# *Expressive verb morphology deficits in Arabic-speaking children with Developmental Language Disorder*

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**1** **Expressive Verb morphology deficits in Arabic-speaking children with Developmental**

**2** **Language Disorder**

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**24**

25    **Abstract**

26    *Purpose*

27    This study investigated the production of tense and subject-verb agreement in Palestinian

28    Arabic-speaking children with Developmental Language Disorder (DLD) in comparison to

29    their typically developing peers (TD) in terms of (1) performance accuracy and (2) error

30    patterns.

31    *Method*

32    Participants were 14 children with DLD aged 4;0 - 7;10 (years; months) and 32 TD children

33    aged 3;0-8;0 (years; months) matched on non-verbal abilities. Children were asked to complete

34    a picture-based verb elicitation task. The task was designed to measure the production accuracy

35    of tense and subject-verb agreement inflections in Arabic.

36    *Results*

37    The DLD group scored significantly lower than the TD group on the verb elicitation task. The

38    DLD group was significantly less accurate than the TD group in marking tense, specifically

39    present tense. They were also less accurate in marking agreement in general, with specific

40    difficulty in using feminine verb forms. The DLD and TD groups differed in their tense error

41    patterns, but not in agreement error patterns.

42    *Conclusion*

43    The acquisition of verb morphology in Palestinian Arabic-speaking children with DLD appears

44    to be delayed and possibly different from their TD peers. The DLD group found the production

45    of marked verb forms more challenging than less marked ones. These results are discussed in

46    light of the structural characteristics of Arabic. Future studies would need to include larger

47    sample sizes, investigate other aspects of verb morphology, including both production and

48    comprehension, include other language domains, and consider longitudinal designs to provide

49    more in-depth knowledge of Arabic language acquisition.

**Introduction**

Children with *Developmental Language Disorder* (DLD) exhibit morpho-syntactic deficits often related to the use of tense and subject-verb agreement inflections (for a review, see Leonard, 2014). Production of verb inflections, such as past tense –*ed*, present third-person singular –*s*, auxiliary and copula *be* and auxiliary *do* forms have been reported as problematic for English-speaking- children with DLD (e.g., Leonard & Kueser, 2019; Rice & Wexler, 1996) and verb morphology difficulties are considered to be a clinical marker of DLD in English (e.g., Bedore & Leonard, 1998; Conti-Ramsden, Botting, & Faragher, 2001).

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 (TD) peers in marking tense and agreement, and especially past tense marking (Krok & Leonard, 2015), 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; Bortolini, Caselli, & Leonard, 1997). Hebrew-speaking children with DLD have difficulties marking agreement in past tense, but not marking present tense (e.g., Dromi, Leonard, Adam, & Zadunaisky-Ehrlich, 1999; Leonard & Dromi, 1994).

In summary, verb morphology deficits vary between languages, especially when languages are typologically different. Therefore, studies of grammatical morphology should be language-specific. The present study aims to extend this line of research by characterizing verb morphology deficits in children with DLD acquiring Palestinian Arabic (PA).

*Palestinian Arabic Verb Paradigm*

75    In the Arab world, Modern Standard Arabic (MSA) is the language of literacy tasks and is

76    used in formal contexts, such as news. A unique feature of the Arabic language is diglossia

77    (Haeri, 2000). Each Arab country has a distinctive dialect of Arabic that is used for everyday

78    social interactions. This paper focuses on the colloquial dialect of Palestine: Palestinian Arabic

79    (PA).MSA and its dialectal varieties are characterized by their nonconcatenating templatic

80    morphology that is based on a system of *roots* and *patterns* (McCarthy & Prince, 1988; Ryding,

81    2005). The *root* is an invariable sequence of three to five consonants and it carries lexical

82    meaning. The *pattern* consists of one or more vowels and it carries grammatical meaning.

83    Patterns (vocalic infixes) are discontinuously inserted within the consonantal root to form

84    words and stems (Tucker, 2011). In PA, for example, the root *drs* denotes a meaning of

85    "studying". By shifting different patterns and consonantal affixes around this root we can

86    derive different words such as *daras* "he studied", *madrasa* "school" or *dars* "lesson". MSA is

87    null-subject language and verbs are conjugated to represent different grammatical categories

88    including tense and aspect (past/present and perfective/imperfective), number (singular, dual

89    and plural), person (first, second and third), gender (masculine and feminine), mood

90    (indicative, subjunctive, jussive, energetic and imperative) and voice (passive/active;

91    Benmamoun, 2000).

92    Three verb forms are distinguished by traditional Arabic grammarians: perfective,

93    imperfective and the imperative verbs. There is debate of whether Arabic verbs are considered

94    to be tense-specific where perfective and imperfective verbs refer to past and non-past actions,

95    respectively; or aspect-specific where perfective and imperfective verbs refer to complete or

96    non-complete actions (for a review, see Ouali, 2018). According to Ouali (2018), there seems

97    to be a consensus in recent literature that Arabic is tense language. Table 1 presents the verb

98    paradigm in PA.

**Table 1.** *Verb paradigm in Palestinian Arabic for the root d-r-s (studying)*

| Person | Number | Gender | Past tense | | | Present tense | | | Imperative | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Form | Affixes | Verb + Affixes | Form | Affixes | Verb + Affixes | Form | Affixes | Verb + Affixes |
| 1 | Singular | neutral[*] | 1 | *-it* | *daras**it*** | 9 | *b-a-* | ***ba****drus* | | | |
| 1 | Plural | neutral | 2 | *-na* | *daras**na*** | 10 | *b-ni-* | ***bni****drus* | | | |
| 2 | Singular | Masculine | 3 | *-it* | *daras**it*** | 11 | *b-ti-* | ***bti****drus* | 17 | *ʔi-* | *ʔidrus* |
| 2 | Singular | Feminine | 4 | *-ti* | *daras**ti*** | 12 | *b-ti--i* | ***bti****drus**i*** | 18 | *ʔi--i* | *ʔidrus**i*** |
| 2 | Plural | neutral | 5 | *-tu* | *daras**tu*** | 13 | *b-ti--u* | ***bti****drus**u*** | 19 | *ʔi--u* | *ʔidrus**u*** |
| 3 | Singular | Masculine | 6 | *Ø* | *daras* | 14 | *b-yi-* | ***byi****drus* | | | |
| 3 | Singular | Feminine | 7 | *-at* | *dars**at*** | 15 | *b-ti-* | ***bti****drus* | | | |
| 3 | Plural | neutral | 8 | *-u* | *daras**u*** | 16 | *b-yi--u* | ***byi****drus**u*** | | | |

*Note.* [*]The gender category "neutral" indicates that the affix attached to the verb has no gender distinction.

114 **Past Tense**

115      In PA, the perfective verb is used to refer to past and completed actions (Abu-Ghazaleh,

116 1983, p.125), will be referred to as past tense. Past tense is an abstract morpheme, i.e. not

117 realized by an overt affix (Benmamoun, 2000). The past tense verb consists of a stem *daras*

118 (root + vocalic infixes) and takes only suffixes which denote subject-verb agreement

119 (Benmamoun, 2000). The suffix is a discontinuous unit which simultaneously reflects

120 agreement for person, gender and number. For example, the suffix *-ti* in *daras**ti*** " you studied"

121 denotes agreement for a 2nd person feminine singular subject (form 4, Table 1).  The 3rd person

122 masculine singular *daras* " he studied" is unmarked, i.e. it does not take any suffixes (form 6,

123 Table 1).It is homonymous with the past tense verb stem. It is important to note here that unlike

124 MSA, PA verb paradigm is smaller as the subject-verb number agreement has no dual category

125 and the plural agreement suffix *-u* has no gender distinction (e.g., forms 8, 16 and 19 in Table

126 1; Jarrar et al., 2014).

127 **Present tense**

128 The imperfective verb is used to refer to an ongoing activity which could be in the present, past

129 or the future time (Benmamoun, 2000). In PA, the imperfective verb has three moods:

130 indicative, subjunctive and imperative (Abu-Ghazaleh, 1983; Shahin, 2007). In this section,

131 we focus on its indicative mood which occurs in sentences with present tense interpretation

132 (henceforth, present tense).

133      The present tense is composed of a stem *drus* (root + vocalic affix) with its subject-verb

134 agreement being realized by a prefix or a combination of a prefix and a suffix (circumfix

135 morpheme). In the PA present tense verb, the temporal information is carried by the present

136 progressive clitic *b-*, which attaches to the prefix (Abu-Ghazaleh, 1983; Jarrar et al., 2014;

137 Shahin, 2007). Person agreement is mainly realized by the prefix. Gender is also realized by

138 the prefix, except for the 2nd person singular feminine where gender is expressed by the suffix

6

139    -*i* (form 12, Table 1). Plural number agreement is realized by the suffix *-u* except for the 1st

140    person where the number is realized by the prefix *bni-* (Benmamoun, 2000). More than one

141    subject-verb agreement feature can be realized by one prefix. For instance, the prefix *byi-* in

142    **byi***d.rus* *"he is studying"* indicates a 3rd person masculine subject (person and gender

143    agreement). In other instances, the subject-verb agreement features are realized by a circumfix

144    affix, an unanalyzable unit of a prefix and a suffix. An example is the circumfix *byi—u* in

145    **byi***d.ru.s***u** "they are studying", where it denotes 3rd person plural agreement (no gender

146    distinction).

