense and agreement as their English-speaking peers do (Bortolini et al., 2002; Dromi et al., 1999; Leonard, 2000). Italian-speaking children with SLI have been found to omit more obligatory verbs than their typically developing peers (Bortolini et al., 2002). In contrast, Catalan Spanish-speaking children with SLI are reported to produce verb forms in which the inflections fail to agree with subject number (Leonard, 2000). A study of Puerto-Rican Spanish-speaking children with SLI found subject verb agreement for gender to be problematic for both the SLI and non-SLI children aged between 3;08 and 6;09

(Anderson, 2001). Hebrew-speaking children with SLI are reported to use “abbreviated forms” (Leonard et al., 2000) or “stripped forms” (Berman & Armon-Lotem, 1997). The produced verbs were typically found to be the infinitive and present tense forms; for example, both /mexabek/ present tense-*Hug* and /lexabek/ infinitive-*Hug* were produced as /xabek/ (Leonard et al., 2000).

Past tense has been reported to be a particular area of difficulty for English-, Swedish-, Spanish-, Hijaz Arabic-, and Hebrew-speaking children with SLI (Swedish: Hansson & Bruce, 2002; Hansson & Leonard, 2003; Hebrew: Leonard et al, 2000; English: Leonard, Deevy, Kurtz, Krantz Chorev, Owen & Polite, 2003; Leonard, 2000; Conti-Ramsden & Windfuhr, 2002; Danish: Rikee & Hansson, 2012; Hijazi Arabic: Abdalla & Crago, 2008). In Swedish, finite inflections mark tense only and there are no distinctions for person or number in the language. Hansson et al. (2000) found that Swedish children with SLI produced the present tense inflection in a comparable way to their MLU controls. However, the past tense inflection was produced at lower percentages than in MLU controls. Hansson et al. (2000) concluded that for Swedish children with SLI the problem was not related to tense or the number of features but specifically to past tense.

Previous research on Arabic

There is a scarcity of published research on Arabic with respect to both language impairment and typical language development. Although it is spoken extensively in parts of Africa and across the Middle East, there are only limited descriptions of language acquisition of Egyptian Arabic among typically developing children (Omar & Nydell, 2007). Other developmental studies have examined specific features of other regional variants of Arabic, such as the use of plurals in Palestinian Arabic (Ravid & Farrah, 1999), phonological development in Jordanian Arabic (Amayreh & Dyson, 1998), comprehension of word order in Kuwati Arabic (Aljenaie & Farghal, 2009), prosodic patterns of Egyptian Arabic children with SLI (Azab & Ashour, 2015) and pragmatic difficulties in Egyptian Arabic children with SLI (Osman, Shohdi & Abdel Aziz, 2011).

Verb morphology deficits have been examined in children with SLI speaking Urban Hijazi Arabic (UHA), a variety spoken in western Saudi Arabia (Abdalla & Crago, 2008). Verb morphology was found to be an area of difficulty for the UHA-speaking children with SLI, and when an error in verb inflection occurred, the reported substitute form was the imperative. SLI has also been examined in children speaking Egyptian Arabic (Morsi, 2009). This study investigated tense and agreement for verbs and nouns, as well as sentence and digit repetition. The Egyptian Arabic-speaking children with SLI 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. A prominent substitution error was the use of a verb form that resembled the imperative.

The aforementioned studies have investigated varieties of Arabic, which do exhibit

grammatical differences amongst them. While they are all called Arabic many of these varieties are not always mutually intelligible to speakers of other varieties from different regions and countries. The present study focuses on Egyptian Arabic as spoken in Cairo. The grammatical features relevant to the study of SLI will be described below.

These studies demonstrate that children with SLI do not display uniform grammatical profiles across languages, and the cross-linguistic differences found in children with SLI appear to depend on various language-specific grammatical characteristics of the different languages examined. Further empirical investigations are needed across a wider range of languages to support the underlying theories that account for SLI and to develop appropriate diagnostic and treatment materials for children with SLI. The objective of this study is to contribute to the corpus of cross-linguistic research on SLI by examining Egyptian Arabic-speaking children with language impairment. Since little research has previously been carried out on children with SLI in this language, the goal is to provide a characterization of language-specific markers for Arabic SLI, which can be used to inform more effective diagnostic and treatment methods. From a theoretical perspective, Arabic is an interesting test case for investigating children's use of verb morphology and inflections, because it is a pro-drop language, has no infinitive form and has a rich, bound morphological system. A consideration of the language patterns observed in Arabic-speaking children with SLI as compared to previously documented patterns from children with SLI who speak other languages, will also contribute to theoretical accounts proposed for SLI.

Grammatical Features of Egyptian Arabic

The children who participated in this study speak a form of Arabic known as Egyptian (Spoken) Arabic (EA). Like other Semitic languages, Arabic is a morphologically rich language with a complex system of bound morphology. All verbs in Arabic are formed from a combination of a consonantal root plus vocalic infixes. The root provides the common semantic or formal core for words formed, i.e., nouns and verbs, but on its own the root is unpronounceable and is not a lexical item (Boudelaa & Marslen-Wilson, 2001, 2004). EA has a basic subject-verb-object as well as verb-subject-object word order. Unlike other Semitic languages such as Hebrew, there is no verbal infinitive form. Verbs in Arabic agree with their subjects and carry affixes expressing person (first, second, third), number (singular and plural) and gender (masculine and feminine), in addition to the affixation for verb stem information, i.e., aspect tense and mood. The two primary verbal paradigms in EA are the perfective aspect, which denotes a completed action, and the imperfective aspect, which represents a non-complete action – that is, either present, progressive or habitual. A system of proclitics (i.e., /bi-/ and /ha-/) function as aspectual markers and are used in EA to mark progressive, habitual, and future action.

