

# Chapter 13

## The Development of ADAT (Arabic Diglossic Knowledge and Awareness Test): A theoretical and clinical overview

Reem Khamis-Dakwar and Baha Makhoul

**Abstract** Children growing up in an Arabic-speaking community must learn both a vernacular language variety (Spoken Arabic or SA) used in everyday life, and a standard language variety (Modern Standard Arabic or MSA) used for writing and formal language functions. A diglossic situation such as this poses special challenges for professionals engaged in the assessment of children's emergent learning skills because of issues related to the simultaneous acquisition of two distinct linguistic systems. Most, if not all available Arabic language and reading assessment tools test children only in MSA. In contrast with this traditional stance, recent approaches have proposed evaluation in SA only, or in both MSA and SA, depending on the modality: written tasks versus spoken tasks. In this chapter, we will outline the development of "ADAT", the Arabic Diglossic Knowledge and Awareness Test, which was designed to assess diglossic and metadiglossic knowledge at the elementary school level in the two language varieties of Arabic (MSA and SA) and across all language domains.

**Keywords** Arabic · Diglossia · Emergent literacy · Language acquisition · Language assessment · Language-literacy connections · Speech language pathologist · Speech disorder · Palestinian Arabic · language development

### 13.1 Introduction

The study of reading development and reading disabilities has been predominantly focused on findings from British and American research (Miles 2000). There are two main challenges in applying findings from these studies to the understanding and assessment of reading cross-linguistically. The first challenge is whether the

---

R. Khamis-Dakwar (✉)

Department of communication Sciences and Disorders, Adelphi University,  
1 South Avenue, Hy-Weinberg Center, Room 136, Garden City NY 11530, USA  
e-mail: Khamis-Dakwar@adelphi.edu

B. Makhoul

Haifa University, Haifa, Israel  
e-mail: baham@cet.ac.il

The Centre for Educational Technology (CET), Tel-Aviv, Israel

phenotypic patterns of children or adults with reading disability demonstrate a similar manifestation across languages. Specific deficiencies may not affect reading in the same way in different languages. For example, since Spanish has a transparent orthography, children with a reading disability would not necessarily demonstrate phonological reading difficulties as might be more evident in English readers. English written language holds more exceptions with regard to grapheme-to-phoneme correspondence rules, therefore these phonological decoding difficulties seen in English readers with a disability may not surface in reading Spanish or other transparent languages. Indeed, several studies show that valid measures of phonological deficiencies in English fall short of identifying phonological processing deficits in Spanish, and that measuring phonological processing deficiencies in transparent languages is better diagnosed through pseudo-word reading (e.g. Gonzalez and Hernandez 2000), reading slowness (e.g. Zoccolotti et al. 1999), rapid naming and phonological memory deficits (e.g. Landerl and Wimmer 2000).

The second challenge relates to the interpretation of the performances of individuals with reading disabilities in different languages. For example, several studies of Italian, French, and Spanish provide evidence in support of the phonological deficit model for dyslexia (Zoccolotti et al. 1999) whereas studies of German provide evidence against it (Landerl and Wimmer 2000) supporting the double deficit hypothesis (Wimmer et al. 2000).

Reliance on a framework that assumes a match between written and oral linguistic systems may lead to conclusions that are not applicable to different sociolinguistic situations. Such situations would include the case of native vernacular Arabic speakers learning to read and write in MSA; or native speakers of African American English (AAE) learning to read and write in Standard American English (SAE) (see Myhill, Chap. 9). There is a scarcity of studies investigating the relationship between oral language and literacy development in languages exhibiting a mismatch relationship (see Saiegh-Haddad & Spolsky, Chap. 10). Such research would enhance our understanding of literacy development in general. Moreover, it is essential for determining appropriate evidence-based pedagogical practices in literacy assessment and literacy instruction in these speech communities in particular, which have so far been largely based on mainstream sociolinguistic situations in which a language-literacy match is assumed (for more on the Anglocentricism in reading research and practice, see Share 2008).

Most of the studies that do exist in this area focus on African American English (AAE) speaking students' reading development in Standard American English (SAE). The Black-White reading achievement gap is well documented in the literature and is reflected in several measures of school success (McDonald and Craig 2006). These achievement gaps often demonstrate a widening difference between a minority students' grade level and their corresponding reading level (Morrison et al. 2005). Sixty-one percent of African American children failed to achieve basic reading levels on the 2003 Fourth Grade National Assessment of Educational Progress compared to 26% of their white peers (U.S. Department of Education 2003). Research has investigated the source variables of the described achievement gaps. Early studies investigating the relationship between AAE speaking students

and reading showed no relationship between literacy achievement in SAE and children's AAE abilities (Gemake 1981; Goodman and Buck 1973; Harber 1977; Hart et al. 1980; Melmed 1973; Rystrom 1973–1974; Seymour and Ralabate 1985; Simons and Johnson 1973; Steffensen et al. 1982 as cited in Craig and Washington 2006, p. 97). However, subsequent studies provide empirical evidence to support the idea that the use of some AAE constructions does correlate negatively with reading achievement for African American students learning to read in SAE written language (Adler 1992; Manning and Baruth 2000 as cited in Craig and Washington 2006, p. 97).

