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Thesis Topic:
The Effect of Diglossia on the Comprehension and Production of Syntactic Structures among TLD and DLD children

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1. Introduction: Arabic is a typical case of diglossia which means that Arabic has two varieties of the language: Modern Standard Arabic (MSA) and Spoken Arabic (SpA) which are used within the same speech community for complementary sets of socio-communicative functions. Arab children acquire Spoken Arabic (SpA or Ammiya) as their mother tongue and are thus exposed to Spoken Arabic from the birth. Yet, they are occasionally exposed to Standard Arabic (StA or *Fusha*) through storybook reading at home or in the daycare center and in kindergarten, as well as via TV. The current study addresses the impact of the syntactic distance in Arabic diglossia on the comprehension and production of narratives among typically developing kindergarten children and age matched children with Developmental Language Disorder (DLD).

As StA is the only language of conventional reading and writing in Arabic, children are extensively exposed to StA in the first grade when they start learning to read and write. This language variety, however, is structurally different from SpA in all domains: phonology, morphology, syntax and lexicon (Saiegh-Haddad & Spolsky, 2014; Saiegh-Haddad & Henkin-Roitfarb, 2014). Research has shown that this linguistic distance between SpA and StA impacts language representation and processing in StA, namely, that children find linguistic structures in StA more difficult to represent and process than SpA linguistic structures (Saiegh-Haddad, 2003, Saiegh-Haddad et al, 2011; Saiegh-Haddad & Haj, 2018; Schiff & Saiegh-Haddad, 2017, 2018). Yet, the bulk of this earlier research focused on phonological and morphological distance and its effect on phonological and morphological processing in reading and spelling to the exclusion of morpho-syntactic and syntactic distance and its realization in story retelling. This will be taken up by the current study. Moreover, earlier research tested TLD children and children with reading disabilities. The current study focuses on children with DLD.

The current study will examine if use of syntactic structures in story retelling in the two groups is different in SpA and StA. The syntactic structures that are targeted are: word order, inflections, object pronouns, possessive pronouns, nominal constructions, object relative clauses, connectors, negations, and construct states. The study will further investigate whether diglossia impacts the production and comprehension of syntactic structures in story retelling. This last question will be addressed by targeting those specific syntactic structures that are different and are used to a

different degree in SpA versus StA, such as nominal constructions, and those for which different lexical terms are used in the two language varieties, such as connectors.

For the purpose of this study three story telling conditions were manipulated: In the first condition: SpA to SpA, the story is delivered in SpA and the child is asked to retell the story in SpA. This condition serves as the baseline to test narrative telling skills and the impact of retelling on the target structures. In the second condition: StA to SpA, the story is delivered in StA and the child is asked to retell it in SpA. This condition tests the comprehension of the target structures in StA. In the third condition. StA to StA, the story is delivered in StA and the child is asked to retell it in StA, testing both comprehension and production.

2. Literature review: 2.1. Arabic diglossia: diglossia is a phenomenon where two or more varieties of the language exist in the same speech community and each variety is used for a specific purpose and in a distinct situation. (Ferguson, 1959; Farghaly, & Shaalan, 2009). The linguistic situation of Arabic is characterized as having a complex diglossic situation. Chronologically, classical Arabic represents the language that was spoken by Arabs more than fourteen centuries ago. "While Modern Standard Arabic is an evolving variety of Arabic with constant borrowings and innovations proving that Arabic reinvents itself to meet the changing needs of its speakers"**.** Both Classical Arabic and MSA have a strong "tradition of grammar" as well as an established norm for grammar, vocabulary and pronunciation. In contrast, SpA does not follow the same "body of standards". Therefore, there is a significant variation in grammar, vocabulary and pronunciation. This gap between the two varieties challenges children's abilities while learning the language as a result of being exposed to a specific set of rules since they are born that distinguishes from the set of rules that they are exposed to in the first grade, which is mostly a new set of rules. (Farghaly, A., & Shaalan, K. 2009).

2.2. Linguistic distance between SpA and StA and its impact on language representation and processing in Arabic: The case of Arabic diglossia created a linguistic distance (Saiegh-Haddad, E., & Schiff, R., 2016) which in turn influenced language processing among its speaker. The linguistic distance is manifested across all domains of language such as, morphology, phonology, syntax, and lexical-semantics. StA structures were found to be more difficult to process than SpA structures in target phonological units (Saiegh-Haddad 2004, 2007; Saiegh-Haddad & Ghawi-dakwar, 2017).