One of the methodological problems encountered when conducting cross-linguistic research is to identify and specify adequate levels of comparability across languages. When examining Urban Hijazi Arabic, Abdalla and Crago (2008) did not make these aspectual

distinctions and instead referred to the perfective as the 'past tense' and the imperfective as the 'present tense'. This has advantages in that it simplifies the cross-linguistic comparison; however, it is also misleading and can therefore result in inappropriate comparisons and conclusions. Even when comparing closely related languages such as Hebrew and Arabic, categories and hence descriptive terms used to describe a grammatical feature in one language may not exist in another language. Equally, cognate features may be realized differently in the two languages with different grammatical implications.

For example, in EA there is no infinitive form of the verb, and all verbs must be marked for either tense or aspect. By contrast, in Hebrew, there is an infinitive form, which is inflected. Also, in Hebrew, the present tense is expressed using participles, which are marked for gender and number but not for person. The past tense is a more complicated paradigm and is marked by affixation for person, gender and number. In EA, present tense verbs are marked for person by prefixes, with gender and number being marked by suffixes. Present tense verbs may also carry the aspectual marker for progressive as a prefix. The imperfective verb is not specified for tense and it is proposed by some Arabic grammarians as the only default form that is resorted to whenever the verb does not carry temporal features (Benmamoun, 1999). In the perfective marked by a rich set of suffixes, gender distinctions are similarly found only in the 2nd and 3rd person singular. In the absence of an infinitive, 3rd person, masculine singular of the past is typically used as the citation form, as it carries no affixes. Thus /katab/ 'wrote (sgM)', whose root is ktb, is the citation form for the verb 'write'. Imperatives in Egyptian Arabic are marked for gender and (plural) number. For example, /ʔiktib/ 'you (sgM) write'; /ʔiktib-i/ 'you (sgF) write'; /ʔiktib-u/ 'you (Pl) write'. These distinctive language features are therefore important when considering the emerging error patterns.

Unlike the case of a language such as English, in which morphemes are typically realized by affixes, added morphemic complexity in Arabic and Hebrew is not necessarily expressed by increased linear length of utterance. The reason is that for both Arabic and Hebrew inflectional morphology can take a suffix, infix, or prefix position. Mean length of utterance (MLU) calculations, based on a count of morphemes initially developed by Brown (1973) to measure linguistic maturity, do not account for languages such as Hebrew and Arabic where morphology may take the form of internal modification using infixes. Taking as an example the root /ktb/, the words /kita:b/ *book*, /kutub/ *books*, and /katab/ (wrote-3sgF) *wrote* are all formed either by infixation (internal modification) or intercalation of vowel patterns of the consonants of the tri-consonantal root sequence. Using Brown's conventions, all these forms would be counted as one morpheme.

Dromi and Berman (1982) devised the measure of mean morphemes per utterance (MPU) for language development research in Semitic languages: "The term MPU reflects our belief that for this model, morphemes rather than length are critical for characterizing linguistic maturity" (Dromi & Berman 1982, p.405). For example, /katab-it/ (wrote-3sgF) would be counted as only two morphemes in typical MLU calculations, although three items of morphological information are arguably represented; the internal marking of past

tense is expressed by the two vowels in /katab/ and the /-it/ marks 3rd person singular feminine. However, /katab/ (wrote-3sgM) would be counted as only one morpheme with MLU and not two as in MPU calculations. Due to similarities between Arabic and Hebrew, i.e., both are Semitic languages, and to account for internal marking of morphology, the measure of MPU was adopted in the present study.

Methods

Participants

Three preschool monolingual Egyptian Arabic-speaking children with developmental language impairment (EA-DLI) were recruited through the Learning Resource Center, a private inter-disciplinary pediatric clinic in Cairo, Egypt. The children were initially referred to the speech and language therapy department either by their parents or preschool teachers due to concerns regarding poor language development. The children were diagnosed as having a language impairment by the first author who is a bilingual English-Arabic speaking speech-language pathologist certified by the Royal College of Speech and Language Therapists, UK.

The EA-DLI children consisted of two males, Abdul and Mike, and one female Nadine. All the EA-DLI children were 4;06 years at the time of recording. The three children with language impairment's cognitive abilities were tested by certified psychologists and developmental specialists using a set of tasks such as matching, association, categorization, and problem solving. Diagnosis of language difficulties was arrived at by using various speech-language diagnostic measures; as to date, there is no standardized test for preschool language development in Arabic. A selection of tools was adapted for Arabic: (a) the Renfrew Action Picture Test (A-RAPT), (b) The Sentence Comprehension Test (A-SCT), (c) labeling a set of verb pictures, (d) an error analysis of utterances from spontaneous language samples, (e) calculations of mean morphemes per utterance, and (f) a functional analysis of their use of language. The three children's nonverbal IQ was judged to be "within normal limits". The three children met the initial inclusionary and exclusionary criteria for SLI as defined by Leonard (2000). The development of their language was significantly behind their development in all other areas, such as nonverbal intelligence, motor and socio-emotional abilities. In addition, the underlying cause of their language difficulties was unknown and not directly due to any acquired neurological lesions, e.g., cerebral palsy. Diagnostic records showed that they had passed hearing tests and did not have any episodes of *otitis media*. It was noted that there was a positive family history of language learning difficulties for one of the children with language impairment, Abdul. Due to the children's young age when first seen, i.e., under the age of five, and in order to remain conservative with diagnostic labeling, the children were given the initial diagnosis of Developmental Language Impairment (DLI). This more generic label was used to indicate that receptive and expressive language performance was below the developmental milestones expected in typically developing children.

Six monolingual typically-developing Egyptian Arabic-speaking (TD) children served as a comparison group for the three EA-DLI children (three females and three males, ages ranged from 2;03 to 4;06; mean= 3 years). Two of the typically developing (TD) children were Abdul's female (F) siblings: one was his twin (TD-Samira) and the other was his younger sister (TD-Sanna). The remaining four TD children were recruited from preschools or day care centers in Cairo. The TD group was screened by the speech and language therapist. Their birth and medical histories were uneventful, and developmental milestones were achieved within the expected period. The parents of all the children participating in this study provided informed written consent for the use of their children's videos and language samples for research and educational purposes.