Three main hypotheses have been proposed to explain these latter results and to explain the achievement gap. The first hypothesis is the teacher bias hypothesis, in which teachers' negative perceptions of AAE speaking students results in provision of lower quality instruction, thus affecting achievement. The second hypothesis claims that linguistic mismatches between the home language and language of reading instruction results in possible confusion in the learning process. Finally, the third hypothesis attributes the achievement gap to a lack of linguistic awareness knowledge of both varieties and the relationship between them (Terry et al. 2010; Terry 2010). This knowledge has been referred to as dialect awareness ability (Charity et al. 2004), dialect shifting (Connor and Craig 2006; Craig and Washington 2004), or linguistic awareness flexibility (Scarborough et al. 2007).

Current research in language and literacy has been expanded to include non-mainstream American English (NMAE) dialects other than AAE such as Southern American English, Creole English, Appalachian English, and Latino English (Terry et al. 2010) and can be divided into four main areas of research. These include a focus on studying the development of oral language shift abilities in relation to reading achievement (e.g. Craig and Washington 2006), understanding metalinguistic awareness development in relation to reading development (e.g. Scarborough et al. 2007), developing non-discriminatory language and literacy evaluation procedures (e.g. Craig et al. 2005; Pearson et al. 2009) and ultimately, enhancing our understanding of the factors in predicting academic success for AAE-speaking students in academic contexts (e.g. Terry et al. 2010).

This review of studies of learning to read and write in oral-literacy mismatch situations underscores the importance of various aspects of the relationship between oral language skills and reading development in these contexts. For example, Craig and Washington (2006) argue that dialect shifting ability is necessary for conventional literacy development in AAE speakers learning to read and write in SAE. Moreover, a new focus on examining language awareness effects for the prediction of reading success in Arabic supports the effect of 'linguistic affiliation' (Saiegh-Haddad 2007), that is, whether a given linguistic structure is affiliated with the spoken vernacular or with the standard written language, on metalinguistic awareness in Arabic and points to the need to develop assessments that are sensitive enough to these differences in linguistic affiliation on the acquisition of basic literacy skills in Arabic. Assessment and evaluation of the linguistic affiliation effect in developing readers would enable earlier identification of reading deficiencies for populations

with an oral-literacy mismatch (i.e., diglossia) such as vernacular Arabic speakers and non-mainstream English speakers.

### ***13.1.1 Arabic Diglossia and Learning to Read and Write***

One of the markers of speech societies exhibiting diglossia is the restriction of access to formal schooling, along with a requirement on the part of formal institutions for knowledge of the ‘high variety’ language (for a cross-linguistic perspective, see Myhill, Chap. 9; Romaine 2000). The low literacy rate in the Arab world is widely reported in the literature (Maamouri 1998; UNDP 2003; Haeri 2003).<sup>1</sup> It is also reported in Haeri’s (2003) fieldwork in Egypt, which observes that many people who had a college education or otherwise work in a literate setting (e.g., public librarians) report not liking to read in spite of their high proficiency in MSA. Participants in this study attributed their lack of interest in reading to their perception that written Arabic is very complex and difficult (Chap. 9, Myhill, for linguistic distance reasons, Rosenhouse, for pedagogical reasons and Saiegh-Haddad & Spolsky, for ideological and other reasons).

Arabic might be considered a transparent orthography (where direct relationships between the orthographic system and the phonological systems exist), if the fully vowelized script is employed. Maamouri (1998) claims that this relation, however, becomes opaque once vowelization is eliminated (for a description of Arabic language and orthography, see Saiegh-Haddad & Henkin-Roitfarb, Chap. 1). Many researchers have found that children achieve better spelling and oral reading when exposed to fully vowelized script and hence the use of fully vowelized scripts has been encouraged in schools (Azzam 1990; Abu-Rabia 2002). However, due to the diglossic situation between SA and MSA, a different opacity still exists in the literacy process for developing readers, due to the mismatch between the spoken and standard varieties (Saiegh-Haddad 2005). There is therefore a need to understand how typically-developing children develop their linguistic competence of these features. This understanding may inform our educational and clinical evaluation and intervention for children with learning difficulties or disabilities.