147        Finally, it is clear that the verb forms we described differ from each other in terms of

148    markedness, i.e. the morphological realization of grammatical categories (e.g., Corbett, 1991,

149    2000; Leech, 2006). In Arabic subject-verb agreement, contrasts in number agreement

150    (singular versus plural) and gender agreement (masculine versus feminine) are asymmetrical

151    in terms of their morphological realization. Rather, one member of the contrast is overtly coded

152    by an affix and therefore is "marked", whereas the other member has no overt coding (zero

153    affixes) and is therefore considered as an unmarked form. For example, if we look at the

154    opposition of singular-plural in number agreement, the singular verb is not overtly realized by

155    any affixes (e.g., *daras* "he studied"), whereas, the plural verb is realized by the affix *-u (e.g.,*

156    *daras***u** "they studied"). The singular verb is therefore considered as the unmarked/default

157    form, while the plural is the marked form. The same applies to gender agreement (only in past

158    tense) where the feminine verb is marked whereas the masculine form is unmarked.

159    **The Imperative**
160
161        Although the imperative verb has a shared structure with the present tense, the imperative

162    lacks the present progressive clitic *b-* and the initial prefix which indicates person and gender

163    agreement. The imperative only occurs in the second person , yet the person feature is

164    unmarked (Al-Aqarbeh, 2011). Although PA has a prefix for second person present tense verbs

165 (e.g., *bti-* or *bit-*), this prefix is dropped in the imperative verb. Gender and number agreement

166 of the imperative verb is denoted by the suffix (see forms 17 -19, Table 1).

167     There is little agreement on whether the default tense form in Arabic. While some

168 researchers augured that the default form is the imperative (Abdallah & Crago, 2008; Morsi,

169 2009; Omar, 1973; Qasem & Sircar, 2017), others identify it as the imperfective verb stem

170 (Aljenaie, 2010; Benmamoun, 1999). Fahim (2017) stated that the default verb can take more

171 than one form including the imperative, subjunctive or a variant of the imperfective verb stem.

172 The imperative does not have a time reference and it is considered non-finite (Ryding, 2005).

173 Similarly, Benmamoun (2000) states that the imperfective verb occurs in different contexts

174 such as sentences with past, present or future interpretation as well as in embedded non-finite

175 sentences. This evidence clearly shows that the imperfective does not morphologically carry

176 any temporal or aspectual information (Benmamoun, 1999, 2000). Although there are slight

177 morphological differences between the two forms (primarily in their prefixes), they are very

178 similar which could be the cause of inconsistency among studies. By removing the affixes of

179 the imperative (e.g., form 17, Table 1) and imperfective indicative (present tense; e.g., form

180 11, Table 1), it can be seen that both forms share the same stem, suggesting that the imperative

181 is derived from the imperfective verb (Benmamoun, 1999; Shahin, 2010; Soltan, 2007).

182

183 ***Typical and atypical verb morphology acquisition in Arabic***

184     Few studies have examined typical language acquisition in Arabic. In a longitudinal study,

185 Omar (1973) described the acquisition of phonology, syntax, and morphology in 37 Egyptian

186 Arabic-speaking children aged 6 months to 15 years. The study reported that children started

187 using verbal agreement morphology around the age of 2;3 years. Masculine and singular verbs

188 emerged earlier than feminine and plural verbs, respectively. Omar (1973) further observed

189   that, in the early stages of verb production, Egyptian Arabic-speaking children predominantly

190   used the singular masculine verb as the default verb agreement category.

191       In a longitudinal study on PA, Abdu and Abdu (1986) documented the milestones of lexical

192   development of their two children from around the age of one year up until six years. Their

193   data on the acquisition of verbs indicated a certain order in which verb forms emerge in PA. In

194   line with Omar (1973)'s findings on verb agreement, masculine and singular verbs were

195   developed earlier than feminine and plural verbs, respectively. Additionally, 3rd person verbs

196   appeared before 1st person verbs, with $2^{nd}$ person verbs appearing last. This order was limited

197   to past tense verbs, as no particular order was noted for present tense verbs.

198       Similar findings are reported by Aljenaie (2001) who followed the development of verb

199   tense and agreement in four Kuwaiti Arabic-speaking children aged 1;17 to 2;6 years for 6

200   months using spontaneous speech, elicited production and imitation tasks. All four children

201   began using present and past tense verbs at age 2;0 years. However, the order at which these

202   forms emerged in the children's language could not be determined due to the variability in the

203   data. Agreement marking emerged in a developmental pattern: masculine verbs appeared

204   before feminine verbs, singular verbs appeared before plural verbs while 1st person verbs

205   appeared first followed by $3^{rd}$ person and $2^{nd}$ person verbs, respectively. Furthermore, Aljenaie

206   (2001) noted that children showed a tendency to use unmarked forms in contexts where verb

207   infections where required. In past tense contexts, the unmarked form was the $3^{rd}$ person

208   masculine singular, wherein the present tense context the unmarked form was described as

209   being as either the imperative masculine verb or a form that was homophonous to the stem of

210   the target verb (Aljenaie, 2001). The use of the imperative was also noted in the speech of

211   typically developing Yemini (Qasem & Sircar, 2017) and Egyptian-Arabic-speaking children

212   (Omar, 1973).

213      In another longitudinal study, Aljenaie (2010) examined spontaneous speech samples of

214      three Kuwaiti Arabic-speaking children aged 1;8 to 3;1 years. An analysis of agreement errors

215      revealed that masculine verbs were used to substitute feminine verbs. These findings suggest

216      that children show a preference for the less marked, more neutral masculine form, over the

217      feminine counterpart, which is strongly and consistently marked by inflections for gender

218      (Aljenaie, 2010, p.852).  Regarding tense errors, Kuwaiti Arabic-speaking children used the

219      imperfective bare verb, a non-finite form, in place of fully inflected verbs (Aljenaie, 2001,

220      2010). This supports the view that the imperfective verb stem is most likely the default tense

221      form in Arabic (Benmamoun, 1999, 2000).

222      Basaffar and Safi (2012) investigated the developmental patterns of tense and verb

223      agreement in two to four-year-old Hijazi Arabic-speaking children. Using experimental tasks

224      alongside a spontaneous speech analysis, they replicated the findings of verb agreement

225      reported by Aljenaie (2001). Basaffar and Safi (2012) concluded that children produced present

226      and imperative forms with higher accuracy than past and future forms. However, the lack of

227      any reported accuracy levels, statistical analysis, error analysis or clear guidelines for the

228      protocol and scoring of the children's responses limits the generalizability of these results.

229      Research into morpho-syntactic difficulties in Arabic-speaking children with DLD has been

230      scarce. Drawing on her dissertation data from 2002 (Abdallah, 2002), Abdallah and Crago

231      (2008) analyzed speech samples obtained from Hijazi-Arabic speaking children with DLD 4;0

232      to 5;3 years of age. Children with DLD were less accurate than their age and language-matched

233      peers in marking tense in general. The DLD group scored significantly higher for past tense

234      than for present tense forms, which suggests that these children's difficulties with tense were

235      more pronounced in present tense verbs. Not all subject-verb agreement categories were

236      problematic for the DLD group. Present tense, feminine and 3rd person verbs, which were

237      structurally more complex were more problematic than unmarked verb forms, such as past

238 tense and masculine verb forms (Abdallah & Crago, 2008). Importantly, both TD and DLD

239 children used the imperative in place of the target tensed forms. In a few instances, children

240 used an incorrect tense form (e.g., present tense for past tense). When agreement errors

241 occurred, one agreement feature was affected (e.g., third person masculine singular replaced

242 third person feminine singular). Abdallah and Crago (2008) characterized agreement errors as

243 follows: singular verbs were used in place of plural verbs, masculine verbs for feminine verbs

244 and first person verbs for third person verbs.

245 Morsi (2009) found that Egyptian Arabic-speaking, 6-year old children with DLD  were less

246 accurate than their age and language-matched peers in the production of verbal tense and

247 agreement, with tense being more challenging than agreement. Morsi (2009) stated that, for the

248 DLD group, present tense production was more difficult than past tense production, and the

249 imperative was used as the default form when tense errors occurred.

250 Drawing on her dissertation data from 2005 (Fahim, 2005), Fahim (2017) analyzed

251 spontaneous speech samples of three Egyptian Arabic-speaking children with DLD 3;1 to 4;6

252 years of age and six TD children aged 1;0 to 4;0 years. She concluded that only subject-verb

253 agreement marking was impaired in Egyptian-speaking children with DLD while tense

254 marking was less affected (based on past tense marking). Furthermore, Fahim (2017) identified

255 three errors patterns that were noted in the speech of children with and without DLD. The first

256 error pattern involved the use of a default verb form in place of the tensed verb. The form was

257 described to resemble the imperative or the subjunctive. The second error pattern involved a

258 verb with the correct tense but incorrect agreement.  The third error involved the production of

259 non-adult target forms (pseudowords) in place of the target verbs.

260 A different pattern of results emerged in  Shaalan's (2010) dissertation which reported that

261 Qatari Arabic-speaking children with DLD (aged 4;6 to 9;4 years) were less accurate in

262 producing tense and agreement inflections than TD children. Specifically, past tense was more

11

263  problematic than present tense for the DLD group. Shaalan (2010) stressed that these results

264  were preliminary, as they were only based on a few items ($N = 12$) and noted that further

265  research was required.

266      The results of the Arabic studies have generally determined tense and verb agreement

267  aspects that are challenging for children with DLD. There is little agreement among the studies

268  on which aspect of verb morphology is more problematic for children with DLD: tense or

269  agreement. Also, it is inconclusive what the default form in Arabic is as both the imperative

270  and the imperfective bare verb forms have been suggested These questions require further

271  investigation. Besides, two other methodological issues may have contributed to different

272  findings. First,  low participants numbers ($N = 3$) in Fahim's (2017) and Morsi's (2009) studies,

273  which does not allow for generalization of their results. Second, methodological differences in

274  terms of task used: Abdallah and Crago's (2008) and Fahim's (2017) studies analyzed speech

275  samples, whereas Morsi (2009) and Shaalan (2010) used a structured elicitation task for the

276  target verb inflections. This could have resulted in differences in the number and type of verb

277  inflections included in the analyses.

278  ***Aims and Approach***

279      This study aims to extend previous Arabic studies by conducting a systematic investigation

280  of verb morphology use by children with and without DLD acquiring Palestinian Arabic (PA).