Procedure

Videoed language recordings were made of both groups, with their mothers and with the speech and language therapist. During the month that the recordings took place, both groups of children attended twice per week. Each of the eight sessions per child was for 30 minutes and consisted of child-led play sessions, picture description and spontaneous conversation. All sessions were held in the clinic playroom. The children were recorded in the play sessions with the first author and their mothers.

The children's language productions were phonetically transcribed according to the conventions of the CHAT system (MacWhinney, 2000). The first author, who has a high proficiency in Egyptian Arabic as a second language conducted the data transcription. A random transcription sample from all children who participated in this study were re-examined by two independent bilingual speech and language therapists who were native speakers of EA to ensure the consistency and reliability of the coding and analyses.

Coding and analyses

For each child a number of quantitative measures were calculated from the spontaneous language transcriptions of the play sessions: the total number of utterances produced, the percentage of utterances produced with errors (PUE), the mean morphemes per utterance (MPU), the number of verbs produced, percentage of verbs produced with errors (PVE) and a descriptive error analysis of verb productions. Each of these measures will be described in detail below.

Mean morphemes per utterance (MPU)

For reasons discussed above, MPU was chosen in this study as a more accurate measure of linguistic maturity (rather than MLU) in children speaking Semitic languages. The methodology devised by Dromi and Berman (1982) was used to ensure a standardized system for determining the basic unit of counting. The number of morphemes produced for each utterance was calculated and then divided by the total number of utterances to give an

MPU calculation for each child.

Percentage of utterances with errors (PUE)

All errors were coded and the percentage of utterances produced with errors (PUE) was calculated. Developmental errors were expected to be present in both the DLI and TD children. Given the young age of the TD children it was of interest to identify and describe any qualitative differences in the error patterns found between the two groups.

Analysis of spontaneous verb productions

All verb form productions were subjected to additional analyses. The number of verbs produced by each child and the percentage of verbs with errors (PVE) were calculated and used to develop a picture of the different error patterns produced by the children. Coding for verb errors was determined by both the syntactic context and the discourse context, e.g., who was the child's interlocutor(s) for determining gender and number. Type/token ratios were also calculated to gain a picture of the relative richness of morphology.

In line with the cross-linguistic findings reviewed above, it was predicted that due to their young age, both TD and EA-DLI children would produce simple unmarked verb forms while the children with DLI would produce them with higher frequency. Specific interest was focused on the production of person and gender agreement relative to the use of tense/aspect marking as these grammatical morphemes had been shown to reflect language specific-patterns of difficulty in previous cross-linguistic SLI research. A secondary interest was to develop a picture of what TD and DLI children would produce as non-adult target forms in Egyptian Arabic, as little language documentation presently exists for developmental forms of this language.

Verb forms extracted from the transcribed play sessions and picture naming were coded according to whether the error was (a) a stripped form without tense/aspect and agreement markers (i.e., person, number and gender); (b) an agreement error for person or gender but correct tense/aspect; or (c) production of a non-adult target form. For example, if the child produced an utterance such as the imperative /buss/ 'you (sgM) look'; where the target form was the imperfective /bi-buss/ (he-is-looking) this would be coded as a tense/aspect error. If the utterance produced was /buss/ 'you (sgM) look' where the target form was the imperative /buss-i/ 'you (sgF) look' this would be coded as an agreement error because the feminine inflection is omitted, but is correct for tense/aspect. The term 'non-adult target form' is used here to describe productions where the tri-consonantal lexical root of the word is produced in the utterance in the location where a verb would be expected, but an incorrect vocalic template for grammatical inflection is inserted. For example, if the target verb is /wiʔiʕ/ 'fell (sgM)', whose root is /wʔʕ/ and the child instead produces /waʔaʕ/. The tri-consonantal root is produced however, the vocalic template is incorrect and this would be considered a non-adult target form.

The language productions of EA-DLI children were compared with the TD children

on measures of mean morphemes per utterance (MPU), percentage of utterances with errors (PUE) and an analysis of the number of verbs produced and percentage of verbs with errors (PVE). Verb related morpheme error comparisons across groups were limited to descriptive statistical analysis because of the small sample size and low frequency of occurrences.

Results

Mean Morphemes per Unit (MPU)

Mean morphemes per unit were calculated for each of the nine children who participated in this study. For the three children with EA-DLI, a total of 301 utterances were transcribed for Abdul, 154 utterances were transcribed for Mike and 128 utterances were transcribed for Nadine.

Table 1

Age, Number of Utterances, Mean Morphemes per Utterance (MPU), Percentage of Utterances with Errors (PUE), Number of Verbs Produced and Percentage of Verb Error Patterns (PVE) for children with EA-DLI and TD children.

Participant	Age	Number of utterances	MPU	PUE	Number of Verbs	PVE
DLI-Abdul	4,06	301	2.4	40%	92	84%
DLI-Mike	4,06	154	2.9	88%	97	56%
DLI-Nadine	4,06	128	3.0	43%	61	33%
TD- Samira	4,06	89	7.5	9%	34	0%
TD-Sharif	3,04	66	2.1	35%	26	16%
TD-Sanna	3,00	39	4.2	26%	33	6%
TD-Suzy	2,07	47	3.0	28%	20	15%
TD-Omar	2,04	41	2.8	15%	19	16%
TD-David	2,03	49	2.6	53%	21	57%

This relatively large number of utterances was balanced by a quite small MPU. In contrast, the number of utterances produced during the recorded play session was only 89 for the TD children and while the younger TD children produced relatively fewer utterances, they had age appropriate MPUs of between 2.1 and 4.2. At four years of age, the children with EA-

DLI had MPUs that fell into the range for the TD children between two and three years of age. The EA-DLI and TD children's MPUs are summarized in table 1.

