Acquisition of verb and sentence structure in Palestinian Arabic:

Typical and atypical development

A Proposal for a Doctoral Thesis in Literature

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רכישת הפועל והמשפט בערבית הפלסטינית:

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פרופ׳ אלינור סאיג חדאד

פרופ׳ שרון ארמון לוטם

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Introduction

In the study of language acquisition, what is known about Typical Language Development (TLD) vs. Developmental Language Disorder (DLD) is based mainly on assessments of speech in spontaneous contexts using language-specific tools. To the best of our knowledge, no studies have been carried to date on the development and assessment of language in Palestinian Arabic (PA) speaking children with TLD and with DLD using an analysis of spontaneous samples of speech. The goal of the present study is thus to investigate language development, and specifically syntactic skills, among PA speaking children with DLD compared to children with TLD. The proposed study aims to develop an assessment index of syntactic skills as a research instrument which will enable an evaluation of the morpho-syntactic complexity that is unique to this language variety as it is produced by children in spontaneous contexts. The results are expected to add theoretical knowledge on language acquisition in general and acquisition of syntactic skills in PA, a specific vernacular of Colloquial Arabic.

This research proposal is broken down into three chapters: (1) literature review, (2) methodological premises and (3) results of a pilot study that aims to validate the study's main research tool.

The first chapter reviews the literature dealing with the acquisition of verbs and sentence structure both in general and in PA specifically; then follow the presentation of research findings regarding the acquisition of verbs and sentence structure amongst children with DLD and the description of the *Index of Productive Syntax* (IPSyn) as a reliable and sensitive research instrument for evaluating both acquisition types. The second chapter describes the procedure of the proposed study: comparing children with DLD to children with TLD of various age ranges; the criteria which served for a previous developmental study on this particular dialect (Abu Shakra, 2012) will also serve for the comparison of both groups of speakers in the current study. And the third chapter discusses the procedure and results of a pilot study that was conducted, and which serves as the basis

for the decision to focus the current study on the acquisition and development of verbs and sentence structure.

1.0. Literature Review

1.1. Verb Acquisition

The verb is a central lexical category of human languages (Schachter, 1985). It expresses the relationships between Noun Phrases and carries morpho-syntactic, lexico-semantic, and temporal information. Verbs constitute the "architectural centerpiece" of grammar, as they determine the argument structure of the sentence (Golinkoff & Hirsh-Pasek, 2006, p. 4). Since verbs label diverse semantic categories such as actions, events, processes, and states, they are more difficult to conceptualize by children than concrete nouns (Gentner, 1982; Golinkoff & Hirsh-Pasek, 2008). Nonetheless, in most of the world's languages, acquisition of the verb system and verb inflection is achieved by the age of three, regardless of the complexity of the morphological system of the target language (Bittner, Dressler, & Kilani-Schoch, 2003; Tomasello, 2006). Moreover, children appear to approach verb learning in ways which vary between languages based on specific structural characteristics of their native language such as the differential typological organization of verb morphology and lexical semantics (Kibrik, 2012; Koptjevskaja-Tamm, 2012; Talmy, 1985; Saiegh-Hadad, Hadieh, & Ravid, 2012).

The process of verb acquisition presents a number of challenges for children. **First**, children have to identify the verb within the utterance using prosodic and phonological cues that allow them to divide the linguistic units, including verbs, into levels of frequency (Golinkoff & Hirsh-Pasek, 2006). In this context, Mintz (2006) distinguishes between two levels: (1) utterances that include two different words that belong to the same category and (2) conjugation morphemes that relate to word suffixes. **Second**, children need to identify, isolate, and classify the events and situations and find ways to conceptualize them using cognitive, social, and linguistic abilities, which allow for the

interaction of activities. **Third**, children have to map the words onto actions and action categories that are represented by the verb. All of the above challenges may vary according to language-specific features; children, therefore, have to acquire verbs in specific ways that relate to their native language (Talmy, 1985).

Gleitman, Cassidy, Nappa, Papafragou, & Trueswell (2005) and Snedeker & Gleitman (2004) emphasize that syntactic structure carries semantic elements in the acquisition of verb meanings, especially for light verbs or mental verbs that tend to appear with prepositional phrases or complementary sentences that provide additional information regarding what is happening. The syntactic structure is less informative in the acquisition of verbs that represent concrete actions and that tend to be identifiable in real-world contexts.

The derivational morphology in Arabic is quite similar to that of other Semitic languages, such as Hebrew, and follows the morphological pattern and root principle. Lexical systems are constructed so that they are semantically and morphologically related to the root. Tarabani (2006) studies the distribution of verb patterns in spoken Palestinian Arabic for five Palestinian Arabic-speaking age groups with TLD from the ages of two to six, and then in fourth grade for comparison. She reported that the most common pattern for all age groups was *fa'ala* (pattern CaCaCa), and the second most frequent was *fa''ala* (CaCCaCa). In her analysis, Tarabani (2006) does not refer to the order of acquisition as a developmental aspect. The current study thus wishes to investigate the acquisition of language from a developmental viewpoint.

Abdo & Abdo (1991) investigate the language development of two Palestinian Arabic-speaking children from ages one to five. They find that concrete nouns are acquired earlier than abstract nouns, and that function words and pronouns are acquired later than nouns and verbs. The authors report that words related to tense are acquired later than words related to place and that adjectives are acquired prior to the verbs derived thereof. Although Abdo & Abdo (1991) collate their data in general categories, namely noun, verb, adjective, etc., they do not analyze these categories

internally. With respect to verbs, analysis into the different verb patterns is very important in Arabic but is missing from their analysis. In the proposed study, I wish to explore the relative chronology of acquisition of the verb patterns in spoken Arabic.