This chapter is focused on the early stages of learning to read and write in Arabic and children’s diglossic knowledge and/or awareness development within the diglossic situation where they are taught to read and write in MSA and speak vernacular Arabic at home. This study was administered in Israel, where in comparison to the Arab world children have relatively limited exposure to Modern Standard Arabic. This is because Hebrew and English are the dominant languages in the state of Israel, and Arabic is the language of the indigenous minority (Spolsky 1997; Amara 2002). Hence, we assume an increase of the possible interactive effects of diglossia on literacy development in such a sociopolitical environment. Using language

---

<sup>1</sup> Forty percent of the total population of all Arab states over 15 years old is illiterate, with some variation across the Arab states and within each state (Maamouri 2003).

properly involves understanding the effect of context in choosing the appropriate language variety and the different linguistic rules for each variety. Since children are mainly exposed to MSA through formal instruction in the schooling system, we assume that increased exposure to MSA in schools amplifies the development of their diglossic knowledge (i.e. knowledge of the diglossic linguistic features of Arabic) and metadiglossic awareness (i.e. the awareness of the two language varieties of Arabic as such, and the interrelationships between them). The acquisition of diglossic knowledge and metadiglossic awareness is hypothesized to be positively correlated with literacy development, in much the same way that Non-mainstream American English speaking children with improved dialect awareness demonstrated improved SAE reading and writing abilities.

### ***13.1.2 Diglossia in Arabic: Earlier Studies***

Khamis-Dakwar (2005) describes four main lines of research on Arabic diglossia. The first line is focused on describing the linguistic features of the two varieties and the relationship between them (e.g. Altoma 1969; Talmoudi 1984 as cited in Khamis-Dakwar 2005, p. 76), whereas a second line of research focuses on examining the effects of early exposure to literary Arabic texts on reading comprehension abilities in Arab pre-school children (e.g. Abu-Rabia 2000; Eviatar and Ibrahim 2000; Feitelson et al. 1993 as cited in Khamis-Dakwar 2005, p. 76). An expanded third line of research examines the development profiles of native Arabic-speaking children either linguistically (e.g. Abu-Rabia et al. 2003; Khamis-Dakwar et al. 2012; Saiegh-Haddad 2003, 2004, 2005), or in reading and spelling (e.g. Abu-Rabia 2002; Abu-Rabia and Taha 2004; Abu-Rabia and Shalhoub Awwad 2004; Abu-Rabia and Taha 2006). The last line of research focuses on teaching Arabic as a foreign language within the existent diglossic situation as cited in Khamis-Dakwar (2005). For the purpose of this chapter, we will describe only those studies addressing metalinguistic development in Arabic and Arabic language assessments.

#### **The Development of Metalinguistic Awareness in a Diglossic Situation**

Eviatar and Ibrahim (2000) studied the metalinguistic abilities of Palestinian children from Israel who had been exposed to both spoken and literary Arabic in comparison to the metalinguistic abilities of Russian-Hebrew bilinguals and monolingual Hebrew speakers. Arbitrariness ability (in which the child was asked to exchange one word for another in the same language), phonological awareness, and vocabulary size were evaluated in this study. The Palestinian children were tested in spoken Arabic whereas the Hebrew monolinguals and Russian-Hebrew bilinguals were tested in Hebrew. In the phonological tasks and the arbitrariness tasks, children in both the Arabic-speaking group and the Russian-Hebrew bilingual group achieved significantly higher scores than the Hebrew monolinguals. Interestingly,

for the vocabulary task, the Arabic-speaking children had higher performance scores than the Russian-Hebrew bilinguals and their scores were closer to that of Hebrew monolinguals in kindergarten, but not in the 1st grade. Based on these findings, the authors conclude that Arabic-speaking children's exposure to literary Arabic is comparable in its effects on bilingual language analysis performance to that of children exposed to two languages (such as Hebrew and Russian). Based on the study results, the authors suggest that Arabic-speaking children in a diglossic situation perform similar language analyses to children in a bilingual situation. These behavioral findings were further supported by recent neurocognitive investigations in lexical diglossic code-switching in native Arabic-speaking adults. Here, Arabic speakers performed lexical code-switching between MSA and PSA which elicited a P600 event related potential (ERP) response, in much the same way another study elicited the same response from bilingual Spanish-English speakers performing a similar task. This comparison between MSA to PSA and Spanish to English code-switching points to two varieties being linguistically indexed in both situations as separate underlying neural lexicons, despite conceptual constructs of more greatly differing language categories (Moreno et al. 2002; Khamis-Dakwar et al. 2009; Khamis-Dakwar and Froud 2007).

The development of research into diglossia has more to consider in light of the aforementioned studies. Eviatar and Ibrahim's (2000) study examined metalinguistic awareness in only one Arabic language variety and did not control for overlapping and non-overlapping features in the two language varieties. Indeed, on the development of linguistic competence there are very few studies that account for the linguistic features that differentiate MSA and SA in either typically-developing children or in children with reading or learning disabilities. A series of studies by Saiegh-Haddad examined the influence of lexico-phonological distance (between the spoken and standard language varieties in Arabic) on the development of phonological awareness, word decoding, word repetition, and lexical retrieval in native Arabic-speaking children with typical development (Saiegh-Haddad 2003, 2004, 2005, 2007, 2011a, b, 2010; Saiegh-Haddad et al. 2011). Findings from these studies led Saiegh-Haddad (2007) to propose the "linguistic affiliation constraint" hypothesis, which suggests that the oral-written language phonological distance in Arabic dialects impacts the acquisition of basic language and literacy skills in MSA because it affects the development of high-quality phonological representations for MSA linguistic structures, and the accurate encoding of standard language phonological structure in long-term memory (Saiegh-Haddad et al. 2011).