Percentage of Utterances with Errors (PUE)

Both the children with EA-DLI and the TD children were found to produce utterances with errors. The children with EA-DLI produced a higher percentage of their utterances (PUE) with errors (range between 40% and 88%). Only the youngest TD child, David, produced a PUE (53%) in this range. The other TD children produced PUEs of between 9% and 35%, but note that these were calculated on relatively smaller samples compared with the children with DLI (see Table 1).

Analysis of verb productions and verb error patterns

The proportion of verbs produced in these spontaneous speech samples varied considerably in both the children with DLI (Abdul 47%, Mike 63% and Nadine 30.6%) and the TD children (Samira 38.2%, Sharif 39.4%, Sanna 84%, Suzy 42.6%, Omar 46.3% and David 42.9%). This variation is likely to be the result of a complex interaction between developmental maturity, MPU and relative proportion of errors produced. Analysis of the percentage of verbs with errors (PVE) revealed different levels of ability to produce correct verb forms in the children with DLI: Abdul-79/92 (86%) verbs with errors; Mike-54/97 (56%) verbs with errors, Nadine-20/61 (33%) verbs with errors. Apart from the youngest TD child David- 12/21 (57%) verbs with errors, the other TD children's verb errors ranged from 0-16% (see Table 1).

Regarding the use of tense/aspect verb forms, both groups of children produced the imperfective and perfective aspect but with varying levels of accuracy. Overall the perfective aspect was more frequently produced correctly than the imperfective aspect. Although perfective verb forms were produced correctly to mark tense in the speech samples of both the children with EA-DLI and the TD children, the errors which occurred involved substitution or omission of agreement marking for gender or person. For example, Abdul produced /tiliʕ/ 'went-up (3sgM)' instead of /tilʕit/ 'went-up (3sgF)'.

Both groups of children produced some verbs with the correct person, number, gender and aspectual/tense agreement. However, errors occurred in both the DLI and TD children's spontaneous verb productions. There was variability amongst the TD children. The two predominant error patterns were (1) an unmarked 'default' verb form was produced instead due to omissions of the aspectual proclitic used to mark imperfective aspect. In these instances, it was strictly the aspectual proclitic, as opposed to prefixes associated with the imperfective, which is invariant, and unique as an aspectual proclitic); or (2) errors with agreement for number, gender or person, and tense/aspect was correct (see Table 2).

Regarding the first type of error, there was more than one default verb form selected by the children. In such instances, obligatory morphological inflections were omitted for

both tense/aspect and gender/person. For the TD children Suzy (50%) and Omar (66%), one half or more of their erroneous verb forms produced were use of the default verb forms with omissions of grammatical marking. The second most frequent error type was when the tense/aspect of the verb was correct but agreement information for person, number and gender was incorrect. The third type of error was where the children produced a non-adult target form. David, the youngest TD child produced a small number of such non-adult target forms and the three children with DLI produced such errors. The error patterns of the children with EA-DLI compared with the TD children are presented below (see Table 2).

Table 2

Percentage of verb error patterns for the children with EA-DLI and TD group

Participant	Age	Number of Verbs	ofPVE	Default forms	verbGender, person aspect correct	number, Non-adult target forms tense
DLI-Abdul	4,06	92	84%	23.3%	71.5%	5.2%
DLI-Mike	4,06	97	56%	64.8%	22.2%	13%
DLI-Nadine	4,06	61	33%	15%	75%	10%
TD- Samira	4,06	34	0%	0%	0%	0%
TD-Sharif	3,04	26	16%	25%	75%	0%
TD-Sanna	3,00	33	6%	0%	100%	0%
TD-Suzy	2,07	20	40%	50%	50%	0%
TD-Omar	2,04	19	16%	66.6%	33.3%	0%
TD-David	2,03	21	57%	25%	50%	25%

Pattern one: Use of a default verb form

The children with EA-DLI and most of the TD children used a simpler default verb form where they omitted obligatory inflectional morphology. Although present in both groups of children, the prevalence of this error varied. This form was used by the four TD children between the ages 2;03-3;00 but did not appear in the samples of the two older children, and was present to differing degrees in the speech produced by all three of the children with EA-DLI. It was Mike’s predominant error pattern but neither Nadine’s nor Abdul’s. The default verb form either resulted from omitting tense and aspectual marking or it was due to the omission of number, gender, person markers and tense/aspect. The default verb form

took more than one form; it either resembled the imperative, or the subjunctive or a variant of the imperfective stem. 23.3% of Abdul's errors were of this type, 64.8% of Mike's and 15% of Nadine's.

The first type of default verb form was one that resembled the imperative form. For example, the child with EA-DLI, Nadine, was holding a picture of a man opening a box. She produced the utterance */ʔiftaħ ʕelba/ (open box) using the imperative form /ʔiftaħ/ (open-2sgM) instead of the target /bi-yi-/ʔiftaħ/ (he-is-opening), thus omitting the aspectual proclitic and person marker /yi-/ (2M). It must be noted that in Egyptian Arabic in many contexts, forms without the proclitic bi- are in free variation with bi- forms. For example, both forms are acceptable /bi-yi-/ʔiftaħ/ (is-opening-2sgM) or /yi-/ʔiftaħ/ (opening-2sgM), however, in the context where the child is describing an action selecting an imperative would be an error. In another example, the same child, Nadine was sitting at a table coloring with her mother and she was talking to her mother about what she was doing. She produced the following utterance "What is Nadine doing? Scribble" */nadine teʕmil ih teʕmil ʃaxbat/. She used the imperative form /ʃaxbat/ (scribble-2sgM) instead of /ba-ʃaxbat/ (am-scribbling-2sgM), omitting the aspectual marker /ba-/.