281  Determining which verb forms are potential linguistic markers of DLD in PA would inform

282  and enhance the current assessment practices of DLD in Palestine. Furthermore, data from

283  Arabic children with DLD could be used to examine the assumptions of theoretical accounts

284  of DLD and provide insights into possible underlying mechanisms of the disorder.

285      The present study examined the production of tense and subject-verb agreement in PA-

286  speaking children with DLD as compared with typically developing (TD) children by

287  investigating: 1) the production accuracy and 2) error patterns of verb tense and agreement

288  marking.

289      We predict that, compared to TD children, children with DLD will achieve lower overall

290  accuracy on the verb elicitation task. Children with DLD will have more difficulties using

291  marked verb forms compared to less marked ones. Specifically, the use of present tense verbs

292  is expected to be more challenging than past tense verbs (Abdallah & Crago, 2008; Fahim,

293  2005; Morsi, 2009). Feminine and plural verbs are predicted to be more problematic than

294  masculine and singular verbs forms (Abdallah & Crago, 2008).  Children with and without

295  DLD will use the imperative verb (Abdallah & Crago, 2008; Fahim, 2017; Morsi, 2009) or the

296  imperfective bare verb as tense default forms (Aljenaie, 2010; Benmamoun, 1999).  Finally,

297  children with and without DLD will use less marked verbs (masculine and singular verbs) as

298  default agreement forms in place of more marked, feminine and plural verbs (Abdallah &

299  Crago, 2008; Aljenaie, 2010).

300  **Methods**

301  *Participants*

302      The study was approved by the Research Ethics Committee at [REMOVED FOR

303  REVIEW].  Sixty-four Palestinian Arabic-speaking children were recruited: 14 children with

304  DLD (10 boys), aged between 48 and 94 months with a mean age of 66 months ($SD = 15.47$)

305  and 32 TD children (19 boys), aged between 36 and 96 months with a mean age of 62 months

306  ($SD = 16.88$). The groups did not differ significantly on chronological age ($t(44) = .83$, $p = .413$,

307  $d = .27$).  The TD and DLD groups were matched on non-verbal cognitive abilities as measured

308  by raw score on the Coloured Progressive Matrices (CPM; Ravens, 2007), as this test is not

309  standardized on PA-speaking children $t(42) = -.81$, $p = .423$, $d = .26$, *variance ratio* = 1.11).

310  Table 2 summarizes the raw scores of the two groups on several background measures. See

311  Appendix 1 for individual scores.

**Table 2.** *A summary of the demographic characteristics, developmental milestones and background measures for the TD and DLD groups*

| | Group | | |
|---|---|---|---|
| | **TD** N=32 | **DLD** N=14 | |
| **Demographic characteristics** | **% (*N*)** | | |
| *Mother's education* | | | |
| *Primary school* | 9.38 (3) | 14.29 (2) | |
| *High school* | 31.25 (10) | 28.57 (4) | |
| *University /college degree* | 46.87 (15) | 35.74 (5) | |
| *Postgraduate degree* | 12.5 (4) | 21.43 (3) | |
| ***Working mother*** | 39.47 (15) | 50 (7) | |
| ***Family history of communication disorders*** | 6.25 (2) | 42.56 (6)* | |
| *Developmental milestones* *Age in months* | *Mean(SD)* *Range* | | |
| *First word* | 12.69 (2.46) 9 - 18 | 24.64 (6.65)* 15 - 36 | |
| *Follow simple commands* | 17.59(3.44) 12 - 24 | 20.14 (5.95) 12 - 36 | |
| *walking* | 12.66(1.45) 10 - 15 | 12.5(1.7) 10 -16 | |
| *Background measures* *raw scores* | *Mean(SD)* *Range* | | |
| *MPU* | 4.91 (1.24) 2.41 - 7.61 | 3.58 (1.04)*** 2.19 - 6.27 | |
| ***CL-NWR*** (out of 30) | 26.84 (4.34) 16 - 30 | 15.57 (4.13)** 9 - 23 | |
| *CPM* (out of 36) | 16.67 (4.39) 8 - 23 | 15.5 (4.62) 9 – 23 | |

*Note.* **TD** = Typically Developing. **DLD** = Developmental Language Disorder. **SD** = standard deviation. **MPU** = Mean Morpheme per Utterance. **CL-NWR** = Cross linguistic Non-word Repetition. **CPM** = Colored Progressive Matrices. * = p < .05, **= *p* < .01, ***= *p* < .001

315    Children with DLD were recruited through four private speech therapy clinics located in

316    [REMOVED FOR REVIEW]. They were previously independently diagnosed with DLD by

317    qualified speech and language therapists (SLTs) who used non-standardized assessment tasks.

318    Based on a screening of clinical reports, all children in this group had primary language deficits,

319    no obvious non-verbal difficulties, used speech as their primary means of communication and

320    had no diagnoses of any speech disorder interfering with intelligibility. All children were

321    receiving language intervention services at the time of the study. The TD control children were

322    recruited through one day-care, two kindergartens and one school in [REMOVED FOR

323    REVIEW] and had no reported history of language delay/impairment and demonstrated age-

324    appropriate language skills as determined by parental/teachers' reports.

325    Parents completed a questionnaire that included questions about demographics (e.g.

326    maternal education), child's health and general development, language acquisition milestones

327    and family history of language difficulties. The questionnaire was used to ensure that all

328    children were monolingual Arabic speakers and had no evidence or reported history of hearing

329    loss, cognitive and/or neurological impairments, speech motor disorders and diagnoses of other

330    developmental disorders (e.g., Autism). Based on questionnaire results, alongside teacher

331    reports, four children did not meet the eligibility criteria for the TD group and were not tested

332    for the study.

333    Groups did not differ significantly in maternal education: $\chi^2(3, N = 46 ) = 1.03, p = .793$.

334    Children with DLD had a significantly higher frequency of family history of communication

335    disorders: $\chi^2(1, N = 46) = 6.72, p < .001$) and produced their first words significantly later:

336    $t(14.57) = 6.53, p < .001, d = 2.39$. See Table 2 for details.

337    Because the diagnosis of DLD in [REMOVED FOR REVIEW] is based on informal

338    assessments, scores on standardized language assessments were not available. Two non-

339    standardized tasks were used to verify that children with DLD had language skills that were

340    considerably below the level expected for their chronological age.

341    1.  Spontaneous narratives of 100 utterances were elicited using a wordless picture book

342        "Frog, where are you" (Mayer, 1969) to calculate the Mean Morpheme per Utterance

343        (MPU). MPU is equivalent to the Mean Length of Utterance (MLU; Brown, 1973) in

344        English. MPU is a measure of grammatical development and takes into account the

345        highly synthetic nature and rich morphology of Semitic languages. (Dromi & Berman,

346        1982). MPU is calculated by diving the total number of morphemes by the total number

347        of utterances produced in the narrative task. We followed the guidelines of counting

348        Arabic morphemes that were developed by Shaalan and Khater (2006).These guidelines

349        were adapted from the MPU calculation rules in Hebrew (Dromi & Berman, 1982).

350        Previous studies on Arabic (Abdallah & Crago, 2008; Shaalan, 2010) have also used

351        this measure to confirm the presence of developmental language impairment.

352    2.  The Arabic version of a Crosslinguistic Nonword Repetition test (CL-NWR; for a full

353        description see Abi-Aad & Atallah, 2012). The task includes 30 nonwords and was

354        scored using a whole-item approach (correct/incorrect) with the maximum score being

355        30. The task was found to have potential for the discrimination of L1 learners of

356        Lebanese Arabic with and without DLD (Abi-Aad & Atallah, 2012). The task was also

357        documented to have good diagnostic accuracy in identifying Palestinian children at risk

358        of DLD (Taha & Chondrogianni, 2017).

359    The mean MPU for the DLD group was significantly lower for the TD group: $t(44) = -3.51$,

360    $p < .001$, $d = 1.23$. Scores of the DLD group were also significantly lower than the TD group

361    on the CL-NWR test: $t(44) = -8.22$, $p < .001$, $d = 2.63$. Norms for these tasks are not established

362    for the Palestinian population. Therefore, mean raw scores are reported (see Table 2).

363 *Verb elicitation task*

364     An elicitation task was developed to test children's production of the following verb forms

365 (1) present masculine singular, (2) present feminine singular, (3) present plural, (4) past

366 masculine singular, (5) past feminine singular, and (6) past plural. The task assessed the

367 production of these morphemes in third person only.

368     Seventy-two pictures were divided into 30 pairs of experimental items and 12 filler items

369 (singular and plural noun pairs). The experimental items were further categorized into 8 paired

370 items for masculine singular verb forms, 7 paired items for feminine singular verb forms and

371 15 paired items for plural verb forms. Because present tense inflections vary in stress

372 assignment, 50% of the present tense verbs had a stressed tense prefix and 50% had an

373 unstressed tense prefix (see Appendix 2 for test items).

374     Each verb was represented by a pair of pictures showing a sequence of events that the child

375 was asked to describe. The first photograph depicted a person or a group performing an activity

376 and the second photograph depicted the same person or group having finished the activity. The

377 test items depicted actions from familiar daily routines. The task was piloted with 10 TD

378 children aged between 40 and 67 months, mean age 58 months ($SD = 9.36$) to ascertain that

379 children of this age could easily identify the verbs in the pictures. Results showed that 96.38%

380 ($SD = 8.21$) of the children were able to correctly name the pictures.