1.2. Acquisition of sentence structure

The acquisition of various aspects of syntax occurs in different phases, each of which may consist of different patterns of word order. Three aspects are often used to express the relationships between the nominal and verbal phrases in the sentence: (1) word order, (2) markers of grammatical relationships and case, and (3) agreement (morphemes and conjugations). It is generally assumed that every child has access to these three aspects in expressing the relationships between the components of the sentence. Based on adult and peer-input, the order in which the child gains command over them is determined by natural and universal mechanisms (Slobin, 1985). These mechanisms help the child crack the unique syntactic parameters of the target language during childhood.

According to Berman (1997), the course of development goes from the mastery of word order to an explicit indication of the grammatical relationships between parts of a sentence, primarily between the verb and noun phrases. At the end of the process, the child achieves command over conjugations of time and agreement. In Shatz's (1987) and Berman's (1994) view, from the initial stages of language acquisition, the child utilizes a wide variety of bootstrapping mechanisms for the acquisition of new knowledge in the language, such that each component of the language is utilized to master new knowledge.

Akhtar (1999) investigate the acquisition of three basic syntactic structures by three age groups of English-speakers: 2;8, 3;6, and 4;4, going from canonical Subject-Verb-Object (SVO) through non-canonical Subject-Object-Verb (SOV) and Verb-Subject-Object (VSO). Results showed that almost all three groups consistently created utterances in the SVO order using the same verbs that they heard in the earlier exposure. However, the non-canonical structures differed across the three

age groups: one out of 12 children in the youngest group, 4/12 in the middle group, and 8/12 in the oldest group formed sentences in a non-canonical fashion of SOV or VSO.

Among studies exploring spontaneous usage of spoken Arabic, Friedmann and Costa (2011) studied the acquisition of sentence structure in four different languages: Palestinian Arabic, Hebrew, European Portuguese, and Spanish. For Palestinian Arabic, 20 children with Typical Language Development participated, aged 1;9–3;0 years. Two experiments were conducted, one that examined acquisition of SV and VS structures, and the other of SVO and VSO structures. Their results revealed that the younger children (two-years-old) used the VS structure significantly more than the SV, while the older children used both the SV and VS structures to a similar extent. The same results were true for the SVO and VSO structures. The authors note that these results are particularly surprising in light of the fact that adult speakers of Palestinian Arabic use the SV pattern more frequently. This, according to the authors, seems to indicate that children in their initial stages of development use VS more than SV not due to input frequency, but rather due to basic their cognitive condition and to logical and syntactic considerations. These results are consistent with Khamis-Dakwar (2011), who examined the acquisition of SVO and VSO in Palestinian Arabic through a repetition task amongst 15 Palestinian Arabic-speaking children, aged 1;7–3;0. Her findings show that the VSO order is mastered earlier, and is preferred over SVO amongst the younger group. On the other hand, SVO appears later, even though it is common in adults' language. She explains these findings within the framework of movement acquisition of the "head" of the phrase. That is, young children do better in VSO, and with age, master both types of constituent orders. Abdo and Abdo (1991), however, report that the VSO and SVO word orders conveying the same meaning appear at age 2;1, early relative clauses appeared age 2;5, and conjoined clauses appear at age 3;0. Word order is an indicative of the acquisition of other syntactic features as well, as manifested by child use.

To the best of our knowledge, the development of language among Palestinian Arabic-speaking children has not been investigated to date, in particular the differences in the development of the verb phrase and of sentence structure.

1.3. Children with Developmental Language Disorder (DLD)

Children with DLD exhibit significant deficits in language competence, although they exhibit normal hearing, receive age-appropriate scores on nonverbal intelligence tests, and show no signs of serious neurological deficits or disease (Bishop, 2014b; Leonard, 2014). Many of these children have minor weaknesses in specific motor and nonlinguistic cognitive processing. This has led some researchers to suggest alternative terms for these children (e.g., primary language impairment, developmental language disorder). Nonetheless, DLD has remained the most frequently used term for describing these children over the past 30 years (Bishop, 2014a; Leonard, 2014)

The focus of research on the lexical abilities of children with DLD has recently shifted from nouns (Leonard, 2014b; Rice, 1991) to verbs due to the generally recognized importance of verbs in language development (Tomasello, 1992). Contrary to nouns, which convey object-reference concepts (e.g., things, persons, etc.), verbs refer to relational concepts and specify conceptual roles that provide a framework for the organization of the sentence. This role implies their syntactic significance in children's grammatical development (Pinker, 1989; Tomasello, 1992). Investigations of verb acquisition indicate that the process poses a particular learning challenge for children with DLD. More specifically, children with DLD were found to use more uninflected verb forms, and their verb diversity is more limited than that of age-matched controls (Fletcher & Peters, 1984). Studies report variability in grammatical categories for children with DLD, who demonstrate difficulty with verb phrases more than with noun phrases (Kan & Windsor, 2010). These children have limitations in the verb lexicon in comparison to age-matched and language-age-matched children (Rice & Bode, 1993; Watkins, Rice, & Moltz, 1993). For example, Eisenberg (2004), evaluated the use of infinitive verbs by five-year-old children with DLD in English, in comparison with a group of two-three-year-

old typically developing children. She found that DLD children used fewer verbs than children with TLD. Other studies similarly report that children with DLD use fewer complex syntactic structures in their spontaneous speech compared to children with TLD (Marinellie, 2004; Van der Lely, 1998). Additionally, children with DLD demonstrate a lack of flexibility in the use of syntactic structures and switch verbs less frequently than typically developing children (Thordardottir & Weismer, 2002). In a longitudinal study documenting the acquisition and development of complex syntax of three-seven-year-old children with DLD it was reported that only at age 5.9 did complex syntactic forms appear in their speech. Further, this speech included omission errors that continued until age 7:10 years (Schuele & Dykes, 2005). It thus appears that children with DLD display distinct differences in terms of the acquisition of particular language patterns.