The linguistic distance in Arabic diglossia is demonstrated through another distinguished feature, which is the existence of many "paired items", each item belongs to one variety. These items refer to common concepts frequently used in both varieties, where the range of meaning of the two items

is approximately the same, and the use of one of them immediately "stamps" the utterance of written sequence as "high" or "low". For example, the word "sees": the high word is "ra'a" and the low word is "saf" (Ferguson, C. A. 1959). Saiegh-Haddad & Spolsky (2014) argue that in Arabic there are three types of words: **identical words**: have "identical lexico-phonological form" in both StA and SpA. They distinguish in case marking and other inflections used only in Standard Arabic (e.g., na:m “slept”; daftar “notebook”), **cognate words**: are used in SpA but have different phonological form in StA as a result of various computational processes such as, consonant change, or glottal stop deletion/addition (e.g., SpA ðahab versus StA dahab ‘gold’ or SpA sama versus StA sama: ʕ ‘sky’), **lexically unique words:** have " unique lexico-phonological form" in Spoken Arabic that is completely different in Standard Arabic. It does not have a conventional written form. They have a completely different lexical items to encode the same meaning (e.g., SpA ħaṭ versus StA waḍaʕ‘he put’). The literature shows that there is a distance in words' representation between Standard Arabic and Spoken Arabic. According to Saiegh-Haddad, (2007) "this linguistic distance implies that a given linguistic structure may be affiliated either with MSA or with SAV". In order to refrain from having a confounding variable of word type, while writing the stories mostly cognate and identical words were used with fewer unique words. That is, we wanted to eliminate the possibility that the child's lack of understanding the story is actually because of the language difficulty and not syntactic structures.

Khamis-Dakwar et al., (2012), examined Arabic-speaking children’s morphosyntactic development in a diglossic situation and found that children performed better on items presented in Palestinian SpA than in StA, with the exception of negation constructions. They also performed better when the two constructions were similar in both languages. The findings show that children's performance was influenced by language-specific characteristics and similar findings were shown in (Saiegh-Haddad, 2003) for phonological tasks, where disparities between MSA and Palestinian SpA impacted children's ability to perform phonological awareness tasks. Dakwar et al., (2012) found that structures such as plural marking, word order and word agreement were acquired early and structures such as passive structures and relative pronouns were acquired late cross-linguistically such as, passive structures and relative pronouns. Moreover, they found that negation structure was easier to produce in StA than in SpA because of its more complex structure in SpA.

2.3. Syntactic similarities and differences between SpA and StA:

Word order: Primarily, the structure of word order in Classical Arabic and MSA is verb-subject-object (VSO), yet, they also allow subject-verb-object (SVO) and object-verb-subject (OVS). The different dialects of SpA exhibit the SVO order. Arabic varieties allow sentences without subject when it is recoverable. All varieties of Arabic allow "nominal sentences" without explicit use of the

copula. Arabic is a **pro-drop language** which means that it allows "subjectless sentences" (Farghaly& Shaalan, 2009).

Inflections: Inflectional morphology describes how words differ and inflect in order to express grammatical contrasts or categories, such as singular/plural or past/present tense. Inflections are summarized into eight major grammatical categories in Arabic: "tense/aspect, person, voice, mood, gender, number, case, definiteness. Six of these apply to verbs (tense/aspect, person, voice, mood, gender, number), four apply to nouns and adjectives (gender, number, case, definiteness), and four apply to pronouns (person, gender, number and – to a limited extent – case)" (Ryding, 2005). While, the same features are marked by inflections in both SpA and StA, the inflections themselves are different. Thus, for example, in StA, present simple verbs are inflected with "'ي' for masculine and 'ت' for feminine and in SpA 'ب' is either added before the "ي" or replaces it. (Detailed examples in appendix 1)

Possessive-noun- pronouns: they are suffixes that are attached to nouns to show possession. Like in English, these suffixes agree with gender and number of the possessor and not the thing possessed like in French. They are attached at the end of a noun, after the case-marking vowel, except for the suffix 'ي= my' which supersedes inflectional vowels. (Ryding, 2005).

Object-verb- pronouns: these suffixes are identical in form with possessive pronoun suffixes which attach to nouns. They are attached at the end of a verb, after the verb, inflection for person, number, gender, tense, and mood. These suffixes serve as objects of transitive verbs and preposition and thus are affixed to those word classes (Ryding, 2005). Both possessive and object pronouns serve almost the same role in StA and SpA. However, sometimes, the noun that is attached to the suffix is what varies from StA to SpA. For example, the feminine possessive pronoun in StA is "لها ", however, in SpA it is "إلها" with the addition of "ee" at the beginning of the word. (See appendix 2 for examples)

Construct states: link two nouns together in a relationship where the second noun modifies the first by identifying, limiting, or defining it. The two nouns and this relationship function as one phrase or syntactic unit (Ryding, 2005)**.** Traditional Arabic grammar analyzes the following phrases as noun construct or *iddafa* in which the second term is governed by the first and is assigned a genitive case: مدير البنك (noun phrase**)**, حاد الذكآء (adjectival phrase)**,** فوق المنزل (prepositional phrase) (Farghaly & Shaalan, 2009). Both variations must have indefinite nominal first (Khamis-Dakwar et al., 2012).