Both groups of children appropriately used the subjunctive forms in the first person plural when they were requesting help or actions. This is an un-prefixed form used as an optative for suggestions, invitations and requests, producing phrases such as "(let's) play", i.e., /nelʔab/ 'play (1Pl)'. However, the subjunctives were also selected as a second type of default verb form by both groups of children and used as substitutions for indicative verbs which require the prefixes /bi-/ or /ha-/ as in /bi-nelʔab/ 'we are playing (1Pl)' or /ha-nelʔab/ (we-will-play). For example, when the child with EA-DLI, Mike, wanted to leave, he used the subjunctive */nerawwah/ (go-home (1Pl) instead of /ʕayiz ʔarawwah/ (I-want-to-go-home-1sg). When the third child with EA-DLI, Abdul, wanted to buy some sweets, he used the phrase */negib bonboni/ (we-get sweets) instead of /ʕayiz ʔagib bonboni/ (I-want to-get sweets).

Error pattern two: Incorrect agreement for number, person and gender but correct use of aspect/tense

The second error type occurred when the children produced a verb form with the correct aspect/tense but produced errors in gender and/or person. Errors involved both feminine (requiring overt marking) and masculine (unmarked) target verb forms. Person agreement marking errors also occurred. The children were all recorded in play sessions with adult women (the first author and their mothers) present. Thus it would seem that the children had more potential contexts in which they could use the feminine person markers than they did the masculine. Errors on target feminine forms occurred for both naturally gendered subjects and grammatically gendered objects. Additionally, when the children were referring to the same person or object in successive utterances, they produced both feminine and masculine forms in alternation. For example, when Nadine was talking about the

actions of a doll (feminine object) within the session she used both the correct and incorrect agreement for gender. For example, */ʔarusa nayim lih/ (doll sleep-3sgM why) and /ʔarusa sihyit/ (doll woke-up-3sgF). In another example when Nadine was describing a cake she pretended to make, she produced the verb *do* with the incorrect gender and person markers, */ʔanna bi-yi-ʔiʃmil (keka)/ (I is-making-3sgM cake) instead of /ʔanna ba-ʔaʃmil (keka)/ (I am-making-1sg cake). It is important to note that in the first person singular form there is no gender marking required.

Errors concerning the production of the imperative were with gender agreement and never with (plural) number agreement. It is important to note here that imperatives although marked for gender and person are only marked for plural person and there were fewer opportunities where the children would use the plural imperative (female interlocutor). In addition, when the children were using the imperative they frequently omitted the 2nd person feminine singular marker /-i/. This type of error was present in all the language samples but with varying degrees of occurrence. For example, when the TD child, Sharif was passing an object to his mother he used the utterance */xud ya mama/ (take(it)-2sgM mummy) instead of /xudi ya mama/ (take(it)-2sgF mummy). Regarding the EA-DLI children, this error pattern was less prevalent in Mike's productions and more prevalent in Abdul's and Nadine's productions. Approximately, 22.2% of Mike's and 71.5% of Abdul's and 75% Nadine's verb errors were of this type compared with the TD children who produced 33-100% of their verbs with this error pattern. Again variability is seen both within and between the two groups. Mike's verb errors resembled the TD children's, Suzy and Omar; Nadine and Abdul's errors resembled the other three TD children. The only age matched child Samira, Abdul's twin sister, produced no verbs with errors.

Nadine and Abdul's agreement errors were with the imperative, the imperfective and perfective aspect. As mentioned above, the discourse context involved female interlocutors, which required the children to mark verb forms with overt feminine inflections. This may have provided an opportunity to reveal a degree of difficulty, which might have gone undetected in other conversational environments.

Error pattern three: Production of non-adult target forms

The production of non-adult target forms is the third error pattern that was identified. This incorrect form was produced by all of the children with DLI (Abdul $n=4$, Mike $n=7$, Nadine $n=2$) and the youngest TD child (David $n=2$). Although these forms were produced only rarely, their presence is noteworthy. In these instances, the correct consonantal root of the verb was produced with a vocalic pattern, which was not the correct inflectional pattern for that verb although possible in Egyptian Arabic (i.e., a pseudoword but not a phonotactic violation). Examples will be used to illustrate this error pattern. In the first example, Nadine was eating a sandwich which she then smelled, the verb for *smell* is /ʃim/. She produced the pseudoword */ʃimma/. The 2nd person feminine form of the verb would be /ʃimmi/ and the 2nd person masculine form of the verb would be /ʃim/, but there is no marker /-ma/ at the

end of verbs in Arabic. The youngest TD child also produced two of these errors. One occurred when he was drawing and he produced the pseudoword /taʔtib/. The root for the verb write is /ktb/ and substituting /t/ for /k/ is common at this age (Amayreh & Dyson, 1998), however, David's production is a non-word since an incorrect inflectional pattern is used. The target form could have been /ba-ʔaktib/ (am-writing-1sg) or /ʔaktib/ (writing-1sg), the imperative would be /ʔiktib/. Thus, although these errors were infrequently produced, in all cases the root was maintained which given the morphological structure of Arabic is interesting as will be discussed further below.

In summary, the main features of verb related errors in Egyptian Arabic-Developmental Language Impairment are: the use of the default verb forms due to omissions of obligatory morphological forms which are used to mark number, gender and tense/aspect; difficulty with verb agreement for number person and gender; and the production of non-adult target forms. The development of tense and aspect appears to occur early on in EA as demonstrated by the productions of both groups of children. Both the children with EA-DLI and the TD children had less difficulty with their use of the perfective and the imperfective future aspect relative to the other forms. The same verb form errors are seen in both the children with EA-DLI and the youngest TD children with varying rates of production in and within the groups.

Discussion

The first aim of this work is to provide a characterization of language-specific markers for Arabic LI, which can be used to inform more effective diagnostic and treatment methods. The second is to identify how the linguistic deficit patterns of Arabic LI compare to children with LI who speak other languages. Finally, the findings presented here will be related to theoretical accounts proposed for SLI.

Mean Morphemes per Utterance and Percentage of Utterances with Errors

The children with DLI displayed fewer morphological markers as measured by their MPUs. The three children with DLI at four years had MPUs of less than 3.0, which fell into the range of MPUs for the younger TD children between two and three years of age. There is a great difference when these are compared with Abul's twin sister TD Sanna, whose MPU was 7.5. For the TD children, the range of MPU values varied from 2.1 to 4.2 in the five children aged between 2;0 and 3;04. These findings are in line with MPU measures of TD Hebrew-speaking children (Dromi & Berman, 1981).