Evidence of impacted morphosyntactic knowledge in developing diglossic Arabic speakers has also been documented (Khamis-Dakwar et al. 2012). Here, researchers examined the development of morphosyntactic knowledge of MSA and Palestinian vernacular Arabic (PSA) in 60 typically-developing Arabic-speaking children aged 6; 4–12; 4, from a school in Nazareth, using a forced-choice grammaticality judgment task. The results of the study revealed that these children's performance was significantly higher on items verbally presented in PSA, their spoken language, than in MSA, with the exception of constructions involving

negation.<sup>2</sup> In addition to this language variety effect, children performed better on items when the two constructions were overlapping in both language varieties than when they did not overlap, thus supporting the ‘linguistic affiliation constraint’ (Saiegh-Haddad 2007).

Current language assessment tools do not address the findings revealed by the reviewed research examining language and literacy development in Arabic, which if administered, would provide educators and clinicians with a more representative and accurate account of a child’s true linguistic abilities. Further in this chapter is an outline of the development of a test called ADAT, and preliminary findings from its pilot administration with typically-developing Arabic-speaking children in grades 1–5. The introduction of the test is preceded by a review of language and literacy testing in Arabic, with a focus on speech and language pathology assessment in Arabic.

### ***13.1.3 Language and Literacy Testing in Arabic***

Very few studies report on language and literacy testing in Arabic. Most of the existing studies do not account systematically for the diglossic features which have been reported to significantly influence children’s performances, neither in their design nor in their analysis of the results.

For instance, Abu-Rabia and Taha (2004) investigated the profile of spelling errors of native Palestinian Arabic-speaking 5th graders with dyslexia and compared it to that of typically-reading children matched for age and grade level, and also to typically-reading 2nd graders, which were matched for reading level. Children’s spelling was examined in three contexts: spelling of texts, isolated words, and pseudowords. The results revealed that children with dyslexia exhibited no qualitatively different spelling errors in comparison to the children with typical reading development and that their spelling-error profile resembled that of the normal readers matched for reading level. Additionally, the most prominent error exhibited by the group of children with dyslexia and the reading level matched group (i.e., 2nd graders) were the morphological and semiphonetic errors, which arguably reflect the demands of Arabic orthography. On the other hand, children from the age-matched group (i.e., 5th graders) exhibited a high percentage of phonetic errors. The authors suggest that these errors are exhibited due to a limited orthographic lexicon and poor knowledge of spelling rules. The possible effect of diglossic features on these types of errors could not be identified within the study, due to the limitation of the coding paradigm, which does not account for diglossic-based error types.<sup>3</sup> This study was

---

<sup>2</sup> For further discussion of children’s performances on negation structures refer to Khamis-Dakwar et al. (2012).

<sup>3</sup> Abu-Rabia and Taha (2004) classified children’s oral reading errors into the following types of errors: non-semantic semiphonetic errors, semantic and non-morphological semiphonetic errors, semantic dysphonetic errors, non-semantic dysphonetic errors, morphological errors, addition of functional words, visual letter confusion, irregular pronunciation rules, semantic sentence

unique in that it was one of the first studies to examine spelling errors in light of the unique characteristics of Arabic orthography. Nonetheless, although the authors discuss the effect of diglossia on children's spelling and oral reading development and present a model of reading and spelling assumed to illustrate reading and spelling of Arabic in light of its specific sociolinguistic and orthographic features, there was no categorization of the diglossic-based errors which might manifest as a separate error type or as a sub-category of phonetic errors, as observed on phonological and decoding tasks (e.g., Saiegh-Haddad 2003).

Another study conducted by Abu-Rabia and Taha (2006) utilized the same spelling-error analysis paradigm (Abu-Rabia and Taha 2004) and examined word spelling<sup>4</sup> of 288 Palestinian students in the 1st through 9th grades who are native speakers of Arabic from Israel. As detailed and fundamental as this study is in its findings, it also does not address the effect of diglossia on children's spelling, either in its research design or in the data analysis.