Object relative clauses*:* "Relative pronouns relate an element in a subordinate relative clause (in Arabic, الصلة) to a noun or noun phrase in the main clause of a sentence. The Arabic relative pronoun (الاسم الموصول) may be definite or indefinite. MSA uses nine forms of definite relative pronouns". Object relative clauses in Arabic refer back to a noun or a noun phrase in the main

clause which is the object of a verb or a preposition. In this case, a pronoun must be inserted in the relative clause to serve as the object of the verb or proposition, which refers back to the object noun in the main phrase ("the book that we read (it)," الكتاب الذي قرأناه). Whereas, in StA there are nine forms of definite relative pronouns, in SpA only one definite relative pronoun is used in all situations: "إللي ", which parallels "الذي" (Ryding, 2005). For example, the plural masculine in StA is "الأولاد **الذين** يحبهم أبوهم- the boys whom their father loves" in SpA is "الأولاد **اللي** أبوهن بحبهن".

Nominal constructions: nominalization refers to the construction termed *masdar* in Arabic grammars. It corresponds with *shmot pe?ula* (action nominal) in Hebrew. Nominal construction refers to the case where each conjugation has an associated nominalized form e.g. waṣala 'arrived' ~ wuṣu:l 'arrival', mawwala 'financed' ~ tamwi:l 'financing' (Laks& Berman, 2014; Hazout, 1995). Laks& Berman (2014) reported that their sample showed extensive use of nominalizations in a variety of syntactic structures in written texts, which were written in StA (e.g., ħa:wala al-muru:r, lit. 'tried the passing'). Yet, they found that these forms were far less used in spoken narratives, in which subjunctive forms are preferred (e.g., ħa:wal yemurr, lit. 'tried that he pass').

Connectors*:* Connectors are words or phrases that connect one part of discourse with another, they are a pervasive feature of MSA syntax. Sentences and clauses within a text are connected and interconnected by words or phrases that coordinate, subordinate, and link them semantically and syntactically. There is one class of connectors that is called "simple linking connectives", which serve linking functions only, without requiring a grammatical change. For example, fa-'فَ' and so; and then; yet; and thus" as in "then she got hurt- فتألمت". In the other class are the "operative particles" (حروف عاملة) that require inflectional modification of the phrase or clause that they introduce. They require the subjunctive or the jussive on following verbs, or particles that require the accusative case on nouns, adjectives, and noun phrases. For example, 'لأن- because' and ' that – أنّ'. (Ryding, 2005)**.** Some connectors are used similarly in StA and SpA such as, "لأن". Yet, other connectors exist only in one variation. For example, the connector " بينما= whereas" is used strictly in StA and not in SpA, whereas, the connector " عشان = because" is used only in SpA and does not exist in StA.

Negation: Arabic uses a variety of means to express negation. This is accomplished primarily through the use of negative particles, which often affect the following phrase by requiring a particular case on a noun or noun phrase, or a particular mood of the verb. A common way to negate a past tense verb in StA is to use the negative particle لم followed by the verb in the jussive mood. Another is "negative imperative: لا+ jussive". It is formed by using the negative particle لا plus the jussive form of the (second person) verb; in the negative imperative, the jussive verb form preserves its prefix (Ryding, 2005). However, negation in SpA distinguishes greatly from StA. In

SpA negative particles include the affix [-s], and the preverbal free morphemes [mIs] (negates Adjective+Noun) and [ma:] (negates Verb). (Khamis-Dakwar et al., 2012).

2.4. Narratives- story re-telling: narrative discourse has become a selected site for the research of language acquisition (Ravid, Naoum and Nasser, 2014). Story re-telling can inform us of the narrative abilities of children in a way that does not require that they provide both the content and the structure of the story. Re-telling stories is considered a well-established devise in the field of language acquisition (Ravid, Naoum and Nasser, 2014; Geva and Olson, 1983). In their study about re-telling Arabic stories and developmental analysis of narrative production abilities in the Palestinian Arabic dialect spoken in the north of Israel. Ravid, Naoum and Nasser (2014) found that text size is a reliable measure of syntactic development: longer clauses indicate more informative content, more phrases per clause and more words per phrase. Their results showed that age and schooling had an impact on the length of retelling, in which it contained larger amounts of MSA lexicon and morphosyntax. They also showed that the number of errors declined concomitantly (e.g. morphosyntactic errors dropped in adulthood). They found that reconstruction level and linguistic referencing increased with age and schooling, with cut-off points across the whole developmental spectrum, which shows that the road to re-telling all components of a story is long and difficult. Another important finding was that reconstruction of more concrete scenes was easier than the backgrounded content units relating internal and abstract states. Both top-down which is content and global structure and bottom-up which is morpho-syntactic and lexical measures exhibits the consolidation of narrative abilities in PA speakers across the school years. In terms of the effect Arabic diglossia on stories' production, they found that children retold stories in SpA with no MSA constructions; whereas, older groups produced stories in StA but with shorter texts compared to SpA retellings.