Regarding frequency of errors, as expected, developmental errors were present in both groups of children and percentage of utterances produced with errors (PUE) fluctuated. There is no comparable normative data available in Arabic to compare the age at which normal developmental errors occur relative to MPU. However, cross-linguistic studies on Hebrew (Berman, 1985) and English (Bowerman, 1982) report that over-regularization errors are most frequent around the age of 2;06-3;00. This study

demonstrates that high PUE ranging from 15-53% were produced by TD children aged 2;03-3;04 years.

Verb morphology in Arabic DLI

When searching for clinical markers for SLI the focus in the past has been to look at tense/aspect morphemes, number morphemes and person-agreement morphemes. One notable finding in the present study is that both the children with EA-DLI and the TD children had no difficulty with their use of perfective aspect, which is in contrast to Indo-European languages examined for SLI. The three children with EA-DLI correctly used participles and the passive, with a low rate of omission, which was similar to the TD group. Participles in Arabic are only marked for number and gender and they do not need supporting verbs. It is interesting that the EA children did not select participles as a default verb form. Since participles are not marked for person, one might assume the children with EA-DLI would use substitute forms that do not require person marking. However, this was not the case.

Two error patterns were very common but to varying degrees both among the TD and EA-DLI group and among the children with EA-DLI. A third error pattern was less prevalent, and present in the DLI group but only in one of the TD children. The first error pattern was that the EA children selected a default verb form. This was the dominant error for one of the EA-DLI children and two of the TD children. This form either resembled the imperative or the subjunctive. The second error pattern was tense or aspect was correct but there was an error with agreement for number, person and/or gender marking. This error was most common in the productions of two of the children with EA-DLI and three of the TD children. The third error was the production of a non-adult target form; this was the least common in both groups.

Attention to aspect morphemes has not been a particular focus in the SLI literature partly due to the language types examined (Fletcher, Leonard, Stokes & Wong, 2005). When tense and aspect were examined in English-speaking children with SLI, tense was seen to present more of a problem for them than aspect (Leonard, Deevy, Miller, Rauf, Charest & Robert, 2003). Cantonese children with SLI were less likely to use selected perfective and imperfective aspectual markers than both same age peers and younger TD children but had no difficulty with their use of past-time (Fletcher et al., 2005). Both the children with EA-DLI and the TD children had no difficulty with their use of past-time (perfective). These Arabic findings are therefore in contrast to findings reported for SLI concerning tense and in particular past tense, where past tense has been reported to be an area of difficulty for English-, Swedish-, Spanish- and Hebrew-speaking children with SLI (Swedish: Hansson and Bruce, 2002; Hansson and Leonard, 2003; Hebrew: Leonard et al, 2000; English: Conti-Ramsden & Windfuhr, 2002; Leonard et al., 2003).

From the increasing cross-linguistic body of literature on SLI, it is evident that although these children have morpho-syntactic difficulties there is inconsistency within

languages, between languages and between typical versus deviant development. The results presented in this paper provide a preliminary account of language impairment in Egyptian Arabic detailing the difficulties in verb form that occur. Due to the small corpus, the findings should be interpreted with some caution. However, these findings may assist the direction of further research of language impairment in Arabic. The findings of this study demonstrate that the children with EA-DLI do spontaneously produce inflectional verb morphology, although errors were also observed. The observed errors were similar to those produced by the typically-developing younger children. Additionally, analysis of EA verb errors demonstrate that for both groups difficulty with number, person and gender markings are more problematic for the children than use of tense and aspect. However, there was variability between and across both groups as well as variability cross-linguistically. Before considering possible reasons for this pattern of results, it is important to clarify what can and cannot be deduced, from the results reported about Arabic speaking children's knowledge of aspect, tense, and agreement. In the next section these questions will be addressed and will be discussed in light of current theories used to account for SLI.

Theoretical accounts for EA-DLI

Researchers have proposed different theoretical accounts for surface errors produced by children with SLI; and more specifically with their use of uninflected or 'default' verb forms. Two theories will be discussed in light of the Arabic findings: the *Extended Optional Infinitive Account* (Rice et al, 1995; Rice & Wexler, 1996; Rice et al., 2000), and the *Surface Account* (Leonard et al, 1997; Leonard, 2000).

The Extended Optional Infinitive Account

According to the Extended Optional Infinitive (EOI) Account, children with SLI either lack the knowledge that verbs must be finite in main clauses, or they go through a prolonged period of development during which they assume that agreement and /or use of tense are optional. Thus when a finite form is not selected by the children with SLI, an infinitive is used instead, i.e. the 'bare' form of the verb. So what would the Extended Optional Infinitive Account predict for languages which do not have infinitive forms in their language, such as is the case for Arabic? Considering this question raises both typological as well as theoretical issues specific to claims regarding SLI.

A notable error pattern found in the present study by the EA-DLI children was the use of a simpler verb form; this has been reported in the cross-linguistic data in Hebrew, English, German and Swedish (Hamann et al., 1998; Hansson et al, 2000; Hansson and Leonard, 2003;; and Leonard, et al 2000) as well as in Egyptian Arabic (Morsi, 2009). In a language such as Hebrew where infinitive inflections are complex, the EOI Account would predict infinitives to be problematic. Contrary to this in the Hebrew SLI data (Leonard et al., 2000), the children did not use infinitives as their default verb form, which are more complex morphologically; instead, they either used (1) the stripped forms that are

characteristic of the early stages of Hebrew child language (Berman & Armon-Lotem, 1997) or they used (2) the Present masculine singular form or (3) the Past 3rd person masculine singular form as substitutes for the appropriate verb form. The second and third forms in Hebrew are the simplest morphologically and are often referred to as the basic forms (Berman, 1985; Berman and Armon-Lotem, 1997). The EOI Account (Rice and Wexler, 1996) would predict a different form be used for Arabic since there are no infinitive forms. Although both groups did use a simpler unmarked form of the verb, the occurrence of the default verb form in the EA children's speech varied in frequency, in both the children's language productions with EA-DLI and the TD group.