381 *Procedure*

382     Children were assessed individually in a quiet room within their nursery, school or speech

383 and language therapy clinic.  All assessments were conducted in one session by the first author

384 (a qualified Arabic-speaking speech-language therapist). Each session lasted approximately 1

385 hour and was audio-recorded using a Sony ICD-PX370 Digital Voice Recorder. The tasks were

386 administered in the following order: Coloured Progressive Matrices (CPM), narrative task,

387 Crosslinguistic Nonword Repetition Task (CL-NWR), and the verb elicitation task. Four

388   practice items were given to familiarize the children with the verb elicitation task and items

389   were presented in the same order for all participants. Throughout the task, children received

390   praise for their efforts but were not provided with any feedback about the accuracy of their

391   productions. The examiner pointed at each item and presented the child with a question that

392   created an obligatory context for the use of the target verb inflections in present tense, and past

393   tense as seen in the examples below:

394        **1) Present tense**

395        a. **Researcher:** ish   byisawwi        il-walad  halla ?

396                       What  do-PRES-3MS    the-boy   now?

397                       'What is the boy doing now'?

398        b. **Child:**    il-walad  byiyakul         buza

399                       The-boy  eat-PRES-3MS   ice-cream

400                       'The boy is eating ice-cream'

401        **2) Past tense**

402        a. **Researcher:** il-walad  xallas,              ish     sawa        il-walad?

403                       The-boy  finish-PAST-3MS,  what  do-PAST-3MS  the-boy?

404                       What did the boy do yesterday?

405        b. **Child**:    il-walad    akal          buza

406                       The-child   eat-PAST-3MS   ice-cream

407                       The child ate ice-cream

408   *Scoring*

409   The children's responses were transcribed orthographically online and were audio-recorded for

410   further analysis.  Children's productions were scored using three methods:

411   1.  **Whole-item accuracy:** The child's response was scored as correct if it was in the correct

412       tense and had the correct person, number and gender agreement. That is, the child's

413 response should be identical to the target. If the response differed from the target verb in

414 any of these elements (e.g., correct tense, person and number agreement but incorrect

415 gender agreement), it was scored as incorrect. Correct response received a score of 1 while

416 incorrect verbs received a score of zero. The maximum overall score the child could

417 achieve on the task was 60.

418 **2. Tense accuracy:** Tense accuracy was determined based on the context of the picture

419 (present vs past). The child's response was scored as correct and received a score of 1 if it

420 matched the target tense, regardless of subject-verb agreement accuracy. In case of an

421 incorrect response, the substitute tense was recorded for further error analysis.

422 **3. Subject-verb agreement accuracy:** As described above, subject-verb agreement in

423 Arabic is fusional. Therefore, determining the accuracy of subject-verb agreement is not

424 transparent. Inspection of our data revealed the following: 1) children tended to omit

425 different parts of the same prefix. For instance, 3rd person masculine singular verb **byi**drus

426 "he is studying" would be produced as *yidrus* which is a 3rd person masculine imperfective

427 bare verb or *idrus* a 2nd person masculine imperative verb. 2) Children treated the

428 discontinuous circumfix *byi—u* of the 3rd person plural present tense as separate affixes.

429 Omitting part of the circumfix meant that some but not all of the agreement features of the

430 verb were lost. For example, in the verb **byi**drus**u** "they are studying", an omission of *-u*

431 will only change number agreement from plural to singular. However, 3rd person agreement

432 will not change since the prefix *byi-* is preserved. To account for this pattern, we followed

433 Abdallah and Crago (2008)'s scoring approach. Each of the agreement features of the

434 child's response (person, number and gender) was checked against the agreement features

435 of the target verb (subject in the picture), irrespective of tense accuracy. Each agreement

436 category was scored as correct or incorrect. Hence, we had three scores: person agreement

437 accuracy, number agreement accuracy and gender agreement accuracy. Errors in each

438      element were recorded for further error analysis.  To better illustrate the scoring system,

439      we provide an example below.

| | Verb + Affixes | Affixes | Tense | Person | Number | Gender |
|---|---|---|---|---|---|---|
| **Target** | *bti*drus | *bti-* | Present | 3rd | Singular | Feminine |
| **Child's production** | *i*drus | *i-* | Imperative | 2nd | Singular | Masculine |
| **Accuracy** | Incorrect | Incorrect | Incorrect | incorrect | Correct | Incorrect |
| **Whole-item score** | Incorrect | | | | | |

440

441   *Reliability*

442      The spontaneous speech sample of randomly selected 10 children (21% of the sample) and

443   their responses on the verb elicitation tasks were scored by an independent speech and language

444   therapist to calculate inter-rater reliability. The agreement between the two raters was 100%

445   for the overall score, 98% for tense scores, 100% for gender scores, 100% for number scores,

446   97% for the person scores.  The inter-rater agreement for MPU calculations was 87%.

447   *Analysis*

448      Statistical analysis was carried out using R studio software version 3.6.0 (RStudio, 2019).

449   Raw scores were converted to percentages.  For each of the tense and agreement accuracy

450   scores, mixed-design ANOVAs were conducted with the target grammatical category as a

451   within-subject variable and group as the between-subject variable. Significance levels

452   were set at $p < .05$. Significant interactions were followed by simple effects analysis.

453   Bonferroni corrections for multiple comparisons were applied (Field, 2009, *p*.373). Type 1

454   error was controlled for by dividing the significance value ($p < .05$) by the number of

455   comparisons ($n = 4$). Hence, the significance level for all simple effects analysis was $p < .0125$.

456   **Results**

457   *Analysis 1: The production accuracy of verb tense and agreement marking*

458   Overall, the DLD group scored significantly lower than the TD group on the verb elicitation

459   task ($t(16.91) = -3.89$, $p < .001$, $d = 1.36$). Table 3 summarizes the accuracy of the verb forms

460   examined in the task.

461   **Tense accuracy**

462   Tense accuracy scores were analyzed using a 2 x 2 mixed-design ANOVA with group as a

463   between-subject factor (2 levels: DLD and TD) and verb tense as a within-subject factor (2

464   levels: past and present). Analysis revealed a significant main effect of group [$F(1, 44) = 22.36$,

465   $p < .001$, $\eta^2 = .34$], verb tense [$F(1, 44) = 23.85$, $p < .001$, $\eta^2 = .35$]. Also, the group by verb

466   tense interaction was significant [$F(1, 44) = 18.04$, $p < .001$, $\eta^2 = .29$].

467   The TD group were significantly more accurate marking past tense than present tense: $t(31)$

468   $= 2.79$, $p < .0125$, $d = .49$. Similarly, the DLD group was more accurate with past tense marking

469   than present tense marking: $t(13) = 3.97$, $p < .0125$, $d = 1.06$. Independent sample t-tests

470   revealed that the TD group was more accurate than the DLD group in using present tense:

471   $t(14.87) = -3.49$, $p < .0125$, $d = 1.27$) and past tense: $t(44) = -3.36$, $p < .0125$, $d = 1.07$.

472   Furthermore, we examined whether the production accuracy of present tense verbs varied

473   based on whether the prefix was stressed or not. Children with DLD used present tense verbs

474   with a stressed prefix with 73.33% accuracy ($SD = 29.12$). This was slightly higher than their

475   accuracy of producing verbs with unstressed prefixes which was 67.13% ($SD = 22.57$).

476   However, this difference was not statistically significant ($t(13) = -1.41$, $p = .18$, $d = .38$).

477

478

479

**Table 3.** *Mean Percentages correct (with standard deviations) of the TD and DLD groups for the target morphemes*

| | Group | |
| --- | --- | --- |
| | **TD**<br>N=32 | **DLD**<br>N=14 |
| **Overall accuracy** | 94.64 (9.06) | 77.14 (15.71)*** |
| **Tense accuracy** | 96.09 ( 6.51) | 81.42 (14.93)** |
| *Present tense* | 94.06 (9.94) | 70.24 (24.72)** |
| *Past tense* | 98.13 (4.47) | 92.38 (6.97) ** |
| **Agreement accuracy** | 97.34 (4.86) | 85.12 (12.75)* |
| **Gender agreement** | 98.96 (2.15) | 93.10 (7.33)* |
| *Masculine agreement* | 100.00 (0) | 97.32 (4.72) |
| *Feminine agreement* | 97.77 (4.6) | 88.27 (12.09)** |
| **Number agreement** | 98.7 (4.55) | 95.36 (7.11)** |
| *Singular agreement* | 100.00 (0) | 98.81 (2.48) |
| *Plural agreement* | 97.40 (6.21) | 91.91 (8.54) |
| **Person agreement**<br>*3rd person* | 99.06 (2.71) | 92.14 (10.55)** |

*Note.* **TD** = Typically Developing. **DLD** = Developmental Language Disorder.
$^{*}$ = $p < .05$, $^{**}$= $p < .01$, $^{***}$= $p < .001$

**Subject-verb agreement accuracy**

A composite percentage score of subject-verb agreement was calculated for number, gender, and person. Subject-verb agreement accuracy scores were analyzed using a 2 x 2 mixed-design ANOVA with group as a between-subject factor (2 levels: DLD and TD) and verb tense as a within-subject factor (2 levels: past and present). There was a main effect of group [$F$(1, 44) =

492 22.5, $p < .05$, $\eta^2 = .33$]. The main effect of tense was non-significant, but the interaction

493 between tense and group was significant [$F(1, 44) = 8.39$, $p < .001$, $\eta^2 = .16$]. Based on simple

494 effects analysis, the TD group marked subject-verb agreement at a similar level of accuracy for

495 past tense ($M = 97.4\%$, $SD = 5.53$) and present tense ($M = 97.29\%$, $SD = 6.07$, $t(31) = .09$, $p =$

496 .923, $d = .01$. The DLD group presented a different pattern, showing higher accuracy in

497 marking subject-verb agreement in past tense verbs ($M = 97.92\%$, $SD = 6.07$) compared to

498 present tense verbs ($M = 89.52\%$, $SD = 9.41$): $t(13) = 2.36$, $p < .05$, $d = .62$. Furthermore, the

499 TD group was significantly more accurate than the DLD group in marking subject-verb

500 agreement in present tense verbs: $t(14.87) = -3.49$, $p < .0125$, $d = 1.27$, but not in past tense

501 verbs: $t(17.07) = -2.92$, $p = .02$, $d=1.0$.