2.5. Developmental Language Disorder (DLD): children with developmental language disorder (also known as Specific Language Impairment (SLI) show difficulties and deficits in speech production as well as sentence comprehension. There are two types of language impairment: expressive, in which speech is impaired but comprehension is normal; and receptive, in which comprehension is impaired resulting in speech deficits. The degree of comprehension impairment is correlated with the severity of the disorder (Bishop, 1979). Baird, Dworzynski, Slonims and Simonoff (2009) claim that both the linguistic and cognitive processes are relevant to the cause or causes of persistence of language impairment. Several researches have already reported that children with specific language impairment demonstrate significant deficits in different areas of syntax (Shaalan, 2010; Friedmann and Novogrodsky, 2004; Stavrakaki, 2001). Friedmann and Novogrodsky (2004) explained that specific language impairment relates to a heterogeneous group

and within this group a sub-group is identified with a significant deficit in syntax that is addressed as "Syntactic SLI". Research shows that reading disabled children are more influenced by linguistic distance and underperform typically developing children (Schiff and Saiegh-Haddad, 2017). Moreover, Saiegh-Haddad and Ghawi-dakwar (2017) found that children with language impairment significantly underperformed typically developing children in all repetition tasks.

3. Research Questions and hypotheses: The linguistic distance that characterizes Arabic diglossia plays a pivotal role on language processing and representation. Research shows that this distance affects all language domains which in turn explains the difficulty that children as well as adults exhibit while dealing with StA. Although, SpA varieties share phonological, morphological, syntactic and lexical structure with StA, the grammatical system of StA distinguishes greatly from that of SpA. While, the syntactic features of SpA are not formally learned and acquired spontaneously due to exposure, StA syntactic features must be learned formally in schools. This has led many researches to regard these two variations as two distinct languages, which might explain this linguistic distance which native speakers of Arabic deal with. The literature shows that this case of diglossia poses even more difficulties for children with language impairment and challenges their abilities especially when they have to deal with StA. This variation between the two structures, perhaps, might explain the difficulties native speakers of Arabic encounter in the syntactic domain in StA, which is the focus of the current study. It tests whether the grammatical structure of SpA and unlike that of standard Arabic, will facilitate comprehension and production of syntactic structures in SpA stories. We hypothesize that participants will have higher comprehension and production of syntactic structures in SpA condition compared to the StA conditions. This study will further test children with DLD to show if they will display more difficulty in comprehension and production of syntactic structures than their TLD peers across all conditions, especially first (StA to StA) and second (StA to SpA) stories because they are delivered in StA. It will examine if they will demonstrate difficulty in the third condition (SpA to SpA) as well.

<u>The following research questions will be addressed:</u> What is the effect of diglossia on the comprehension and productions of syntactic structure in Arabic among typically developing children and children with specific language impairment?

1. Is the comprehension of syntactic structures higher when the story is told in SpA and children are required to recall it in SpA too (hereafter SpA to SpA condition) than when they are told the story in StA and required to retell in StA (hereafter StA to StA) or in SpA (hereafter StA to SpA) conditions?

2. Does the production of syntactic structures vary with conditions: SpA to SpA, StA to StA and StA to SpA?

Hypotheses: 1. we hypothesize that comprehension of syntactic structures will be higher in SpA to SpA condition than in StA to StA and StA to SpA conditions, because the narratives in the first condition are delivered in SpA while in the second and third condition they are delivered in StA.
2. We hypothesize that production of syntactic structures (in terms of syntactic complexity and morpho-syntactic accuracy) in SpA to SpA will be higher than in StA to StA and StA to SpA because the narratives are delivered SpA.

3. We hypothesize that production of syntactic structures in SpA to SpA will be higher than in StA to SpA, because the narratives are delivered in SpA. The production is expected to be slightly higher since the will be produced in SpA.

4. We hypothesize that production of syntactic structures in StA to SpA will be higher than StA and StA because the narratives will be produced in SpA.

4. Method: participants: a total of 48 Arabic speaking children aged 5-6 years old will participate in the study; 24 with TLD and 24 children with DLD. TLD participants live in a village called Sha'ab in the north of Israel. All participants are native speakers of the Northern Palestinian vernacular. All TLD children come from kindergartens located in Sha'ab village; all children with SLI come from kindergartens located in the north of Israel.

Tasks: story re-telling task: the method used in this study is oral story retelling. It will be administered in three conditions: (a) StA to StA, (b) StA to SpA, and (c) SpA to SpA. The stories were written according to the 5 elements of structure: character, problem, feeling, action, and ending; for each a picture was drawn by a professional animator. The stories were developed in such a way to ensure they were culturally and age appropriate. They consist mostly of identical and cognate words with few unique ones. These tasks will be complemented by a RAVEN test intended for testing IQ performance and ALEF (A*rabic Language: Evaluation of Function*) test. (see Appendix 3).

Procedure: At the beginning of the session, it will be explained to the children what they are required to do. They will be asked if they know "what is StA?" and "what is SpA?" in order to confirm that they understand the difference between each condition. The experiment will be divided into three parts: first, the experimenter will tell the story during which she will point to each picture while telling the event. Second, the child will be instructed to retell the story during which the pictures will be kept in front of him. Third, the child will be asked 5 comprehension questions to make sure that he understands the content of the story. The instructions as well as the comprehension questions will be conducted in SpA across all conditions. (see Appendix 4).