Other studies have attempted to examine the predictive correlations between language and literacy skills in children with reading disabilities, in light of the specific features of Arabic, yet these too did not consider diglossia in their design, implementation, analysis or interpretation. This has resulted in studies using tasks that have randomly mixed the two varieties with the assumption that the same language is being elicited. For example, Abu-Rabia et al. (2003) investigated whether performance on tasks associated with basic cognitive processes, including working memory examined by memorizing digits, missing words in sentences, visual processing, morphological abilities tested by identifying two morphologically related words and producing words from same morphological family in 30 s, syntactic abilities tested by oral cloze test and grammaticality judgment of sentences in MSA, and phonological awareness tested by final phoneme deletion task in pseudowords and in MSA words, predicted word reading ability in three groups of children: 5th grade children with reading disability, age-matched typical readers also in the 5th grade and reading-level matched typical readers in the 3rd grade. Their results revealed deficiencies among the 5th grade children with reading disability in phonological decoding, morphology, working memory, and syntactic and visual processing. Phonological decoding was revealed as the most significant deficiency. On the other hand, orthographic processing was shown to be relatively strong in this group. This study was unique in its separate assessment of children's spoken Arabic and Standard Arabic language skills. However, language processing tasks did not systematically target linguistic features that differentiate MSA and PSA. Instead investigators used both MSA and PSA varieties depending on the modality of testing with the

---

guessing, semantic errors, and omitting functional words. Similarly, children's spelling errors were classified as phonetic errors, semiphonetic errors, dysphonetic errors, visual-letter confusion errors, irregular spelling errors, word omission, and functional word omissions.

<sup>4</sup> The authors do not declare the number of words used for testing children's spelling and they only note that the number of words for each list differed depending on the grade level.



result that the orally administered tasks were verbally presented in PSA and the written tasks in MSA.<sup>5</sup>

Another recent study by Mahfoudhi et al. (2010) examined the predictive relationships of phonological and morphological processing as well as reading fluency in 166 typically-developing Arabic-speaking children and 70 learning disabled (LD) Arabic-speaking children from the 3rd through 6th grade, matched on non-verbal ability. To address their query, Mahfoudhi et al. (2010) developed linguistic measurements specifically for this study. Mahfoudhi et al. (2010, p. 4) maintain that “Given the lack of standardized measures in the Arabic language, these measures were developed specifically for this work”, based on measures typically used in the literature. The measures they used were unique in examining not only phonological processing (in spoken Arabic) but also morphological processing (of written stimuli in MSA). The results of the study showed a significant correlation between morphological processing performances and reading fluency performances in 5th–8th graders with LD (but not 3rd–6th graders LD). Differences in modality and in the language used in each mode of presentation to assess phonological processing and morphological processing might have led to the observed differences in the performances obtained and might, therefore, limit the generalizability of the results and the external validity of the conclusions with regard to the effect of phonological and morphological awareness skills on language comprehension and reading fluency in Arabic. Hence, there is a need to develop a valid test that incorporates the assessment of processing abilities of all language domains while also controlling for the diglossic features specifically related to the process of learning to read and write in Arabic. Such a test would be valuable not only for clinical and educational practices, but also for research use and for its potential to enhance our understanding of language and reading development in Arabic diglossia.

The reality is that clinical assessment (in Israel and most probably in other Arabic-speaking regions) mimics research in that it ignores diglossia as an important factor in language and reading development in Arabic. Clinical practice in Israel relies on a translation of tasks that were developed originally based on normative data for American or British English speaking children, and whose linguistic processing for reading and writing occurs in non-diglossic contexts with a high degree of linguistic matching between the oral language and the language of literacy. Hence, there is a need to develop an authentic linguistic tool for Arabic-speaking children that accounts for diglossia, where the difference in oral and written systems is systematically targeted. This would perhaps be more amenable to analysis by bilingual linguistic assessment procedures than by monolingual assessment paradigms.

---

<sup>5</sup> A similar dichotomy of assessing speaking and listening using vernacular Arabic, while using MSA when assessing writing and reading is reported in the assessment of the most common proficiency tests used for assessing students learning Arabic as a second language in the United States: the ACTFL & ILR tests (Eisels 2006).

## Speech Language Pathology Services in Arabic and Language Assessment in Arabic

Speech language pathology is a developing field in the Arab world. There is at present a limited number of certified Arabic-speaking speech language pathologists (SLPs) and academic and clinical resources are scarce (Khamis-Dakwar and Crowley 2005; Patel and Khamis-Dakwar 2005; Khamis-Dakwar and Froud 2012; Wilson 1996). For example, in Kuwait, there are only 42 Arabic-speaking SLPs (both Kuwaiti and non-Kuwaiti) (Al-Khaledi et al. 2008); and in Egypt, there are 125 phoniatricians and 250 logopedists (Kotby et al. 2010). Moreover, even though speech and language services in Israel are considered to be a “well established professional field” (Korenbrod et al. 2002, p. 72), there is a shortage of certified Arabic-speaking speech language pathologists in Israel, as compared to Hebrew speaking SLPs. A prominent non-governmental organization for human rights reported that in 2000, only 21 of the 1,185 speech therapists in Israel were Palestinian Arabs (Human Rights Watch 2001). Thereafter there were approximately 16 Arabic-speaking SLPs to administer evaluation and treatment for every million people in Kuwait in 2008, 5 Arabic-speaking SLPs per million people in Egypt in 2010, and 17 Arabic-speaking SLPs per million people in the Palestinian population in Israel in 2000. This is compared to the 388 SLPs per million people in the U.S and 224 Hebrew-speaking SLPs per million people in Israel.