Studies on the acquisition of Palestinian Arabic by children with DLD have so far dealt mainly with phonology and the lexicon (Saiegh-Haddad & Ghawi-Dakwar, 2017). Morphology was also rarely studied. Abdalla and Crago (2007) investigated verb inflections in the Saudi Arabian dialect among SLI children aged 4-6 and compared their execution with two control groups: one of the same chronological age and the other of the same language age (based on MLU aggregate). This study showed that children with specific language impairment struggled to inflect verbs generally and particularly in the third person feminine (singular and plural) and they explained their findings in the fact that use of the third person includes gender, person and number. More on the acquisition of verb inflection, in a longitudinal study carried out in Kuwaiti Arabic Aljenaie (2010) found that while the use of the first person is acquired early children with specific language impairment are likely to resort to the third person for all uses since it is the least marked by morphology. Other studies on language acquisition of Arabic with children with DLD, such as Abdalla and Crago, 2008; Aljenaie, 2010; Abdalla et al., 2013; Fahim, 2017; Mahfoudhi and Abdalla, 2017; Qasem and Sircar, 2017; Shaalan, 2017 have also focused on morphology but none addresses the acquisition of syntax. Therefore, the proposed research is unique in its focus so far.

1.4 Index of Productive Syntax

A traditional method of measuring children's language production is by the length of the utterance (Brown 1973). Syntactic complexity, however, is not reflected directly in the length of the utterance. In order to address this shortcoming, Scarborough (1990) developed the Index of Productive Syntax (IPSyn) as a research instrument which measures morphological and syntactic structure complexity. It was developed as a research tool that would enable documentation of syntactic development of children based on the analysis of language samples of preschool children. The IPSyn has an advantage of measuring complexity in four categories: noun phrase, verb phrase, question and negation, and sentence structure. Since Scarborough (1990) developed the IPSyn, it has been used as a measure of language development for a variety of groups of children, including those with TLD (Horton-Ikard, Weismer, & Edwards, 2005; Rispoli & Hodley, 2001) and those with DLD (Hewitt, Hammer, Yont, & Tomblin, 2005; Rice, Redmond, & Hoffman, 2006). For example, Hadley (1998a) used the IPSyn to evaluate the morpho-syntactic development of 20 English-speaking two-three-year-old children with DLD compared to those with TLD. Results showed that the IPSyn was a sensitive measure for evaluating language development for the two groups.

2.0. The Current Study

In order to understand the developmental route in the acquisition of syntax and the specific syntactic difficulties that children with DLD speaking PA encounter, the following research questions will be addressed:

2.1. Research Questions

1. What are the specific areas of difficulties among DLD children?

2. What is the order of acquisition of the verb phrase among TLD children?

3. What is the order of acquisition of sentence structure among TLD children?

4. What are the differences in verb phrase production between TLD and DLD children?

5. What are the differences in sentence structure production between TLD and DLD children?

2.2. Research Hypotheses

The following research hypotheses relate to Palestinian Arabic-speaking children acquiring Verb Phrase Structure (VPSt) and Sentence Structure (SSt):

1. Simple VPSts are acquired at a younger age, and complex VPSts are acquired at later ages.

2. Simple SSts are acquired at a younger age, and complex SSts are acquired at later ages.

3. Children with TLD produce more complex VPSts compared with DLD children.

4. Children with TLD produce more complex SSts compared with DLD children.

2.3. Method

2.3.1 Participants

Data for the TLD children will consist of a database that was created for the Master's thesis of Naila Tallas Abu Shakra (2012). It includes 98 participants sub-divided into five six-month age groups, from 2;6 to 5;0 years of age. The subjects attended preschools and kindergartens in the Northern Triangle of Israel (around Kafr Qara, Ar'ara, Baqa-Jatt and Umm al-Fahm). In order to cover all preschool ages, including kindergarten, we will collect data from an additional group of 40 children with TLD aged 5–6 years and 40 children with DLD, of which 20 are aged 4–5 years and another 20 aged 5–6 years.

2.3.2. Database

The database of Naila Tallas Abu Shakra (2012) was constructed as follows. During a session that lasted about one hour, spontaneous language samples were collected from each child. Five different elicitation tasks for encouraging the children to speak were used during the course of the session: free

play with toys, presenting the child with a pamphlet with pictures, reading a story to the child, showing the child two big pictures, and a structured interview-discourse. The sessions were recorded and transcribed.

In this study, we will focus only on the utterances taken from a description of the pictures:
1. Ten pictures were chosen from a booklet of pictures, which was developed within the framework of the "Kesher" project as part of an instruction pamphlet for parents which focuses on the development of communicative language in early childhood (Dromi, Fuks, Ringwald-Frimerman, & Zohar, 2003). The pictures describe situations related to everyday life of young children.
2. Posters: two large pictures that include a large number of items depicting village life (livestock, field plowing, home life, garden and chicken coop) and city life (what happens on a main road in the city including: people moving, shops, car types, hotel restaurant, school and more ...)