**Subject-verb agreement: gender agreement accuracy**

503  This analysis was only conducted for singular verbs as gender in verbs that end with the

504 plural morpheme *-u* is used regardless of the gender of the subject in PA. Gender agreement

505 accuracy scores were analyzed using a 2 x 2 x 2 mixed-design ANOVA with group as a

506 between-subject factor (2 levels: DLD and TD), verb tense (2 levels: past and present) and

507 gender category (2 levels: masculine and feminine) as within-subject factors. There were

508 significant main effects of group [$F(1, 44) = 17.36$, $p < .001$, $\eta^2 = .28$] and gender [$F(1, 44) =$

509 18.52, $p < .001$, $\eta^2 = .3$]. The group by gender interaction was significant [$F(1, 44) = 9.83$, p

510 $< .01$, η2$= .18$].

511  The TD group showed higher accuracy in marking masculine verbs relative to feminine

512 verbs: $t(31) = -2.74$, $p < .01$, $d = .49$). The same was observed in the DLD group: $t(13) = -3.31$,

513 $p < .0125$, $d = .88$. The TD group and DLD group did not differ significantly in their production

514 accuracy of masculine verbs: $t(13) = -2.12$, $p = .06$, $d = .84$). Yet, the DLD group was

515 significantly less accurate than the TD group in using feminine verbs: $t(14.68) = -2.85$, $p <$

516    .0125, $d = 1.04$). There were no significant interactions between group and tense, gender and

517    tense, and group, gender, and tense.

518        Further analysis was conducted for the DLD group to examine whether the production

519    accuracy of the present tense feminine prefix was affected by stress assignment. The DLD

520    group produced present tense verbs with a stressed prefix ($M = 78.57\%$, $SD = 32.31$) with

521    significantly higher accuracy than the same forms but with unstressed prefix: $M = 61.43\%$, $SD$

522    $= 29.83$, $t(13) = -2.28$, $p < .05$, $d = .61$.

**Subject-verb agreement: number agreement accuracy**

524        The number agreement accuracy scores were analyzed with a 2 x 2 x 2 mixed-design

525    ANOVA with group as a between-subject factor (2 levels: DLD and TD), verb tense (2

526    levels: past and present) and number category (2 levels: singular and plural) as within-

527    subject factors. There were significant main effects of group [$F(1, 44) = 7.36$, $p < .01$, $\eta^2$

528    $= .14$] and number [$F (1, 44) = 16.76$, $p < .001$, $\eta^2 = .28$]. The group by number interaction

529    was significant [$F(1, 44) = 4.29$, $p < .05$, $\eta^2 = .11$]. Simple effects analysis revealed that

530    the TD group did not differ in the accuracy of marking singular and plural verbs: $t(31) =$

531    $-2.37$, $p < .0125$, $d = .42$. In contrast, the DLD group was significantly less accurate in

532    marking plural verbs compared to singular verbs: $t(13) = -3.64$, $p < .0125$, $d = .97$. The

533    TD and DLD groups were not significantly different in their accuracy of marking singular

534    verbs: $t(13) = -1.79$, $p = .094$, $d = .6$ or plural verb forms: $t(19.26) = -2.44$, $p = .044$, $d =$

535    $.74$. There were no significant interactions between group and tense, number and tense,

536    and group, number, and tense.

**Subject-verb agreement: person agreement accuracy**

538        Person agreement score was based on the accuracy of marking verbs in 3rd person and were

539    analyzed with a 2x2 mixed-design ANOVA with group as a between-subject factor (2 levels:

540    DLD and TD), verb tense (2 levels: past and present) as within-subject factor. There was a

541  main significant effect of group [F (1, 44) =12.26, $p < .001$, eta = 0.22], with the TD group

542  outperforming the DLD group in person agreement accuracy. There was a main effect of tense

543  [F (1, 44) = 7.53, $p < .05$, eta = 0.15]. In general, marking 3rd person in past tense verbs (M =

544  98.62%, SD = 3.34%) was easier than marking present tense verbs (M = 95.29, SD =

545  11.06).The group by tense interaction was not significant [F (1, 44) = 2.72, $p = .08$, eta = 0.02].

546  *Analysis 2: Error patterns in verb tense and agreement marking*

547  **Tense**

548  We compared DLD and TD children on the type and frequency of the forms they used in

549  place of the target tense. The frequency of tense substitutes in the DLD group was almost as

550  twice as that of the TD group (see Table 4). The tense substitutes were either finite forms or

551  non-finite/tenseless forms. Finite substitutes involved the use of the incorrect tense (e.g., past

552  tense for present tense). The non-finite substitutes involved the use of the imperfective bare

553  verb and the imperative in place of the target tense.

554  The imperfective bare verb was most commonly used as a substitute for present tense by

555  the DLD group, followed by the imperative and incorrect tense (e.g., past for present).

556  Similarly, the most common present tense substitute in the TD group was the use of

557  imperfective followed by the imperative and incorrect tense. The frequency of present tense

558  substitutes significantly differed between groups ($\chi^2$ (2, $N=201$) = 7.05, $p < .05$).

559  The DLD group used the imperative and the present tense as substitutes for past tense verbs.

560  In rare occasions, they used the imperfective bare verb. On the other hand, the TD group

561  predominantly used the imperfective verb as a default form for past tense, followed by the use

562  of present tense. The TD group rarely used the imperative as a default form in place of past

563  tense. The frequency of past tense substitutes significantly differed between the TD and DLD

564  groups ($\chi2$ (2, $N = 54$) = 10.56, $p < .001$).

565

**Table 4.** *Frequency of tense substitutes*

| Target | Substitute type | | Group | |
|---|---|---|---|---|
| | | | TD | DLD |
| | | | *N* | *N* |
| **Present tense** | Non-finite | *Imperative* | 15 | 51 |
| | | *Imperfective* | 42 | 59 |
| | Finite | *Past tense* | 15 | 19 |
| | | **Total** | **72** | **129** |
| **Past tense** | Non-finite | *Imperative* | 3 | 15 |
| | | *Imperfective* | 10 | 4 |
| | Finite | *Present tense* | 7 | 15 |
| | | **Total** | **20** | **34** |

*Note.* **TD** = Typically Developing. **DLD** = Developmental Language Disorder.

**Subject-verb agreement**

For present tense verbs, the frequency of agreement errors in the DLD group was four times

that of the TD group (see Table 5). Inspection of the data in Table 5 reveals that some of the

agreement errors were associated with tense errors. The majority of the agreement errors were

related to the use of the imperative verb and affected person agreement only. The omission of

the prefix *byi-* often resulted in the 3rd person present tense verb being substituted by the 2nd

person imperative verb (tense and person errors). This type of error barely occurred in the TD

group. There were few instances where gender and/or number were also affected. An example

of this was the use of the 2nd person masculine imperative instead of 3rd person feminine

present tense (tense, person and gender errors).

There were also agreement errors that occurred despite using the correct tense. The majority

of errors in the TD and DLD groups affected the 3rd person plural present tense. Correct

agreement for this form requires the use of the circumfix (e.g. *byi—u* in **byi**drus**u** "they are

studying"). In both groups, it was noted that the plural morpheme *-u* was omitted which resulted

in the 3rd person singular verb (number agreement error). The 3rd person feminine singular

present tense form had the second-highest rate of errors in both groups. In both groups, this

form was substituted by its masculine counterpart (gender agreement error).

In general, the frequency of errors that affected past tense production was lower than present

tense production. As seen in Table 6, some of the agreement errors in past tense were associated

with tense errors. The majority of these errors were associated with the imperative and only

affected person agreement. For instance, when the 3rd person plural past tense was replaced

with the 2nd person plural imperative (person and tense error). In a few occurrences, gender

agreement was also affected. An example of this was the use of the 2nd masculine imperative

in place of third person feminine past tense (tense, person and gender errors).

When past tense was used correctly, the majority of agreement errors affected 3rd person

plural past tense. Both the TD and DLD group showed omissions of the plural suffix *-u* which

resulted in the 3rd person singular past tense as a substitute (number error). The 3rd person

feminine past tense had the second-highest number of errors in both groups. The omission of

the feminine suffix *-at* resulted in the 3rd person masculine as a substitute (gender error).

Table 5. *Frequency of Subject-verb agreement errors in present tense verbs*

| Actual productions | | TD Target forms | | | DLD Target forms | | |
|---|---|---|---|---|---|---|---|
| | | PRES-3MS **b-yi-**drus | PRES-3FS **b-ti-**drus | PRES-3P **b-yi-**drus**u** | PRES-3MS **b-yi-**drus | PRES-3FS **b-ti-**drus | PRES-3P **b-yi-**drus-**u** |
| **Non-finite forms** | IMPR-2FS *ʔidrusi* | | 3 | | | 8 | 2 |
| | IMPR-2MS *ʔidrus* | 4 | 2 | 6 | 15 | 2 | 2 |
| | IMPR-2P *ʔi-drus-**u*** | | | | | | 23 |
| | IMPF-3MS ***yi-**drus* | | | | | 1 | |
| **Incorrect tense** | IMPF-3FS ***ti-**drus* | | | | 3 | | |
| | IMPF-3P ***ti-**drus**u*** | | | | | 1 | |
| | PAST-3MS *daras* | | | 1 | | 3 | 1 |
| | PAST-3FS *dars-**at*** | | | | | | 1 |
| **Correct tense** | PRES-3MS ***b-yi-**drus* | | 1 | 5 | | 5 | 13 |
| | PRES-3FS ***b-ti-**drus* | | | 3 | | | 0 |
| **Total** | | **4** | **6** | **15** | **18** | **20** | **42** |

*Note.* **TD** = Typically Developing. **DLD** = Developmental Language Disorder. **PRES-3MS** = present 3rd person masculine singular. **PRES-3FS** = present 3rd person feminine singular. **PRES-3P** = present 3rd person plural. **IMPR-2FS** = Imperative 2nd person feminine singular. **IMPR-2MS** = Imperative 2nd person masculine singular. **IMPR-2P** = Imperative 2nd person plural. **IMPF-3MS** = imperfective 3rd person masculine singular. **IMPF-3FS** = imperfective 3rd person feminine singular. **IMPF-3P** = imperfective 3rd person plural. **PAST-3MS** = past 3rd person masculine singular. **PAST-3FS** = past 3rd person feminine singular.