These are the syntactic structures targeted in the stories: 9 syntactic structures are examined with a total of 37 structures per story. A table and examples of targeted syntactic structures are included in Appendix 4. The order of presentation will be counter balanced, each group consists of 12 children, *first group:* 1) StA to StA, 2) StA to SpA, 3) SpA to SpA. *Second group:* 1) SpA to SpA, 2) StA to SpA, and 3) StA to StA.

5. Pilot study: a total of 9 typically developing Arabic speaking children aged 5-6 years old were tested with the above design examining 8 syntactic structures**.** The order of the presentation was: 1) StA to StA, 2) StA to SpA, 3) SpA to SpA. Findings are presented for (1) production of syntactic structure, (2) narratives length in terms of words number, and (3) production of standard words (targeted and non-targeted). In order to determine if there are significant differences a series of t-test was run (tables/figures in Appendix 5).

1) Production of syntactic structures: according to the **first hypothesis** comprehension was expected to be higher in SpA to SpA condition compared to the other 2 conditions. However, the results show that all children scored at ceiling level in comprehension questions across all conditions including the conditions in which the story was told in StA: StA-SpA and StA-StA. This implies that comprehension of the stories was rather easy regardless of whether it was told in SpA or StA. This finding enables us to look at the production data across the three conditions. The results show that in overall production of the number and accuracy of targeted syntactic structures (we counted targeted and non-targeted syntactic structures) was easier in SpA to SpA (M=19) story than in the SpA to StA (M=14.55) and StA to StA (M=13.33) stories, which confirms the **second, third, and fourth hypotheses.** However, within the syntactic structures only two significant differences were found: inflections and construct states, in which children produced more of these structures in SpA to SpA than in SpA to StA. The results show that there was a difficulty in producing object relative clauses structure across all stories (StA to StA=0, StA to SpA and SpA to SpA=0.1). Word order, connectors, and construct states were produced the most in StA to SpA than in SpA to SpA. Unlike, the rest of syntactic structures which were produced more in SpA to SpA. However, significant differences were found only in construct states production, in which they were more salient in StA to SpA than in SpA to SpA and StA to StA (StA to StA: M=0.06, StA to SpA: M=0.39 and SpA to SpA: M=0.11). Two structures were salient across the three conditions: inflections and object pronouns. Across all conditions children produced only one word order structure (usually the first one in the story) and dropped the subject throughout the rest of the story.
2) Narrative length: as predicted, children produced longer stories in SpA to SpA condition than in SpA to StA and StA to StA ones. This confirms the **second** hypothesis which predicted that production is going to be higher in SpA to SpA story than in StA to SpA and SpA to SpA. The

results confirm the **third** hypothesis as well, which predicted that production is going to be slightly higher in SpA to SpA than in StA to SpA and a t-test showed that there are no significant differences. Therefore, although in the second condition the story was told StA, the fact that children were instructed to retell in SpA prompted them to produce longer narratives. The **fourth** hypothesis was confirmed; it predicted that production is going to be higher in StA to SpA than in StA to StA, because the narratives will be produced in SpA.

3) Production of standard words: the results show higher production of standard words in StA to StA story than in StA to SpA and SpA to SpA stories, which shows that as a result of listening to the story in StA children produced more standard words but shorter narratives. Although, the differences are not significant, there is also higher production of standard words in StA to SpA than in SpA to SpA. Although, in both StA to StA and SpA to SpA the stories were told in StA, a significant difference was found in standard words production, in which there was higher production in StA to StA than in StA to SpA.

Please not that, after running the pilot study modification were made and 9 syntactic structures will be examined in the thesis. In the second story (StA to SpA) there was no negation structure because of a technical problem but it will be added in the thesis**.** The results show that comprehension was at ceiling level among all children. Difficulties were manifested in the production domain. The most challenging story was StA to StA, in which children heard the story in StA and were asked to retell it in StA. In over all, production of targeted syntactic structures was easier in was SpA to SpA story than in the SpA to StA and StA to StA. This indicates that production of syntactic structures is less challenging when the story is facilitated by SpA as in the second (StA to SpA) and third (SpA to SpA) stories, unlike, the first one (StA to StA). Narratives' length for StA to StA story were the shortest followed by StA to SpA and then SpA to SpA, which indicates, the same as before, that children were able to produce long narratives when the story was facilitated by SpA whether when they hear the story in SpA or when they are asked to retell it in SpA. Moreover, the findings show that production of standard words was the highest in StA to StA story, combining this with the production of short narratives begins to show a clearer picture of the difficulty that faces children when encountered with StA. That is, they try to produce more StA words which in turn constricts their ability to narrate longer stories. This might be explained as well by saying that, perhaps, StA vocabulary has a distinct lexicon from that of SpA and that as a result of lack of exposure to StA it is still not fully formed as SpA lexicon.

6. Contribution of the study: the case of diglossia in Arabic language has been researched by numerous scholars and from different perspectives. The current study sheds light the effect of diglossia on the productions and comprehension of syntactic structure in story re-retelling. We are

interested in examining the effect of this phenomenon on children's abilities to re-tell stories. The results of this study will contribute to understanding another aspect of this phenomenon, which in turn might provide solutions to the difficulties that children encounter as a results of the diglossic situation in Arabic.