Soon after the recording was completed, each language sample was transcribed using transliteration with Arabic letters in dialect spelling. The examiner's utterances were also recorded and transcribed, as well as an accurate description of the recording context.

2.3.3 Assessment tools

2.3.3.1. Adaptation of IPSyn to PA:

To adapt the IPSyn (Scarborough, 1990) from the original English-oriented tool to Palestinian Arabic, a comparison was made between each and every item of the measure in all categories. The adaptation

process revealed specific aspects of Palestinian Arabic with respect to its rich verb morphology. In view of the structural gap, we enriched the existing model with categories to better suit the structure of PA. For example, while the verb category in the original measure (Scarborough, 1990) contained 17 items, our own version contains 41 such items (for the full PA-IPSyn see Appendices).

2.3.2.3. ALEF-SL:

The ALEF (Arabic Language: Evaluation of Function) screening tool for early child language development was designed to assess language skills among speakers of the Saudi Arabian dialect by a US team according to three modules: ALEF-SL (Spoken Language, the core module), ALEF-WL (Written Language), and ALEF-CP (Language-Related Cognitive Processes) (Kornilov et al., 2016). The battery was adapted to speakers of Palestinian Arabic (PA-ALEF Saiegh-Haddad & Ghawi-Dakwar, 2017). Within the ALEF module, however, the ALEF-SL module assesses language knowledge partly related to exposure to written language input. In effect, the assessment of lexicon relates to words acquired through *everyday* experience vs. words learned within the framework of *educational* experience. It thus becomes clear that for the current research, the ALEF-SL module within ALEF screening tool is relevant only for one language participant group, namely participants aged 5-6. In this age group, both IPSyn and PA-ALEF will be used to assess language development.

3.0. Pilot study

In order to ascertain the validity of the proposed study, a pilot study was conducted.

3.1. Participants

From the 98 participants in Abu Shakra's (2012) study, ten language samples were selected from TLD children – two from each age group of the five six-month age groups (2;6–5). For a preliminary

examination of the discrepancy between typical and atypical development, language samples were collected from three DLD participants aged four to six who were diagnosed for language delays.

3.2. Procedure

The picture-based narratives were analyzed for their morphological and syntactic features. With respect to morphology, were analyzed (1) noun inflection within the NP and (2) verb conjugation within the VP. With respect to syntax, question and negation structures, word order, phrase complexity, alongside other features of sentence structure were examined.

3.3. Results

The preliminary results (Figure 1) indicate a positive correlation between the chronological age of participants with TLD and the measure. For example, the Verb category displays increasing results of 5, 7, 7.5, 10 and 13.5 for age groups of 2.6–3, 3–3.6, 3.6–4, 4–4.6 and 4.6–5 respectively. What this means, is that the score increases with the increase in the participant's age (see Figure 1 below: N=noun phrase; V=verb phrase; Q=question; S=sentence). However, participants with DLD display a significant delay in the development of various syntactic categories, as shown in Figure 2 below.
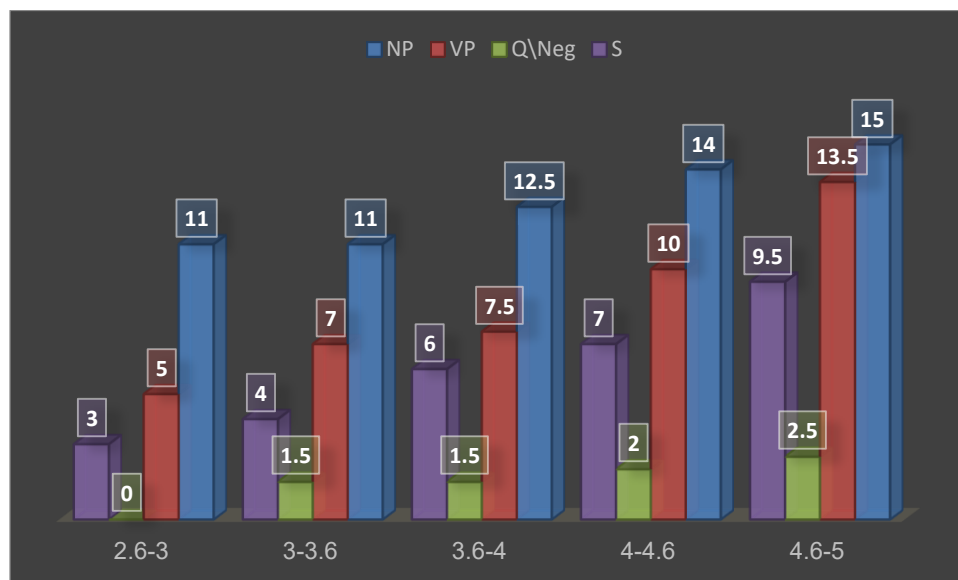