**Table 6.** *Frequency of Subject-verb agreement errors in past tense verbs*

| | | TD | | | DLD | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | **Target forms** | | | **Target forms** | | |
| | | PAST-3MS *daras* | PAST-3FS *dars-at* | PAST-3P *daras-u* | PAST-3MS *daras* | PAST-3FS *dars-at* | PAST-3P *daras-u* |
| **Actual productions** | | | | | | | |
| | IMPR-2MS *ʔi-drus* | 2 | 3 | | 3 | 2 | |
| **Non-finite forms** | IMPR-2FS *ʔi-drus-i* | | 1 | | | 4 | |
| | IMPR-2P *ʔ-idrus-u* | | | 1 | | | 5 |
| | IMPF-3MS *yi-drus* | | | | | 1 | |
| **Incorrect tense** | PRES-3MS *b-yi-drus* | | 1 | | | 1 | 2 |
| | PAST-3MS *daras* | | 2 | 12 | | 5 | 8 |
| **Correct tense** | PAST-3FS *dars-at* | | | 3 | 1 | | 5 |
| | PAST-3P daras-**u** | | | | 1 | | |
| **Total** | | **2** | **7** | **16** | **5** | **13** | **20** |

*Note.* **TD** = Typically Developing. **DLD** = Developmental Language Disorder. **PAST-3MS** = past 3rd person masculine singular. **PAST-3FS** = past 3rd person feminine singular. **PAST-3P** = past 3rd person plural. **IMPR-2MS** = Imperative 2nd person masculine singular. **IMPR-2FS** = Imperative 2nd person feminine singular. **IMPR-2P** = Imperative 2nd person plural. **IMPF-3MS** = imperfective 3rd person masculine singular. **IMPF-3FS** = imperfective 3rd person feminine singular.

**Discussion**

605

606    This study examined verb morphology production in Palestinian Arabic-speaking children

607    with Developmental Language Disorder (DLD) and their typically developing peers (TD).

608    Using a novel verb production task, we aimed to compare children with and without DLD in

609    terms of their (1) accuracy rates and (2) error patterns of marking tense and subject-verb

610    agreement.

*The production accuracy of verb tense and agreement marking*

611

612    As predicted, there was a significant difference between children with and without DLD in

613    the percentage of correct use of tense and subject-verb agreement verb inflections, with the

614    DLD group scoring significantly lower than the TD group on the verb elicitation task. This

615    suggests that PA-speaking children with DLD have difficulties in using verbal tense and

616    agreement forms. These findings corroborate the well-documented evidence that verb

617    morphology production is an area of vulnerability for children with DLD acquiring Arabic

618    (Abdallah & Crago, 2008; Morsi, 2009; Fahim, 2017), just as it is for other languages, such as

619    English (e.g., Rice & Wexler, 1996), German (e.g., Rothweiler, Chilla & Clahsen, 2012);

620    Swedish (e.g., Hansson & Leonard, 2003), Hebrew (e.g., Leonard& Dromi, 1994) and Italian

621    (e.g., Bortolini et al., 1997).

622    Overall, the percentage of correct tense marking in the DLD group (82%) was significantly

623    lower than in the TD group. When the accuracy scores of the groups for both tense forms were

624    contrasted, a remarkable pattern emerged. Despite significant group differences, TD children

625    and children with DLD produced past tense verbs with a high level of accuracy, scoring 98%

626    and 92%, respectively. Conversely, the DLD group had significant difficulties with their use

627    of present tense, with a mean accuracy of 70%. The specific difficulty with present tense

628    production was reported previously for Arabic-speaking children with DLD (e.g., Abdallah

629    and Crago, 2008; Morsi, 2009) and it is unlike other languages where a considerable body of

630   research has reported greater difficulties with the past tense, as in English (e.g., Rice & Wexler,

631   1996). A possible factor for differences in which tense forms are affected in different languages

632   is structural complexity. For example, a higher number of errors exhibited by Hebrew-speaking

633   children with DLD in using past tense relative to present tense has been attributed to the higher

634   number of agreement features required for the past inflection (Dromi et al., 1999). Following

635   this view, in PA, the past tense form is less marked, structurally simpler than the present tense

636   (as discussed in the Introduction). For example, the verb *daras* "he studied", is formed by

637   combining the vocalic pattern *a-a* with the root *d-r-s* ( there is no overt marking of tense),

638   whereas the present form **byi***drus* "he is studying " entails the insertion of a vocalic pattern *-u-*

639   plus the addition of a prefix *byi-*, where the politic *b-* indicates present tense.

640   In terms of subject-verb agreement, children with DLD produced 85% of the verbs with the

641   correct agreement for all categories, and this was significantly lower than the TD group who

642   showed an almost ceiling effect, with their agreement accuracy being 97%. Interestingly, the

643   overall accuracy for marking agreement in the DLD group was higher than for marking tense.

644   This suggests that marking of tense was more problematic than marking subject-verb

645   agreement for our sample. Abdallah and Crago (2008) who also reported that preschool-age,

646   Hijazi Arabic-speaking children had higher accuracy scores in marking subject-verb agreement

647   (77%) compared to tense (68%).

648   Difficulty with subject-verb agreement is not surprising as the subject and verb must agree

649   on several grammatical categories including person, number and gender. Furthermore,

650   agreement in PA in fusional, where more than one agreement category is denoted by a single

651   inflection. For example, the suffix *-at* in *dars**at*** "she studied" denotes 3rd person, feminine

652   gender and singular number simultaneously. In other instance, agreement categories denoted

653   by a circumfix affix, where a prefix and suffix are required. An example of this is the circumfix

654   *byi—u* in **byi***drus**u*** where it indicates 3rd person plural agreement (no gender distinction).

655 Having to express more than one agreement category simultaneously using less transparent

656 morphemes could be contributing factors in making these forms more challenging (Dromi et

657 al., 1999).

658      Examination of gender agreement marking revealed that the DLD group was similar to the

659 TD group in producing masculine verb forms but were less accurate in producing feminine

660 verb forms. Several factors could explain the greater difficulty with marking feminine

661 agreement observed in the DLD group. This pattern was also found in Hijazi- Arabic speaking

662 children with DLD (Abdallah & Crago, 2008). First, in the typical acquisition of Arabic,

663 masculine verb forms are acquired earlier than feminine verb forms, both in production

664 (Aljenaie, 2000) and comprehension (Al-Akeel, 1998). Furthermore, masculine verb forms are

665 less marked compared to feminine forms (e.g., *daras* "he studied" versus *dars**at*** "she studied").

666      Looking at number agreement marking, the DLD group was similar to the TD group in

667 producing singular and plural verbs. However, the DLD group was less accurate in their use of

668 plural verbs compared to singular verbs. This can be attributed to the order in which these

669 forms appear in typical development. Singular verb forms are acquired earlier than plural verb

670 forms, both in production (Abdu & Abdu, 1986; Aljenaie, 2001; Basaffar & Safi, 2012; Omar,

671 1973) and comprehension (Al-Akeel, 1998; Moawad, 2006). Moreover, singular number

672 agreement is unmarked any overt inflections in present and past tense verbs whereas plural

673 number agreement is by the suffix *-u* (e.g., *daras* "he studied" versus *daras**u*** " they studied").

674      In regards to person agreement, though there were significant differences between the TD

675 and DLD groups, both groups marked 3rd person agreement with more than 90% of accuracy.

676 This high level of accuracy can be attributed to the fact that 3rd person verbs are the first to

677 emerge in the language of TD children acquiring Arabic (Abdu & Abdu, 1986; Aljenaie, 2001;

678 Basaffar & Safi, 2012). Our findings are  in contrast to the findings of Abdallah and Crago

679 (2008)  who reported that Hijazi-Arabic speaking children with DLD had a difficulty with

680     person agreement as they produced 3rd person verbs with 66% of accuracy (compared to 92%

681     in our study). This difference can be attributed to age differences: in our study the mean age of

682     the DLD group was 66 months with the oldest child being 94 months) whereas in Abdallah and

683     Crago (2008)'s study, the mean age of the DLD group was 57 months with the oldest child

684     being 63 months).

685     An interesting observation emerged regarding stressed and unstressed affixes ( for a

686     description of stress patterns in PA, see Watson, 2011). Despite the lack of significant statistical

687     differences, the DLD group produced present tense verbs with the stressed prefix more

688     accurately than verbs with the unstressed prefix. Looking specifically at the present tense

689     feminine inflection *bti-* and its allomorph *bit-*, the DLD group used present tense feminine

690     verbs with a stressed prefix with 79% of accuracy compared to 61% of accuracy for verbs with

691     an unstressed prefix. This discrepancy could possibly be attributed to the lower acoustic

692     salience unstressed prefixes.