The literature on language development and language testing for Arabic-speaking children in the Middle East is sparse, when compared to the field as a whole. Some intensive focus has been directed toward developing articulation norms and tests in Arabic (Amayreh 1994; Abou-Elsaad et al. 2009). In one of the rare studies on developing language screening tests for Arabic-speaking children, Wiig and El-Halees (2000) reported that, in Jordan, speech and language screening mainly employs subjective measures and that false negative identifications are numerous. Additionally, they reported that, “At times, English tests are translated literally and scores are interpreted against normative data developed from American or British-English speaking children” (Wiig and El-Halees 2000, p. 261). Similarly, Korenbrot et al. (2002), report that SLPs in Israel tend to translate and use tests from English with no appropriate standardization. They note the availability of only two standardized tests in Israel, both of which are designed for pre-school children (7 years and younger), and are standardized only for Hebrew-speaking children in Israel. Often, these tests are translated word by word when used with Arab children from Israel. Transliteration of testing items does not account for differences in linguistic structure or cultural bias. Additionally, translated language tests do not take into account the sociolinguistic situation of Arabic in which children’s knowledge of a language variety varies between the spoken and the written form and hence, between the two modalities of testing.

One of the responsibilities of speech language pathologists is to assess children’s readiness to read and write. This is due to the growing recognition of the relationship between reading disabilities and underlying linguistic deficits. In addition, several language skills, such as naming and oral language, have been found to be

a strong predictor of success in reading, writing and spelling. Some evidence suggests early intervention might prevent the development of reading disability in later stages (Foster and Miller 2007). As per our review above, there is a need to develop an Arabic readiness test in which diglossic features are controlled for or systematically addressed. There is no Arabic test developed to examine children's diglossic knowledge and awareness in the two language varieties in Arabic, and across the different language domains (semantics, morphology, syntax, phonology, and pragmatics) with respect to features that differentiate MSA and PSA. Developing such a tool will enable a better understanding of the normative development of language and literacy in Arabic diglossia. This normative data is necessary for establishing a basis for distinguishing between children with reading difficulty triggered by the diglossic situation and children with a genuine neurologically based reading disability. In the following section, we will describe the development of ADAT (Arabic Diglossia Knowledge and Awareness Test) and describe preliminary results of children's development of relative competence in the two varieties of Arabic across the early elementary school (1st–5th) grades.

To end this section, it is imperative to note Labov's (2003) assertion that reading research has focused extensively on studying "the small percentage who fall far behind in reading because of a specific cognitive impairment" (pp. 128), and that "considerable progress had been made in defining the symptoms and typology of dyslexia, if not its etiology" (pp. 128). He addresses the need for a new direction in reading research which focuses on studying the failure of minority children to learn to read and write in a language that differs from their mother tongue. This situation involves a larger number of children (more than simply those with dyslexia) in the United States and in the world, and it has serious consequences when considering the limited opportunities these children have as a result of their failure to achieve literacy.

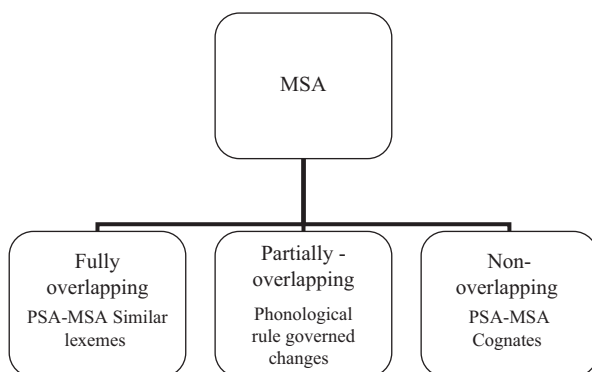
### **13.1.4 ADAT (*Arabic Diglossic Knowledge and Awareness Test*)**

The foregoing sections suggest that it should no longer be ethically acceptable to assess emergent literacy in Arabic-speaking children based on the examination of only one of their language varieties and without controlling for the effect of diglossic features (match vs. mismatch, or overlapping vs. non-overlapping/distinctive) on language tasks performance.

Emergent literacy assessment in a mismatch situation should be carried out with an instrument that is linguistically and culturally appropriate, so as to be able to identify areas in which differential impairment may be found at any level of linguistic structure (phonology, morphology, syntax, pragmatics, and lexicon).