Figure 1. Depiction of the positive correlation between score and TLD chronological age.
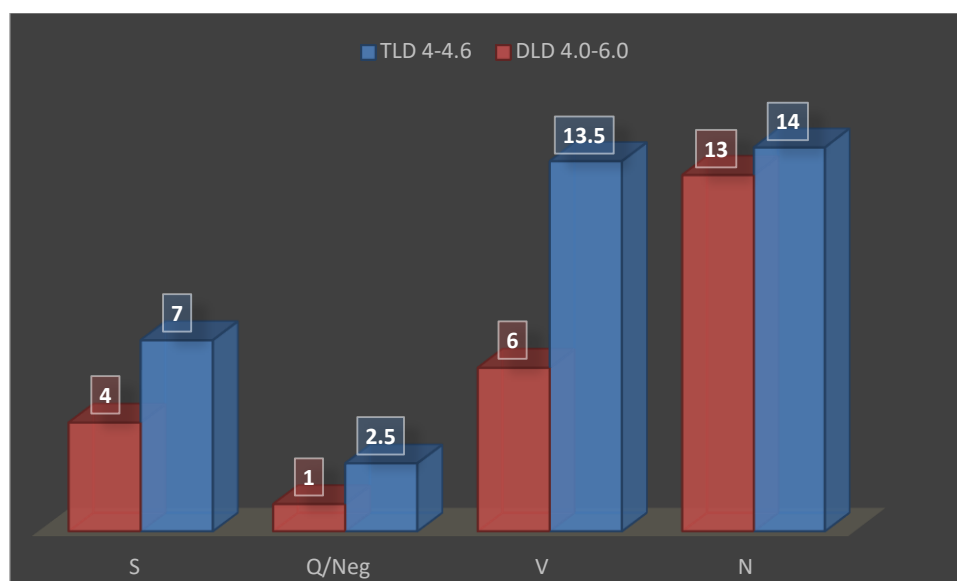
Figure 2. Comparison between four year-old children with TLD and with DLD regarding verb phrase and sentence structure.

As the figure 2 shows, score differences between TLD and DLD groups were most significant in the verb category. Children with DLD scored about half the score of children with TLD. The differences between both groups are prominent in the categories of the VP and SSt, as shown in Figure 2. These score differences reflect the linguistic gap between both groups of children, whereby the DLD group did not use morphological features of the verb complexities observed in the TLD group, as shown in Table 1 in appendix III. Similarly, the significant score differences between the groups regarding sentence structure was reflected the absence of certain syntactic features in the DLD group, which were present in the TLD group, as illustrated in Table 2 in appendix III. These results show that the Palestinian Arabic IPSyn provides an informative picture of the children's grammatical competence and can therefore serve as an effective tool for evaluating the acquisition of the syntax and morphology in the language. This tool, in its Palestinian Arabic adaptation, can provide us with a detailed picture of the language for the assessment in children with LTD and those with DLD. Thus, the IPsyn for PA allows us to thoroughly study and compare the language acquisition process for both groups.

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4.0 Future contribution of the Study

The scientific study of language acquisition has both theoretical and practical goals. The theoretical goal is to better understand the ways and stages in which children with typical language development acquire their native language. The practical goal of this field of study is to help create tools for diagnosis and intervention in cases of impaired acquisition. Thus, when comparing acquisition of a given language in children with Typical Language Development and those with Developmental Language Disorder, the researcher may find precise spots and areas in which DLD children need help.

The study of language acquisition of colloquial Arabic has been rare so far. This is true both for the theoretical and for the practical aspects. Indeed, research on spoken Arabic has been so rare that not only do we know too little about language development in young speakers of Arabic, but neither do we possess the right tools that would help impaired children acquire their native tongue. This state of the art results from the specific diglossic situation of Arabic, i.e. the distance between the Standard yet unspoken language, on the one hand, and the multitude of structurally-different dialects, on the other hand. What this means, is that scientific studies of standard Arabic, indeed numerous, are nevertheless irrelevant for the acquisition of Arabic dialects. The present study focuses on spoken Arabic and can therefore contribute to the understanding acquisition processes not yet studied.

In order to conduct this study, I will collect a large amount of information of colloquial Arabic as spoken by children with TLD as well as by children with DLD. Of all the collected corpus, this study will focus particularly on the acquisition of *verb phrases* and *sentence structure* from both theoretical and practical perspectives. I will probe if verb phrases and sentence structure are two areas of linguistic acquisition, which develop with the chronological age, yet differently in TLD children compared to DLD children. To address this, I will focus on psycholinguistic variations throughout the age groups and between both typical vs. a-typical groups. Professionals who work in language

development in children, such as educators and speech therapists, will certainly enjoy the fruit of the proposed study. The clinical aspect of this research will put at their disposal tools for research-based intervention programs, which do not yet exist for spoken Palestinian Arabic.

The current study is based on one particular dialect but given the continuum of dialects of spoken Arabic (Meiseles, 1980; Behnstedt & Woidich, 2013; Saiegh-Haddad & Henkin-Roitfarb, 2014), it can be adjusted to other dialects with some change in parameters. In this way, intervention programs for speakers of other dialects will use this tool and adapt it to their own speech variety while enjoying the common denominator (isoglosses) of the dialects.