An amendment to this theory would be to propose that similar to the Hebrew SLI children the EA-DLI children use simpler unmarked morphological forms for an extended period of time, and depending on the language typology this may be any zero morphology default form depending on the language e.g., the infinitive in Swedish and English (Hansson et al., 2000), or the present masculine singular form and the past 3rd person masculine singular form in Hebrew (Leonard et al, 2000) or the default verb forms in Egyptian Arabic e.g., the 3rd person masculine singular imperative, 2nd person plural subjunctive or a variant of the imperfective stem. The use of these stripped forms is a shared cross-linguistic characteristic and it seems unlikely that these stripped forms are produced by chance.

In the EA data they are present in the productions of the TD children as well as the children with EA-DLI. It could be argued that the children overused these default forms because this is what that they hear the most when instructions were being addressed to them; however, the data do not support this. Regarding the default verb form, which resembled the imperative, a plausible overgeneralization would be for the male children to use the 3rd person masculine singular form more frequently (e.g., /ruħ/ (go- 3sgM)), and the females to use the 3rd person feminine singular form (e.g., /ruhi/ (go-3sgF)). If it was the case that they were producing forms frequently heard, we would have seen gender distinctions in these children's productions. This was not found to be the case. Additionally, imperative verb forms in Arabic such as /ruħ/ (go- 3sgM) are relatively irregular. It appears that the children use a form that is closest to the root.

In Egyptian Arabic, the perfective-stem (citation form) and the imperfective-stem are the two forms that are closest to the roots. We have already demonstrated that the production of the perfective was not an area of difficulty for either the TD or children with EA-DLI. An explanation for the source of the default verb form could be that the children select a form which is closest to the root, the imperfective stem, and the children with EA-DLI continue to do this later than their typically developing peers. Grammarians have traditionally taken the stance that the third person masculine perfective form, is the form closest to the root, but this data suggests the organization in the mental lexicon may be different.

In some contexts of Arabic, the imperfective-stem is an un-pronounceable form and to make it pronounceable an initial syllable is added in the initial position. The resulting

form would then resemble the imperative (see example below). In other contexts, the imperfective-stem is pronounceable and is identical to the imperative. Although tense substitution errors were seen in the EA data, these were not as frequent as substitutions that resulted in the use of the default verb forms. It is interesting that the selected default verb forms either resembled the imperative or the subjunctive but never the perfective form, e.g. /katab/ (wrote-3sgM), which is also the closest to the root in that it carries no affixes. Given the morphological simplicity of the perfective we would have expected the TD children acquiring verb morphology to begin by using the simplest and least marked form of the verb as has been reported in the Hebrew data (Leonard et al, 2000), but the TD children did not; they selected the default verb forms instead. For example, /bi-yi-ktib-ha (he is writing it) can be analyzed as: bi-(Asp) yi- (sgM) ktib (imperfective stem) –ha (sg. pronoun clitic).

As mentioned earlier, the imperfective-stem is not always pronounceable, and thus when it is not pronounceable it is hypothesized that the children will insert an initial vowel otherwise they will produce it in its pronounceable form which resembles the imperative. Referring to the example above, since the imperfective stem /ktib/ (root ktb) is not pronounceable (there are no initial consonant clusters in EA), a glottal stop and a vowel are added /ʔi-/ thus producing /ʔi-ktib/ (write-3sgM). If this were a generalized phonological process produced by the children, i.e., that a vowel is always inserted at the beginning of the imperfective-stem, errors of addition would also have been observed which was not the case. In the second example, if we remove the inflections marking tense, person and number from the verb /ha-ti-ruḥ/ (She will go-Asp.Fut-3sgF), the resulting form is the imperfective-stem /ruḥ/ (go-2sgM), which is identical to the imperative /ruḥ/ (go-2sgM). However, no productions of */ʔiruḥ/, where an additional syllable is placed were present in the data. Thus when the aspectual, tense, person, gender, number agreement markers are removed the remainder is the imperfective-stem. This would explain the presence of a default verb form, used by the children with DLI and the younger TD children. As the children mature linguistically and have more knowledge of morpho-syntax they are then able to produce verb forms which are appropriately marked for tense, number, person and agreement.

The second predominant error in the data was the production of verb forms with correct aspect and tense but with either omissions or agreement errors for number, gender and person. It is not possible to determine the exact nature of the form chosen by the children with EA-DLI and TD children, i.e., whether the default verb form is the imperative, subjunctive or the imperfective-stem. However, it seems that the children with EA-DLI and the TD children do produce a simpler form and one that is pronounceable while avoiding complex verb forms. Therefore, the simpler the paradigm, be it inflectional or derivational, i.e., the perfective in Arabic, the fewer the errors. The Egyptian Arabic data does not therefore superficially support the Extended Optional Infinitive Account since there are no infinitives in Arabic, although it does support a modified account that the EA-DLI children and younger normally developing children under the age of 3;07 use a simpler default verb form.

The Surface Account

Difficulties with tense and in particular past tense have been attributed to processing and prosodic difficulties— this has been labeled the *Surface Account* (Leonard et al., 2003; Leonard, 2000; Leonard et al, 1997). This account assumes that children with SLI have a general processing capacity limitation. The Surface Account assumes that in English, these limitations will have a profound effect “on the joint operations of perceiving grammatical morphemes and hypothesizing their grammatical function” (Leonard, 2000, p.247). The Surface Account assumes that words whose inflections are brief in duration, relative to the rest of the word, are more likely to be left as bare stems. For English, closed-class morphemes, such as articles and preverbal auxiliaries, are seen to be the most vulnerable (Leonard, McGregor & Allen, 1992). This has also been supported in Italian children with SLI (Bortolini et al., 2002). This prosodic explanation could be due to the children’s difficulties in perceiving the inflections and as a result they do not produce them. Investigators of other Indo-European languages, such as German (Clahsen et al., 1997) have criticized the Surface Account for its failure to account for differences in the use of grammatical morphemes that have identical phonetic and prosodic value. For example, the plural /-s/ and the 3rd person singular verb inflection / -s/ in English (Gopnik, Clahsen & Hansen, 1997; Rice & Oetting, 1993).