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Appendix 1: <u>detailed examples of inflections:</u> the inflection "ii ي" does not exist in most dialects except in some Bedouin dialects, in which it is frequent e.g. "هو ياكل he is eating/he is going هو يروح", in northern dialects, it is substituted either with "b ب" as in " هو بشرب he is drinking" or the "b ب" is added before the " eeي / t ت " as in " he is running هو بيركض/ she is playing هي بتلعب". This inflection replaces also the "ء Hamza" for first person verbs as in " SpA: I'm running انا بركض" instead of "SpA أنا أركض". These different uses are mainly dialect related. The "b ب" does not exist in StA and its source most likely is not from StA.

Appendix 2: <u>detailed examples for possessive and object pronouns:</u>

In other cases pronouns stay the same as in "منه=from him" in both varieties, although, with different articulation (e.g. StA مِنهُ/ SpA مِنُه). Moreover, some pronouns such second and third person masculine for dual (e.g. كما as in لَكُما- for both of you) are not used in SpA, instead, they are replaced with masculine plural form (e.g. إلكم-إلكوا). In the case of feminine and masculine third person for plural (e.g. هن as in منهُنَ and هم as in منهُمْ), in SpA in many dialects the feminine third person is used for both, females and males (e.g. مِنهِنْ, إلهِنْ). Recently, many people started using the feminine third person for the plural in SpA and this can be seen mostly among educated people and feminists. The same can be applied to object verb pronouns, in which many pronouns are used the same in both varieties but with different articulation (e.g. StA سامَحتْهُ/ SpA سامَحَتُه). The masculine and feminine second and third person for dual and plural are replaced by the masculine third person (e.g. SpA-أكلوا StA أكَلنَ). Another difference between both varieties is verbs, in which some verbs are used only in StA (e.g. ذهبوا=they went).

Appendix 3 - ALEF

DLD Screening tasks: since this study aims to investigate children with developmental language disorder, a language screening battery will be used for DLD screening. Children will be tested by some subtests of the ALEF test. A U.S. team led by Grigorenko created this test and it was validated based on a normative sample of children 3-9 years of age from Saudi Arabia. The ALEF tasks that will be used in this study were recently adapted to PA and used in screening for SLI among speakers of PA in Israel (Ghawi-Dakwar, 2017; Saiegh-Haddad and Ghawi-Dakwar (submitted).

Word Articulation Task: The experimenter shows the child a picture via a PowerPoint presentation and asks him\her to name what he\she sees is in the picture based on the sentence that the experimenter starts with (e.g. my sister plays with--?). The child is supposed to say 46 words. There are specific sounds targeted in each word and expected to be articulated by the child.

Receptive Vocabulary Task: The experimenter shows the child three pictures via a PowerPoint presentation, and asks him\her to point to the picture of the target word (e.g. where is the finger?) that is relevant to the target word. The aim of this task is to detect receptive vocabulary.

Expressive Vocabulary Task: The experimenter shows the child pictures via a PowerPoint presentation, and asks him/her to say what he/she sees in each picture. The aim of this task is to test expressive vocabulary.

Sentence Comprehension Task: The experimenter shows the child three pictures via a PowerPoint presentation and says a sentence which describes one of the three pictures in the slide. The child is asked to point to the picture that matches the sentence he/she heard. The aim of this task is to test oral language comprehension.

Sentence Completion Task: The experimenter shows the child pictures via a PowerPoint presentation. The experimenter describes the first picture, then she starts describing the second one and the child is asked to complete the description of the second picture (e.g. there is one king here, and there are 3 ---?) The aim of this task is to test the child's ability to produce the plural\singular forms and other grammatical features.

Sentence Imitation Task: The experimenter says a complete sentence and asks the child to repeat it as he/she heard it. The task aims to test the verbal long term memory.

Pseudo Word Repetition Task The experimenter says novel words and asks the child to repeat the same novel words as he/she heard them. The aim of this task is to test the verbal \ phonological short term memory.

Pseudo Word Discrimination Task The experimenter says two pseudo words, and the child is asked to determine whether the words are matched or different. This task aims to test the ability to discriminate between phonological forms.

Digit span task. The experimenter says a random string of digits, in the first part (forward digit span) the child is asked to repeat the digits in the same order he hear, and in the second part (backward digit span) he is asked to repeat the digits he heard but with the opposite order. This task measures verbal short term-working memory.

Rapid automatized naming (RAN) The experimenter shows the child a row of 5 shapes or pictures of objects repeated fifty times and asks the child to name what he\she sees as fast as he can. The experimenter measures the time the child takes to finish naming the whole set of 50 items. The task includes two trials: picture/object naming and shapes naming.