The *Arabic Diglossic Knowledge and Awareness Test* (ADAT) is intended to be a comprehensive language test designed to test language-based skills found to predict success in reading, writing, and spelling in Arabic for kindergarten and 1st grade students. Each student is tested individually. The testing is multidimensional—testing various linguistic levels, across multiple tasks (e.g., comprehension, judgment, and production), and units (e.g., phonemes, words, and narrative).

**Fig. 13.1** Type of lexemes presented in the receptive diglossic vocabulary assessment



To administer the ADAT, the examiner employs the stimulus book. At present, it is only available for testing Palestinian Spoken Arabic (PSA) in the north of Israel. We hope that future studies will develop or adapt the ADAT for other Arabic dialects in different sociolinguistic contexts. The test is comprised of four parts, including a receptive vocabulary assessment, a morphosyntactic knowledge assessment, an assessment of phonological awareness, a questionnaire regarding sociolinguistic knowledge of diglossia and finally, a narrative sample.

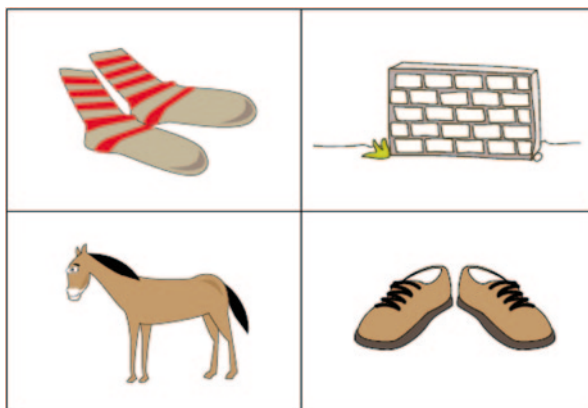
### Receptive Vocabulary Assessment

In this sub-test children are asked to identify 15 MSA words via point gesture, as represented by a picture in a field of four images. Five of the stimulus words are non-cognates which do not share phonological features with MSA (i.e., non-overlapping features), 5 are related by phonological features (i.e., partially overlapping features), and 5 are similar to MSA (e.g., overlapping features) lexemes as outlined in Fig. 13.1. For example, in testing receptive identification of non-cognates that do not share phonological features, children were asked to identify the MSA word for ‘shoe’, which is *ħiḏa:ʔ* in MSA but *kundara* in PSA (see Fig. 13.2). Alternately, in examining children’s receptive identification of words that are related phonologically, children are asked to identify the word *qalb* ‘heart’ in MSA, which has the phonological form *ʔalib* in PSA, being that the classical Arabic phoneme /q/ becomes a glottal stop /ʔ/ in PSA-northern dialect (see Fig. 13.3). An example of an item assessing the identification of PSA-MSA overlapping lexemes is exhibited in Fig. 13.4, where children are asked to identify the word *ba:b* ‘door’ spoken in the same way in both varieties.

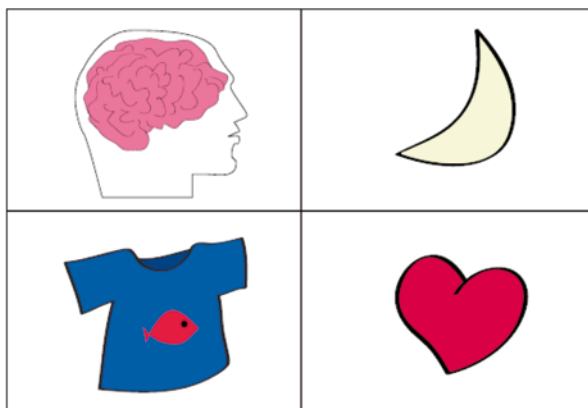
### Morphosyntactic Knowledge Assessment

This sub-test is based on a morphosyntactic knowledge assessment developed by Khamis-Dakwar et al. (2012). A forced-choice grammaticality task is presented in

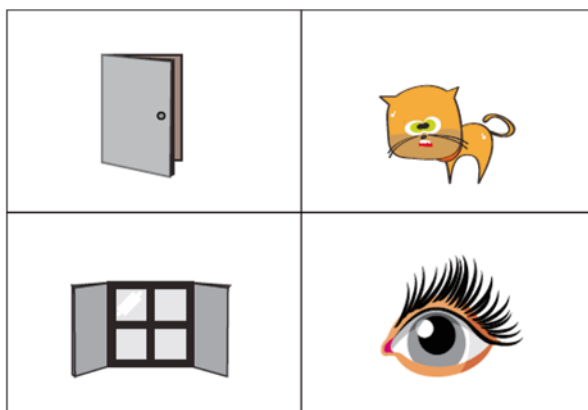
**Fig. 13.2** Receptive diglossic vocabulary item assessing identification of distinct lexemes. Children are asked to point to the *hiḍa*? ‘shoe’. (Used with permission from Khamis-Dakwar and Makhouh (2009), *Arabic Diglossic Knowledge and Awareness Test*. 1st edition)