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Appendix I: Verb phrase structure

Tenses

Item	Description	Examples
V1	Present tense m.s.	بلعب /bilʕab/ 'I/you/he plays/is playing'
V2	Present tense f.s.	بتلعب /btilʕab/ 'I/you/she plays/is playing'
V3	Present tense m.pl.	منلعب /mnilʕab/ 'we play/are playing' بتلعبو /btilʕabu/ 'you play/are playing' بلعبو /bilʕabu/ 'they play/are playing'
V4	Present tense f.pl.	بتلعبن /btilʕaben/ 'they play/are playing'
V5	Past 1s.	لعبت /lʕébet/ 'I played'
V6	Past 1pl.	لعبنا /lʕébna/ 'we played'
V7	Past 2ms.	لعبت /lʕébet/ 'you played'
V8	Past 2pl.	لعبتو /lʕébtu/ 'you played'
V9	Past 2fs.	لعبتِ /lʕébti/ 'you played'
V10	Past 3m.pl.	لعبوا /leʕbu/ 'they played'
V11	Past 3f.pl.	لعبن /lʕében/ 'they played'
V12	Periphrastic future	بدك تلعب /beddak tilʕab/ 'you will play'

Morphological verb patterns

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Item	Description	Examples
V13	Verb pattern fa'al	سَقَط /saqeṭ/ 'to jump', وقف /waqef/ 'to stand', لعب /laʕeb/ 'to play'
V14	Verb pattern fa''al	لبّس /labbas/ 'to dress'
V15	Verb pattern infa'al (middle voice)	انفجر /infájar/ 'to explode' انسحب /insaḥab/ 'to withdraw'
V16	Verb pattern af'al	امسك /amsak/ 'to hold' اسرع /ʔasraʕ/ 'to hurry'
V17	Verb pattern ifta'al	اشترك /ištarak/ 'to participate' التكى /iltaka/ 'to meet'
V18	Verb pattern fa:'al	صالَح /ṣa:laḥ/ 'to conciliate' لاعب /la:ʕab/ 'to make (sb) play'
V19	Verb pattern tafa:'al	تصالَح /taṣa:laḥ/ 'to reconcile'
V20	Verb pattern tafa''al	تصرّف /taṣarraf/ 'to behave' تعلّم /taʔallam/ 'to learn'
V21	Verb pattern af'all	احمرّ /iḥmarr/ 'to become red'
V22	Verb pattern istaf'al	استعمل /istaʕmal/ 'to use' استوعب /istawʕab/ 'to capture, comprehend'

Verb valency and complementation

Item	Description	Examples
V23	Valency: [+1] verbs (intransitive, 1 argument)	نام /na:m/ 'to sleep'
V24	Valency: [+2] verbs (transitive, 2 arguments)	أخذ /aẖað/ 'to take'
V25	Valency: [+3] verbs (transitive, 3 arguments)	اعطى /aʕṭa/ 'to give'
V26	Simple NP verb complement (1 component: head noun)	أخذت التفاحة /aẖaðt attufa:ḥa/ 'I took the apple'
V27	Complex NP verb complement (2 components)	أخذت التفاحة الكبيرة /aẖaðt attufa:ḥa likbíre/ 'I took the big apple'
V28	Copula: verbal	الولد كان فرحان /alwalad ka:n farḥa:n/ 'the boy was happy' الولد صار فرحان /alwalad ṣa:r farḥa:n/ 'the boy became happy'
V29	Copula: pronominal	امي هي المعلمة وأبي هو المدير /immi hi limʕálme uábi hu lmudi:r/ 'my mother is the teacher and my father is the principle'
V30	Simple PP verb complement	خاف من الكلب /ẖa:f min alkalb/ 'afraid of the dog'

Item	Description		Examples
V31	Primary adverb (place, time, manner)		هون /ho:n/ 'here', هناك /huna:k/ 'there', مبارح /mba:reḥ/, 'yesterday', هسّا /hassa/ 'now', دايمًا /dayman/ 'always'
V32	Secondary adverbs: preposition + abstract noun		بسرعة /bsúrʕa/ 'fast (=in speed)', بقوة /bkúwa/ 'agressively', بهداوة /bihadáwe/ 'gently', بدفاشة /bidafáše/ 'impolitely'

Verb aspect and mode

Item	Description		Examples
V33	Aspectual adverbs		
	V33.1	progressive	هذيني بلعب /haði:ni bélʕab/ 'I am playing'
	V33.2	following immediately	تقريبا اجا لما اكلنا /takríban aja, lamma akálna/ 'as soon as he came, we started eating'
V34	Modal verb: modal predicate + prefix conjugation verb		
	V34.1	possibility, probability, uncertainty	بجوز تلعب /bijuz tílʕab/ 'maybe you will play', ممكن /múmkin/ 'maybe', احتمال /iḥtima:l/ 'possibly'
	V34.2	will, want	بدك تلعب /biddak tílʕab/ 'you want to play'
	V34.3	obligation	لازم /lá:zem/ 'must', مجبور /majbu:r/ 'must absolutely' (stronger obligation)

	V34.4	cohortative	ما تفوت /ma tfu:t/ 'hurry up – get in' يلا روح /yalla ru:ḥ/ 'hurry up – [and] leave!'
V35		Mental / stative verbs: oscillating between prefix conjugation as action verbs and active participle as nominals	/báʕref/بعرف ,/ḥa:beb/ حابب ~ /bḥebb/بحب 'like', /ʕa:ref/ عارف ~ /befakker/بفكر 'know', 'think (express an opinion)', /bḥess/بحسّ ~ حاسس /ḥa:ses/ 'feel', /bénsa/بنسى ~ ناسي /na:si/ 'forget'
V36		Aspectual auxiliary verbs: - following immediately - consequential inchoative - past progressive - habitual present - continuous	أجا قال لي /aja: kalli/ 'he came [and] said to me' قام ضربني /ka:m darábni/ 'he came [and] hit me' صرت ابكي /ṣuret abki/ 'I [then consequentially] started crying' كنت العب /kunt élʕab/ 'I was playing' كان يلعب /ka:n yélʕab/ 'he was playing' ظل ييكي /ðal yíbki/ 'he goes on crying'
V37		Aspectual prefix: habitual present (may also be used for past events in a lively narrative)	بلعب /bélʕab/ 'he [in general] plays'
V38		Planned future: active participle	راجع بكرا /ra:jiʕ búkra/ 'he is returning tomorrow'
V39		Habitual aspect in the past	بكا يلعب /baka yélʕab/ 'he used to play'
V40		External passive	اللعبة إنكسرت /llluʕbe inkásarat/ 'the toy was broken'