The procedure: at the beginning of the session it was explained to the children what they were required to do. They were asked if they know "what is Standard Arabic?" and "what is Spoken Arabic?" in order to confirm that they understood the difference between each condition. The experiment was divided into three parts: first, the experimenter told the story during which she points to each picture while telling the event. Second, the child was instructed to retell the story during which the pictures were kept in front of him. Third, the child was asked 5 comprehension questions to make sure that he understood the content of the story. The instructions as well as the comprehension questions are all conducted in Spoken Arabic across all conditions.

Appendix 4 - The stories to be used in the study

(1) StA to StA: Today, in kindergarten Manal was cutting a purple butterfly with her brother whom she loves. While she was holding the scissors she cut her hand. She hurt and started crying. Manal asked her teacher (female teacher) to help her. The teacher told her not to cry: "I will put medicine on the wound and the pain will stop". After the pain stopped, Manal continued cutting the butterfly.

(2) StA to SpA: One day, Majd was drinking milk in his sister's room. Majd spilled the milk on his sister's doll's dress whom he loves. He was afraid that she would know and get angry at him. None the less, he called her and told her that he had spilled the milk on the doll's dress. Ahlamdid not get angry at him and helped Majd clean the dress. Majd was happy because his sister forgave him and hugged him.

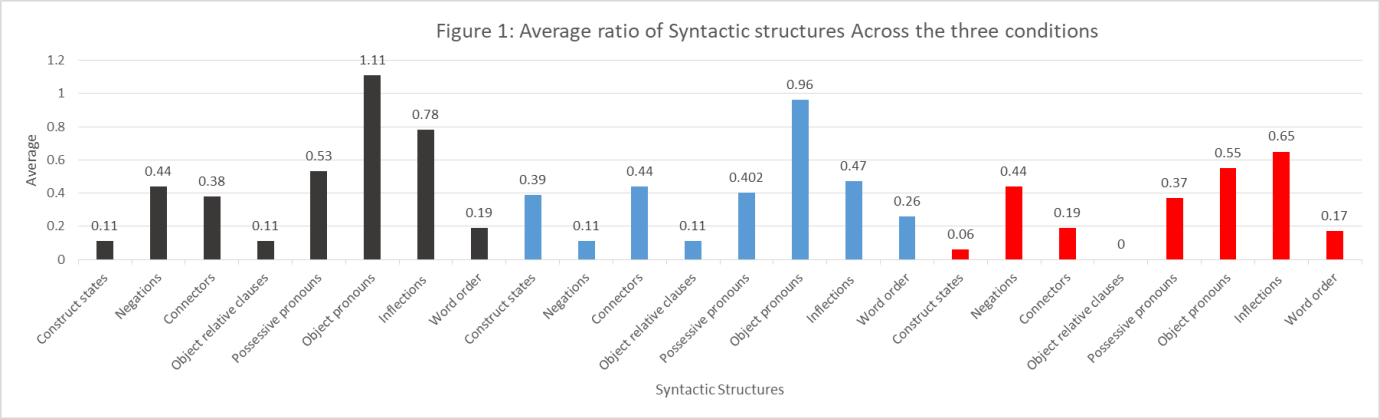
(3) SpA to SpA: Today at the zoo, Sarah was playing with the little monkey whom she loves. When she came close in order to give him a banana, the monkey snatched it from her. She was sad and started crying. Sarah complained about the monkey to her mother. So, her mother told her "don't be sad, he's poor and hungry". Go and give him another banana. The monkey was happy, took the second banana and kissed her.

Syntactic structures by condition			
Syntactic Structure	**Story 1: StA-StA**	**Story 2: StA-SpA**	**Story 3: SpA-SpA**
Word order (SVO&VSO)	**8**	**3**	**4**
Inflection	**15**	**10**	**14**
Object pronoun	**1**	**3**	**4**
Possessive pronoun	**5**	**8**	**5**
Nominal Construction	**1**	**1**	**0**
Object relative clause	**1**	**1**	**1**
Connector	**3**	**6**	**5**
Negation	**1**	**1**	**1**
Construct state	**2**	**4**	**3**
Total	**37**	**37**	**37**

Examples of targeted syntactic structures		
Syntactic structure	**Story**	**Example**
Word order	StA to StA	كانت منال تقص فراشة ليلكيه (Manal was cutting a purple butterfly)
Inflection	StA to StA	ن**ت** (was), يشر**ب** (he is drinking), **ت**حبه (she loves him).
Object pronoun	StA to SpA	سامح**ته** (she forgave him)
Possessive pronoun	SpA to SpA	ن**ها** (from her), إم**ها** (her mother)
Nominal Construction	StA to StA	قص الفراشة (cutting the butterfly)
Object relative clause	StA to SpA	على فستان لعبة اخته **التي** يحبها (on his sister's doll's dress whom he loves)
Connector	SpA to SpA	ما (when), عشان (because), **ف**قالتلها (then she told her)
Negation	StA to SpA	**لم** تغضب (she did not get angry)
Construct state	SpA to SpA	قرن الموز (a banana)

Appendix 5 – Pilot Study – Detailed Results – please note that for the pilot study there was no negation structure in StA to SpA story because of a technical problem. As well as, we decided to add nominal construction structures in StA to StA and StA to SpA stories in the thesis, which were not examined in the pilot study.