693     Furthermore, the past tense feminine agreement morpheme *-at* as in *'dar.sat"she studied"*

694     was challenging for the DLD group in our study. This inflection occurs at the end of the word

695     as part of an unstressed syllable, making the suffix *-at* more likely to be missed by children

696     with DLD possibly due to its lower acoustic salience. This suffix was often omitted from the

697     past feminine verb forms resulting in a masculine verb *da.ras* "he studied". The plural

698     inflection *-u* as in *'da.ra.su* "they studied" was not problematic for the DLD group. The plural

699     inflection always occurs in a final unstressed syllable (Watson, 2011), which would have lower

700     acoustic salience relative to the other syllables in the verb. Stressed syllables are typically

701     louder and longer making them have a high perceptual salience. Although the accuracy of using

702     inflections was higher when they were stressed compared to being unstressed, the scores of the

703     DLD group on the stressed inflections were relatively low. This suggests that, even though

704     children with DLD may have difficulties in perceiving morphemes of low acoustic saliency,

705   this is unlikely to be the only factor that underpins their difficulties with verb morphology

706   production and further research is needed to address this issue.

707   ***Error patterns in verb morphology production***

708       Qualitative analysis revealed that the target tense forms were substituted by either finite

709   forms (incorrect tense) or non-finite/tenseless forms (imperative and the imperfective bare

710   verb). Interestingly, the TD and DLD groups appear to display the same tense substitution

711   patterns, but they differ in the frequency of their use. As predicted, the most frequent tense

712   substitution patterns in the DLD group were the use of the imperative as well the imperfective

713   bare verb. These two non-finite forms occurred with equal frequency. On the other hand, the

714   use of the imperfective bare was the most common substitute noted in the TD group, whereas

715   the imperative was used less frequently in this group. The use of incorrect tense (e.g., past for

716   present tense) was the least occurring tense error in both groups.

717   A considerable body of research has shown that the verb morphology error patterns displayed

718   by children with DLD are similar to those observed in younger TD children acquiring the same

719   language (Leonard, 2014). In fact, according to the *Extended Optional Infinitive (EOI;* e.g.,

720   Rice & Wexler, 1996; Rice, Wexler, & Cleave, 1995), children with and without DLD go

721   through an *OI* stage in which they treat marking of tense and agreement as being optional in

722   obligatory contexts (e.g., Rice & Wexler, 1996).  For example, English and German-speaking

723   children with DLD tend to use infinitives or bare stem forms instead of the target tense  (Rice

724   & Wexler, 1996). Arabic has no infinitive forms. Yet, a stage similar to OI seems to exist in

725   this language. Children with and without DLD in our study used the imperative and

726   imperfective bare verb forms instead of target tense. The use of the imperative has been

727   observed in the language of TD toddlers acquiring Yemini Arabic (Qasem & Sircar, 2017),

728   Egyptian Arabic (Fahim, 2017; Omar, 1973) and Kuwaiti Arabic (Aljenaie, 2001) as well as

729   children with DLD acquiring Hijazi Arabic (Abdallah & Crago, 2008) and Egyptian Arabic

730 (Fahim, 2017; Morsi, 2009). The imperfective bare stem has been observed in the language of

731 TD children acquiring Kuwaiti Arabic (Aljenaie, 2010)  and children with and without DLD

732 acquiring Egyptian Arabic (Fahim, 2017). In accordance with *EOI*, the use of the imperative

733 and the imperfective bare verb forms as default forms is extended for a longer period in Arabic-

734 speaking children with DLD. Both of these forms are described as being non-finite (Ajlenaie,

735 2010) or tenseless (Benmamoun 1999, 2000). Children with and without DLD in our study also

736 used finite forms instead of the target. Our findings thus emphasize that the typology of a

737 language impacts both on the type of structures affected by DLD and on the type of errors that

738 characterize the disorder. Our findings also expand on Paradis and Crago's (2004) proposal that

739 the term "default form" refers to the optional use of either non-finite or finite forms instead of

740 target tense, which is observed in children with and without DLD.

741     A closer look at the types of errors in subject-verb agreement reveals an interesting pattern.

742 The of the masculine verb instead of the feminine verb was the most dominant gender

743 agreement error in the DLD and TD groups. The error involved the omission of the suffix *-at*

744 of past tense feminine verbs, or the prefix *bti-* /*bit-* of present tense feminine verbs. This type

745 of error has been reported to Arabic-speaking children with typical language development

746 (Aljenaie, 2001, 2010; Omar, 1973) and with DLD (Abdallah, 2002; Abdallah & Crago, 2008;

747 Fahim, 2005).

748     For the TD and DLD groups, the most dominant number agreement error was the omission

749 of the plural suffix *-u* of the past tense, or the suffix *-u* of the circumfix *byi-u* in the present

750 tense verb. This pattern was observed in the TD and DLD groups.  This omission error resulted

751 in the unmarked singular verb being a substitute of the marked plural verb. The use of singular

752 verbs in placed of plural verbs has also been documented in Arabic speaking children with and

753 without DLD (Abdallah, 2002; Abdallah & Crago, 2008; Aljenaie, 2001, 2010; Omar, 1973).

754 It can be seen that, in line with our prediction, gender and number agreement errors involved

the use of the unmarked form instead of the marked form. In this case, the unmarked masculine

and singular verbs were used instead of the marked feminine and plural verbs, respectively.

This pattern has been also reported for Kuwaiti Arabic-speaking TD children (Aljenaie, 2001,

2010) and Hijazi Arabic-speaking children with DLD (Abdallah & Crago, 2008). These

findings are in support of Omar (1973)'s suggestion that the third masculine singular may be

the default verbal agreement form in Arabic.

We only examined the subject-verb agreement for 3rd person verbs. Person agreement errors

were primarily associated with tense errors. This occurred in cases where the imperative was

used instead of the target tense.  This pattern differs from the findings of Abdallah & Crago

(2008) who documented that  Hijazi Arabic-speaking children with DLD used 1st person verbs

in place of 3rd person verbs. The pattern also differs from studies reporting that the 3rd  person

verbs emerge earlier than 2nd person verbs (Abdu & Abdu, 1986; Aljenaie, 2001, 2010;

Basaffar & Safi, 2012). In the DLD group, the imperative was mostly used instead of present

tense verbs ( $N = 51$) and much less frequently in place of past tense verbs ($N = 15$). Third

person agreement is realized by the prefix of the present tense verb or the suffix of the past

tense verb, whereas, the impertive 2nd person agreement is unmarked by any affixes. Therefore,

it appears person agreement errors represent the use of the unmarked 2nd person imperative

instead of the marked 3rd person present/past tense verb.  Based on the current data and the test

items, it is difficult to determine whether the difficulty is in marking tense or person agreement.

To determine this, an  additional examination of 1st and 2nd person verb production is needed.

It is important to not that Abdallah and Crago (2008) reported that when Hijazi Arabic-

speaking children with and without DLD made tense or agreement errors, the inaccurate

production differed from the target verb by one feature only. Inspection of our data reveals a

similar pattern. Apart from the use of the imperative ( tense and person error), the majority of

errant productions of the TD and DLD groups differed from the target by one feature. These

780   errors are referred to as being "near misses" and have been documented in richly inflected

781   languages such as Hebrew and Spanish ( for a review, see Leonard, 2014). Another important

782   observation is that most errors in the TD and DLD groups were made in forms in which

783   agreement is realized by a circumfix morpheme. In our study, this form was the 3$^{rd}$ plural

784   present tense verb in which tense, person and number agreement are expressed by the circumfix

785   *byi--u*. The children in our study treated the circumfix affixes as separate units. The most

786   common error was the omission of the prefix *byi-* while retaining the suffix *–u*. A similar

787   pattern was noted in Kuwaiti Arabic in which the 3$^{rd}$ plural present tense verb is expressed with

788   the circumfix *yi--oon.* Aljenaie (2001) found that the TD Kuwaiti Arabic-speaking children

789   tended to omit the prefix *yi-* and maintain the suffix *-oon*. The second error pattern in our study

790   involved omission of the plural suffix *-u* while retaining the prefix, and this pattern was

791   documented in Hijazi Arabic-speaking children with DLD (Abdallah & Crago, 2008) and was

792   also observed in TD Kuwaiti Arabic-speaking children (Aljenaie, 2010).

793   *Clinical implications*

794   Given the lack of standardized Arabic assessments for PA, the diagnosis of DLD is based

795   on informal evaluation procedures that are combined with subjective clinical judgments, which

796   may lead to variations and inconsistences across speech and language therapists (SLTs) as to

797   which structures are targeted in the assessment of DLD. The results of our study provide SLTs

798   with a description of specific verb morphology difficulties in Arabic-speaking children with

799   DLD. Significant differences between children with DLD and TD controls were found in using

800   present tense and verbs with feminine inflections. The findings indicate that SLTs should

801   consider targeting these structures in the assessment and intervention of PA children with DLD.

802   *Limitations*

803   One of the limitations was the small sample size of the DLD group. This is due to the limited

804   number of clinics in [REMOVED FOR REVIEW] from which this group was recruited. Future

805    studies are recommended to include larger sample sizes. The study provides results about the

806    deficits of verb morphology production only and no data on children's comprehension of verb

807    morphology. To achieve a full understanding of the underlying mechanisms of DLD, other

808    aspects of verb morphology should be examined. These should include comprehension and

809    grammaticality judgment tasks, tasks investigating 1st and 2nd person morphemes and tasks

810    which target derivational as well as inflectional morphology.

811    *Conclusion*

812    The findings show that Palestinian Arabic-speaking children with DLD present with deficits

813    in the production of verb morphology relative to typically developing children. Inflected verbs

814    with increased markedness including present tense and feminine verb form were more

815    challenging for the DLD group than past tense, masculine verb forms, respectively. For the TD

816    and DLD groups, the most frequent tense and agreement error patterns included omissions of

817    the target morphemes. The omission of target morphemes often resulted in the children

818    producing structurally simpler (less marked) verb forms instead of marked verb forms. And

819    although it seemed that the DLD group was more accurate with some stressed than unstressed

820    forms, the scores of the DLD group were still lower than the TD group. Future studies would

821    need to include larger sample sizes to increase statistical power and generalizability of the

822    findings, investigate other aspects of verb morphology, including both production and

823    comprehension consider other language domains, such as syntax, phonology and semantics

824    and employ longitudinal designs to provide more in-depth knowledge of Arabic language

825    acquisition.