The EA findings do not support the predictions of the proposed grammatical accounts for aspect/tense difficulties, because firstly the use of aspect/tense was not any more problematic than the children’s use of agreement, and the perfective was an unproblematic paradigm for both the EA-DLI and TD children. Second, although the children with EA-DLI do produce morphological errors they did not omit morphemes of short duration in the initial position (e.g., the definite article or passive markers). Many of their errors were errors of substitution. While the difficulties encountered by the children with EA-DLI may be attributed to limited processing abilities, they cannot be attributed to prosodic difficulties.

The second most frequent verb error pattern in the EA data was agreement errors and not omissions (e.g., where the target requires a masculine marker and the child produces the feminine instead as in /bi-yi-ʔixsil/ (washing-3sgM) and /bi-ti-ʔixsil/ (washing-3sgF). This cannot be viewed as due to the omission of a weak syllable, i.e., prosodic. The child with EA-DLI, Abdul, correctly produced the utterance /ma-bi-ji-ʔftaħʃ/ *It doesn’t open*, and he also produced a similar utterance with an addition error, i.e., an additional morpheme is inserted, */mabijftaħħuʃ/; target: /ma-bi-ji-ʔftaħʃ/ (addition of /ħ/ and /u/ which mark plural). Errors where morphemes are added would also not be predicted by the Surface Account. Further data would be required to examine other polysyllabic grammatical constructions in Arabic such as the negative particle as these would be an interesting test case for the Surface Account.

An alternative explanation of the Surface Account is that the children's errors are not due to prosodic difficulties, but instead with difficulty of simultaneously processing

complex linguistic stimuli. This would also explain the nature of errors seen in the younger TD children, who too at a young age, i.e., less than three, would neither have a fully developed linguistic or processing system and therefore when required to produce complex morphological forms would produce developmental errors. It would also explain the presence of the non-adult target forms. A pattern of morphological development was seen in both the children with EA-DLI and the TD children. The children started with forms closest to the root and in a sequential manner built on the stem adding the morphemes. The sequence observed was, (1) to produce verb forms without aspectual/tense and person, gender, number markers, (2) to use person markers but without aspectual/tense (person agreement errors occurring), and finally (3) to use aspectual/tense and person, gender, number markers.

The Hebrew findings are particularly interesting in relation to the EA data due to the language similarities between Hebrew and Arabic. When examining tense, the Hebrew-speaking children with SLI (Dromi et al., 1999) were found to resemble the MLU controls in their use of present tense verb inflections that had to agree with the subject according to number and gender, but they were poorer with their use of past tense inflections. Dromi and colleagues initially attributed these difficulties to processing limitations, assuming that the children's difficulties with past tense agreement inflections were due to the complexity of the verb paradigms thus leading to a breakdown in processing. This was confirmed in a later study (Leonard *et al.*, 2000), where children's problems with verb agreement inflections were attributed to processing difficulties rather than difficulty with person and tense in particular. Therefore, the Arabic verb pattern errors reported here may be accounted for by some interaction between phonological, prosodic, morphological and syntactic information that together place processing demands on children with SLI. Of the three error patterns that emerged two were most prevalent. However, the within-group variation in the children with EA-DLI is interesting. One child with EA-DLI mostly produced default verb forms and the other two children generally produced errors with incorrect agreement for number, gender and person but correct aspect/tense. This divergence may be explained by varying cognitive and linguistic capacities as well as the different languages they speak. Therefore, rather than searching for the same clinical markers across languages, such as past tense or use of infinitives, knowledge of the language family examined can instead predict different surface errors, i.e., different clinical markers, due to the same underlying impairment.

Conclusion

The purpose of this study was to identify the linguistic characteristics of DLI and TD children acquiring Egyptian Arabic. Specific focus was on the production of verb morphology in spontaneous speech samples. Patterns identified lower MPU, high PUE and difficulty with grammatical morphology in the children with EA-DLI, which overlapped to some degree with patterns found in TD children, one to two years younger. The children

with EA-DLI and most of the TD children used a simpler default verb form in which obligatory inflectional morphology was omitted. Although present in both groups of children, the prevalence of this error varied. As they stand, neither the Extended Optional Infinitive Account nor the Surface Account would predict the pattern of DLI speech findings for these EA children. Amendments to these two theories are proposed to account for the variation found between children with EA-DLI and amongst the EA-DLI and TD children.

This was a preliminary study of the spontaneous speech of a small number of children, and as such the findings have to be interpreted with caution. Egyptian Arabic is an interesting test case for Developmental Language Impairment and although shared cross-linguistic features were observed, there are also many differences in areas that are problematic for the children. The cross-linguistic variation between children 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, i.e., Semitic, Germanic, Chinese or Romance.

Further research into other characteristic features of the Arabic language such as the discontinuous negative, the dual and adjective-noun agreement would be areas of potential value. It would also be interesting to compare children with DLI who are speakers of other varieties of Arabic to support the development of appropriate diagnostic assessment measures. Continuing to compare cross-linguistic SLI findings will provide us with compelling evidence of how children learn and use verbal morphology and, therefore, how to provide better remediation for those who are experiencing difficulty.

Acknowledgments

The author wishes to thank the LRC Egypt, and the children and parents involved for their willing participation in the project, and all those who assisted in the completion of this work. The data for this manuscript was drawn from an unpublished doctoral dissertation at Birkbeck, University of London; the author wishes to also thank her dissertation supervisors, Professor Lorch and Dr Edwards for their guidance and support.

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