Pilot study: number of syntactic structure per story			
Syntactic Structure	**Story 1: StA-StA**	**Story 2: StA-SpA**	**Story 3: SpA-SpA**
Word order	**8**	**3**	**4**
Inflection	**15**	**10**	**14**
Object pronoun	**1**	**3**	**4**
Possessive pronoun	**5**	**8**	**5**
Object relative clause	**1**	**1**	**1**
Connector	**3**	**6**	**5**
Negation	**1**	**0**	**1**
Construct state	**2**	**4**	**3**
Total	**36**	**35**	**37**



1) Production of syntactic structures: this section shows the average ratios of syntactic structures across the three conditions. **Figure 1:** the red columns show the average ratio of StA to StA story re-telling; the blue columns show the average ratio of the StA to SpA story re-telling; and the black columns show the average ratio of SpA to SpA story re-telling.

A series of t-tests found that there are no significant differences in the production of syntactic structures across the three stories except for:

1) The production of inflections structure between SpA to SpA and StA to SpA ($p=0.03$); inflections were more salient in SpA to SpA ($M=0.78$) than in StA to SpA ($M=0.47$).
2) The production of construct states structure between SpA to SpA and StA to SpA ($p=0.02$); construct states were more salient in StA to SpA ($M=0.39$) than in SpA to SpA ($M=0.11$)
3) The production of construct states structure between StA to SpA and StA to StA ($p=0.001$); construct states were more salient in StA to SpA ($M=0.39$) than in StA to StA ($M=0.06$).

2) Narrative length: this section shows average ratio of the total number of words produced for each story to show the differences across the three conditions.

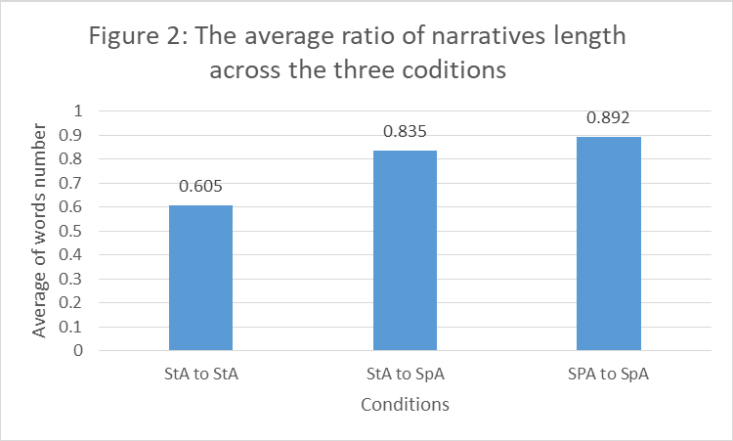


Figure 2: shows the average ratio of narratives length per story. The average ratio for SpA to SpA condition is 0.892, for StA to SpA is 0.835, and for StA to StA is 0.605. A t-test revealed that there are significant differences between StA to StA-SpA to SpA (p=0.006) and StA to StA- StA to SpA (p=0.04)**.** However, there is no significant difference in StA to SpA - SpA to SpA (p=0.47).

3) Production of standard words: this section shows the average ratio of the number of standard words produced by each child per condition.

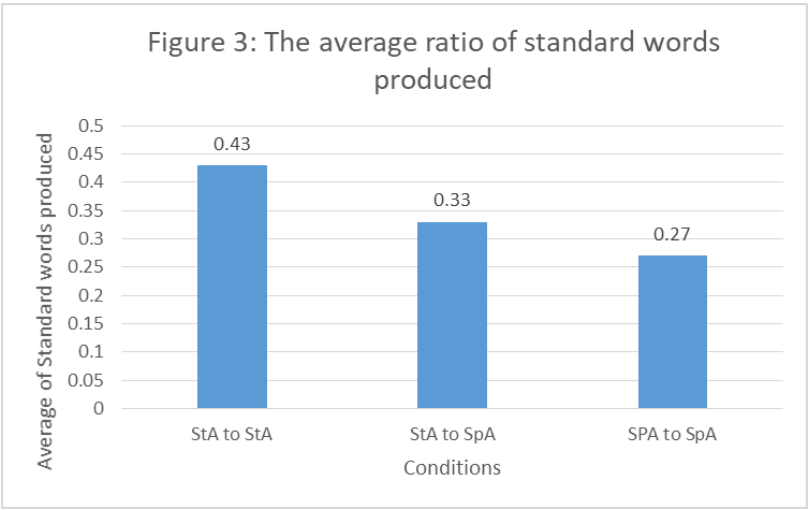


Figure 3: shows the average ratio of the number of standard words produced by each child per condition. The average for SpA to SpA condition is 0.27, for StA to SpA is 0.33, and for StA to StA is 0.43. A t-test revealed that there are significant differences between StA to StA-SpA to SpA

(p=0.02) and StA to StA- StA to SpA (p=0.04)**.** There is no significant difference in StA to SpA - SpA to SpA (p=0.054).