829    children, and in particular, [REMOVED FOR REVIEW] for their help in recruiting children

830    with DLD.

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**APPENDIX 1**

Individual raw scores of the background measures and the verb elicitation task for the TD and DLD groups

| subject | gender | age | *MPU* | *CL-NWR* (score out of 30) | *CPM* (score out of 36) | % of correct verbs |
|---------|--------|-----|-------|---------------------------|-------------------------|--------------------|
| DLD1  | M | 67 | 2.88 | 17 | 20 | 55 |
| DLD2  | M | 69 | 3.14 | 19 | 21 | 70 |
| DLD3  | F | 84 | 4.06 | 16 | 23 | 60 |
| DLD4  | F | 85 | 4.1  | 12 | 20 | 51 |
| DLD5  | M | 52 | 3.21 | 13 | 12 | 90 |
| DLD6  | M | 58 | 3.12 | 10 | 18 | 65 |
| DLD7  | M | 50 | 2.62 | 11 | 11 | 68 |
| DLD8  | M | 94 | 6.27 | 23 | 19 | 91 |
| DLD9  | M | 54 | 3.22 | 16 | 12 | 88 |
| DLD10 | M | 48 | 2.19 | 9  | 10 | 78 |
| DLD11 | F | 56 | 3.21 | 16 | 12 | 86 |
| DLD12 | M | 66 | 4.98 | 18 | 16 | 96 |
| DLD13 | M | 61 | 3.36 | 21 | 9  | 100 |
| DLD14 | F | 89 | 3.77 | 17 | 14 | 78 |
| TD1   | M | 57 | 6.47 | 30 | 19 | 100 |
| TD2   | M | 59 | 5.21 | 30 | 14 | 98 |
| TD3   | M | 71 | 4.19 | 30 | 18 | 100 |
| TD4   | F | 75 | 5.46 | 30 | 16 | 100 |
| TD5   | F | 42 | 2.97 | 19 | 8  | 91 |
| TD6   | M | 60 | 5.1  | 30 | 17 | 100 |
| TD7   | F | 66 | 5.26 | 29 | 21 | 100 |
| TD8   | F | 56 | 3.46 | 28 | 18 | 96 |
| TD9   | F | 84 | 6.31 | 30 | 21 | 100 |
| TD10  | F | 54 | 3.93 | 30 | 14 | 93 |
| TD11  | F | 56 | 5.11 | 28 | 15 | 96 |
| TD12  | F | 36 | 2.41 | 16 | NA | 65 |
| TD13  | M | 83 | 5.89 | 30 | 22 | 100 |
| TD14  | F | 54 | 4.9  | 27 | 17 | 98 |
| TD15  | M | 48 | 3.93 | 24 | 15 | 96 |
| TD16  | M | 85 | 6.01 | 30 | 21 | 100 |
| TD17  | M | 80 | 5.68 | 30 | 15 | 100 |
| TD18  | M | 79 | 5.13 | 30 | 19 | 98 |
| TD19  | M | 68 | 4.88 | 29 | 19 | 98 |
| TD20  | F | 51 | 3.79 | 27 | 14 | 98 |
| TD21  | M | 65 | 3.92 | 25 | 21 | 98 |
| TD22  | M | 96 | 7.61 | 30 | 23 | 100 |
| TD23  | M | 87 | 6.58 | 30 | 20 | 100 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **TD24** | M | 41 | 2.83 | 19 | 9 | 80 |
| **TD25** | M | 90 | 7.24 | 30 | 20 | 100 |
| **TD26** | M | 73 | 5.96 | 30 | 18 | 100 |
| **TD27** | F | 39 | 3.87 | 19 | NA | 73 |
| **TD28** | F | 43 | 4.21 | 21 | 8 | 80 |
| **TD29** | F | 47 | 4.53 | 25 | 10 | 91 |
| **TD30** | M | 49 | 4.69 | 23 | 15 | 95 |
| **TD31** | M | 43 | 3.91 | 20 | 10 | 78 |
| **TD32** | M | 55 | 5.45 | 30 | 23 | 100 |

*Note.*. **MPU** = Mean Morpheme per Utterance. **Cl-NWR** = Crosslinguistic Non-word Repetition. **CPM** = Colored Progressive Matrices.
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# APPENDIX 2

List of verbs used in the verb elicitation task

| Pair | Number Agreement | Gender Agreement | Tense Present (A) | Past (B) |
|---|---|---|---|---|
| | | | A. bit.qatˤ.tˤiʕ*<br>**cut**-PRES-3FS | A. qatˤ. tˤa. ʕat<br>**cut**-PAST-3FS |
| | **Practice items** | | B. byir.bu.tˤu<br>**tie**-PAST-3P | B. ra.ba.tˤu<br>**tie**-PAST-3P |
| **1.** | | | 1. biyoː.kil<br>**eat**-PRES-3MS | 1. ʔa.kal<br>**eat**-PAST-3MS |
| **2.** | | | 2. byiʃ.rab<br>**drink**-PRES-3MS | 2. ʃi.rib<br>**drink**-PAST-3MS |
| **3.** | | | 3. byi.ɣas.sil<br>**wash**-PRES-3MS | 3. ɣas.sal<br>**wash**-PAST-3MS |
| **4.** | | **Masculine** | 4. biy.maʃ.ʃit<br>**brush**-PRES-3MS | 4. maʃ.ʃat<br>**brush**-PAST-3MS |
| **5.** | | | 5. byir.sum<br>**draw**-PRES-3MS | 5. ra.sam<br>**draw**-PAST-3MS |
| **6.** | | | 6. byi.law.win<br>**paint**-PRES-3MS | 6. law.wan<br>**paint**-PAST-3MS |
| **7.** | | | 7. byi.ɣib.ri<br>**sharpen**- PRES-3MS | 7. ba.ra<br>**sharpen**- PAST-3MS |
| **8.** | | | 8. byif.taħ<br>**open**-PRES-3MS | 8. fa.taħ<br>**pray**-PAST-3MS |
| **9.** | **Singular** | | 9. bit.far.ʃi<br>**brush**-PRES-3FS | 9. far.ʃat<br>**brush**-PAST-3MS |
| **10.** | | | 10. btik.tub<br>**write**-PRES-3FS | 10. kat.bat<br>**write**-PAST-3FS |
| **11.** | | | 11. bit.qusˤ<br>**cut**- PRES-3FS | 11. qasˤ.sˤ.at<br>**cut**-PAST-3FS |
| **12.** | | **Feminine** | 12. bit.naʃ.ʃif<br>**dry**-PRES-3FS | 12. naʃ.ʃa.fat<br>**dry**-PAST-3FS |
| **13.** | | | 13. bitʃ.rab<br>**drink**- PRES-3FS | 13. ʃir.bit<br>**drink**-PAST-3FS |
| **14.** | | | 14. btaʕ.tˤiː<br>**give**- PRES-3FS | 14. aʕ.tˤat<br>**give**-PAST-3FS |
| **15.** | | | 15. bit.taʕ.mi<br>**feed**- PRES-3FS | 15. taʕ.mat<br>**feed**-PAST-3FS |
| **.16** | | | 16. byil.bi.su<br>**wear**-PRES-3PL | 16. lib.su<br>**wear**-PAST-3PL |
| **17.** | | | 17. byi.nadˤ.fu<br>**clean**-PRES-3PL | 17. nad.dˤa.fu<br>**clean**-PAST-3PL |

| | | | |
|---|---|---|---|
| **18.** | | 18. bi∫.ra.bu<br>**drink**-PRES-3PL | 18. ∫ir.bu<br>**drink**-PAST-3PL |
| **19.** | | 19. byi.law.nu<br>**paint**-PRES-3PL | 19. law.wa.nu<br>**paint**-PAST-3PL |
| **20.** | | 20. byik.tu.bu<br>**write**-PRES-3PL | 20. ka.ta.bu<br>**write**-PAST-3PL |
| **21.** | | 21. byin.fu.χu<br>**blow**-PRES-3PL | 21. na.fa.χu<br>**blow**-PAST-3PL |
| **22.** | | 22. byil.ʕa.bu<br>**play**-PRES-3PL | 22. liʕ.bu<br>**play**-PAST-3PL |
| **23.** | | 23. bin.∫u.ru<br>**hang**-PRES-3PL | 23. na.∫a.ru<br>**hang**-PAST-3PL |
| **24.** | **Plural** | 24. byif.ta.ħu<br>**open**-PRES-3PL | 24. fa.ta.ħu<br>**open**-PAST-3PL |
| **25.** | | 25. byi.ma∫.tu<br>**brush**- PRES-3PL | 25. ma∫. ∫a.tu<br>**brush**- PAST-3PL |
| **26.** | | 26. byi.far.∫u<br>**brush-** PRES-3PL | 26. far.∫u<br>**brush-** PAST-3PL |
| **27.** | | 27. byir.bu.tu<br>**tie-** PRES-3PL | 27. ra.ba.tu<br>**tie-** PAST-3PL |
| **28.** | | 28. byi.na∫.fu<br>**dry-** PRES-3PL | 28. na∫.∫a.fu<br>**dry-** PAST-3PL |
| **29.** | | 29. byi.qusˤ.sˤu<br>**cut**- PRES-3PL | 29. qasˤ.sˤu<br>**cut**- PAST-3PL |
| **30.** | | 30. byi∫.la.ħu<br>**takeoff**- PRES-3PL | 30. ∫il.ħu<br>**takeoff**- PAST-3PL |

*Note.* PRES-3MS = present 3rd person masculine singular. PAST-3MS= past 3rd person masculine singular. PRES-3FS= present 3rd person feminine singular. PAST-3FS= past 3rd person feminine singular. PRES-3P= present 3rd person plural.PAST-3P= past 3rd person plural.
*underlined syllable are stressed.

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