Appendix II: Sentence (and utterance) structure

Verbless utterances

Item	Description	Examples
S1	Gestural indication using a single (concrete) noun	كلب /kaleb/ '[this is a] dog' ماي /may/ '[I want] water'
S2	Verbless (nominal) clause with two NPs: demonstrative subject + predicate	هذا كلب /háða kaleb/ 'this [is a] dog' هاي دار /hay da:r/ 'this [is a] house'
S3	Verbless (nominal) clause with two NPs: explicit nominal subject + predicate	الولد كبير /lwálad kbi:r/ 'the boy [is] big' السيارة حلوة /assayyá:ara ḥílwe/ 'the car [is] beautiful'

Verbal sentences

Item	Description	Examples
S4	S: NP + VP	القرد وقع /alkerd wékaʕ/ 'the monkey fell' سيارة مرقت /sayyá:ara márkat/ 'a car passed' اكلتي /akálti/ 'you ate / did you eat?'
S5	S+V+Complement	بابا بوكل كعكة /bába bákol káʕke/ 'dad is eating a cake'

S6	S+V(copula)+A	الصف صار حلو /ṣṣaf ṣa:r ḥílu/ 'the class turned / became nice'

Non-Subject-initial sentences

Item	Description		Examples
S7	Predicate-initial sentences		
	S7.1	Agreement-marking verb = verb containing morphological subject (Berman 1990, *Linguistics* 28, §2.2)	بصلح هسا /baṣálleḥ/ 'I am fixing now' روحت عالمدرسة /ruḥet ʕalmádrase/ 'I went to school' بتعمل ماما كعكة /btáʕmel máma lkáʕke/ 'mom is making a cake'
	S7.2	Existential / possessive	عندك طابة /ʕíndak ṭá:be/ 'you have a ball' ظايل عندي ماي /ða:yel ʕíndi may/ "is left to me some water" = 'I have some water left'
	S7.3	V-S	وكع المفتاح /wikeʕ lmufta:ḥ/ "fell the key" = 'the key fell'
	S7.4	Experience utterances	حم هون /ḥam ho:n/ '[it is] hot [in] here'
S8	Complement-initial sentences		

	S8.1	OVS	كعكة بتعمل الماما /káʕke btáʕmel almáma/ "cake is making mom" →'mom is making a cake'
	S8.2	OSV	كعكة الماما بتعمل /káʕke btáʕmel almáma/ "cake mom is making" → 'mom is making a cake'

More-than-one-word verb complements

Item	Description	Examples
S9	Two-word subject NP + V	الولد الكبير راح /lwálad likbi:r ra:ḥ/ 'the big boy went away / left' الطابة هاي دحلت /ṭṭá:be ha:y dáḥlat/ 'this ball rolled (away)'
S10	Sentence containing a conjoined phrase	عندي دبدوب ولعبة /ʕíndi dabdub ulóʕbe/ 'I have a teddy-bear and a toy'

		Sam dáʕlinm inti aná/ انا وانت منلعب مع بعض /ba9ád/ 'you and I are playing together'

More-than-one-clause sentences

Item	Description	Examples
S11	Conjoined sentence: and, then, or, but, therefore	بدنا نلعب بس اللعبة مكسورة /bídna nílʕab bas lló9be maksúra/ 'we want to play, but the toy is broken' اللعبة مكسورة عشان هيك منلعب بالرمل /lló9be maksúra, ʕaša:n he:k mnílʕab birrámel/ 'the toy is broken, therefore we'll play in the sand'
S12	Relative clause with direct object pronoun	هذا الولد شفناه /háða lwálad šufnah/ 'this is the boy (that) we saw (him)' هاي اللعبة بدي اياها /ha:y lló9be biddi yeha/ 'this is the toy (that) I want (it)'
S13	Relative clause with indirect object pronoun	شفنا اللعبة اللي حكيت عنها/ šufna lló9be lli ḥake:t ʕanha/ 'we saw the toy (that) you talked about'
S14	Complement clause with direct speech	امي قالت لي انت ولد مليح /immi ka:lat li ínte wálad ḥílu/ 'my mom told me you are a nice boy'
S15	Complement clause with indirect speech	امي قالت لي اني ولد مليح /immi ka:lat li íni wálad ḥílu/ 'my mom told me that I am a nice boy'

S16	Early adverbial clause: temporal, causal	امي بتساعدني اما اتحمم /immi bitsaʕdni lamma atḥamam/ 'mom helps me when I wash'
S17	Advanced adverbial clause: place, purpose, result, concession, condition, comparison	هو بكى لانه وقع /hue báka linno wíkiʕ/ 'he cried because he fell'
		اذا بتصرف حلو معناها بوخذ جائزة /iða batşarraf ḥilu, maʕanéha bóḫeð ja:iza/ 'if I behave well, then (=its meaning is that) I will get a prize'
		ماعيّطت حتّى لما بوجع /ma ʕayyáṭet ḥátta lamma bujiʕ/ 'I didn't cry although it hurts'
S18	Center-embedded subordinate clause	الولد اللي كان هناك ما بدو يلعب /alwálad ílli ka:n huna:k ma bíddo yílʕab/ 'the boy who was there does not want to play'

Passive sentences

Item	Description	Examples
S19	Passive without complement	اللعبة إنكسرت /lluʕbe inkásarat/ 'the toy was broken'
S20	Passive with complement	اللعبة انأخذت من الولد /llóʕbe inʔáḫaðat min alwálad/ 'the toy was taken from the boy'

Appendix III: Tables 1 & 2

Table 1

Verb Phrase Features Appearing Amongst Children with TLD but absent in DLD

Category	Element Description	Meaning
Verb patterns	Verb pattern انفعل infa'al (middle voice)	Using the derived verb stem to express the middle voice (not passive), e.g. انفجر البالون /infájar albalon/ 'the balloon exploded'.
Verb patterns	Verb pattern فاعل /fa:'al/ expressing reciprocity	صالَح /ṣa:laḥ/ 'to conciliate' لاعب /la:ʕab/ 'to make (sb) play'
Valency	Valency: [+3] verbs (transitive, 3 arguments)	Appearance of two complements according to the semantic constraints of the verb e.g. امي اعطت رامي تفاحة /immi aʕṭat rami tufa:ḥ/ 'Mother gave Rami an apple'
Valency	Complex NP verb complement (2 components)	Appearance of a noun + adjective after the verb or preposition e.g., رمى الطابة الكبيرة /ráma iṭṭá:be likbíre/ '(he) threw the large ball'
Aspect, mode and mood	Mental / stative verbs: oscillating between prefix conjugation as action verbs and active participle as nominal	Use of a verb that expresses thought or feeling. The use of mental verbs is cognitively and syntactically more complex, and therefore warrants a separate category, e.g. بحب /bḥebb/ 'like, love', حاسس /ḥá:ses/ 'feel'
Aspect, mode and mood	Aspectual use of adverbs and auxiliary verbs to indicate the way one looks at an action	تقريبا اجا لما اكلنا /takríban aja, lamma akálna/ 'as soon as he came, we started eating' ظل يبكي /ðal yíbki/ 'he goes on crying'

	Passive verb form of the morphological pattern: انفعل /infáʕal/ inC₁aC₂aC₃	اللعبة إنكسرت /lluʕbe inkásarat/ 'the toy was broken'

Table 2

Sentence Structure Features Appearing Amongst Children with TLD but not DLD

Category	Element Description	Meaning
Word order	Complement-initial sentences: OVS, OSV	كعكة بتعمل الماما /káʕke btáʕmel almáma/ "cake is making mom" →'mom is making a cake' كعكة بتعمل الماما /káʕke btáʕmel almáma/ "cake is making mom" →'mom is making a cake'
More-than-one-word complements	NP with an adjective in subject position: Two-word subject NP + V	الولد الكبير راح /lwálad likbi:r ra:ḥ/ 'the big boy left' الطابة هاي دحلت /ṭṭá:be ha:y dáḥlat/ 'this ball rolled (away)'
	Sentence containing a conjoined phrase	عندي دبدوب ولعبة /ʕíndi dabdub ulóʕbe/ 'I have a teddy-bear and a toy' انا وانت منلعب مع بعض /ána u inti mnílʕab maʕ báʕad/ 'you and I are playing together'
More-than-one-clause sentences	Conjoined sentence: and, then, or, but, therefore	بدنا نلعب بس اللعبة مكسورة /bídna nílʕab bas llóʕbe maksúra/ 'we want to play, but the toy is broken' اللعبة مكسورة عشان هيك منلعب بالرمل /llóʕbe maksúra, ʕaša:n he:k mnílʕab birrámel/ 'the toy is broken, therefore we'll play in the sand'
	Complementary sentence[1] - Complement clause with *direct* speech	امي قالت لي انت ولد مليح /immi ka:lat li ínte wálad ḥílu/ 'my mom told me you are a nice boy'

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[1] Although our pilot contains no complementary sentences, it is reasonable to assume, pace previous research on general tendencies in language acquisition (Nordqvist 2001), that the larger corpus will make the expected difference between direct and indirect speech within a complementary sentence, whereby children with DLD will display less frequent or no indirect clauses compared to TLD children.

		- Complement clause: with *indirect* speech	امي قالت لي اني ولد مليح /immi ka:lat li íni wálad ḥílu/ 'my mom told me that I am a nice boy'
		Relative clause - Relative clause with *direct* object pronoun - Relative clause with *indirect* object pronoun	هذا الولد شفناه /háða lwálad šufnah/ 'this is the boy (that) we saw (him)' هاي اللعبة بدي اياها /ha:y llóʕbe biddi yeha/ 'this is the toy (that) I want (it)' شفنا اللعبة اللي حكيت عنها /šufna llóʕbe lli ḥake:t ʕanha/ 'we saw the toy (that) you talked about'
		Center-embedded subordinate clause: the clause is placed in the middle of the sentence	الولد اللي كان هناك ما بدو يلعب /alwálad ílli ka:n huna:k ma bíddo yílʕab/ 'the boy who was there does not want to play'
Passive mood		Passive	اللعبة انأخذت من الولد /llóʕbe inʔáḫaðat min alwálad/ 'the toy was taken from the boy'