**Fig. 13.3** Receptive diglossic vocabulary item assessing phonologically related lexemes. Children are asked to point to the *qalb* ‘heart’. (Used with permission from Khamis-Dakwar and Makhouh (2009), *Arabic Diglossic Knowledge and Awareness Test*. 1st edition)



**Fig. 13.4** Receptive diglossic vocabulary item assessing similar/overlapping lexemes. Children are asked to point to *ba:b* ‘door’. (Used with permission from Khamis-Dakwar and Makhouh (2009), *Arabic Diglossic Knowledge and Awareness Test*. 1st edition)



**Fig. 13.5** Falafel seller prompt. (Used with permission from Khamis-Dakwar and Makhoul (2009), *Arabic Diglossic Knowledge and Awareness Test*. 1st edition)



MSA, and in PSA. In both varieties, six morphosyntactic features that are non-overlapping in MSA and PSA, and four overlapping features in both language varieties are examined. The non-overlapping morphosyntactic features include dual-number marking, word order/agreement, negation, yes/no question formation, relative pronouns and passive formation. The overlapping features include sound plurals, adjective definiteness, wh- questions, and construct phrases. All target structures were selected based on the fact that they are structures explicitly targeted in the elementary school curriculum for teaching Arabic in Arab schools in Israel. For each morphological or syntactic feature there are four pairs of sentences. Each pair consists of a grammatical and an ungrammatical sentence. Accordingly, each of the MSA and PSA grammaticality judgment lists included 40 grammatical and 40 ungrammatical counterparts. Both grammatical and ungrammatical sentence pairs were similar in word number and sentence meaning except for the rule violation contained in the ungrammatical sentences and the minimal phonological and lexical adaptations to the different variety.

Sentences are presented in the context of two linguistic scenarios for each variety. PSA sentences are presented along with a picture of a falafel seller, a profession in which employees are likely to use PSA during work (see Fig. 13.5). Children are asked to listen to 40 pairs of sentences. For each pair, the child is asked to select which sentence sounds more acceptable by a falafel seller. Conversely, MSA sentences are presented along with a picture of television broadcaster, a profession in which employees are likely to use MSA during work (See Fig. 13.6) and children are asked to judge the most acceptable sentence in a pair of sentences spoken in MSA. These pictures are presented to prompt and cue the language variety called upon in these contexts and hence being tested. Two illustration trials for each sentence list are provided. These illustration trials do not relate to the test item conditions.

### Phonological Diglossic Awareness

This sub-test consists of 12 phonological awareness tasks. Similar to practices reported by studies on metaphonological awareness in diglossia situations (e.g.

**Fig. 13.6** Television broadcaster prompt. (Used with permission from Khamis-Dakwar and Makhoul (2009), *Arabic Diglossic Knowledge and Awareness Test*. 1st edition)



Saiegh-Haddad 2003, 2004, 2005, 2007), target phonemes in each of the 12 tasks were manipulated to occur in MSA only (4 out of 8 items) and not in the Galilee dialect of PSA (such as /θ/, or /ð/), whereas the other 4 target phonemes are shared in both language varieties. In this section the following tasks are presented: rhyme identification, initial phoneme identification, medial phoneme identification, final phoneme identification, syllable deletion, initial phoneme deletion, initial phoneme substitution, medial phoneme substitution, final phoneme substitution, rhyming production, syllable blending, and phoneme blending.

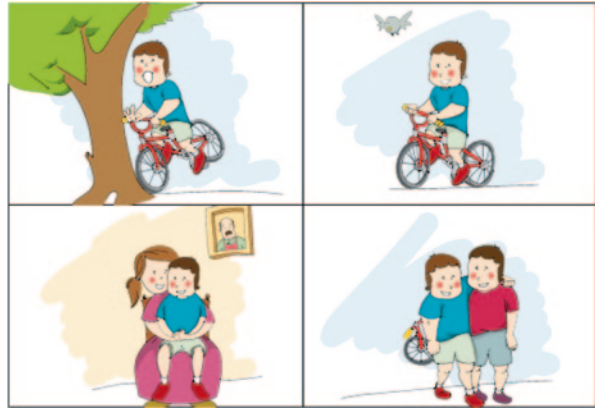
### **Sociolinguistic Knowledge of Diglossia**

This section of the exam asks clinicians to administer a questionnaire in order to gather information regarding the child's understanding of the sociolinguistic context of Arabic. The questionnaire includes open-ended questions used to elicit information about the child's identification of diglossia (with and without prompting), their understanding of the different contexts of use for each of the two language varieties (i.e., when do we use each language variety and with who), their explicit knowledge of linguistic similarities and differences between MSA and PSA, their reading preferences, and cognitive processes involved in reading and writing in MSA, wherein a switch from PSA would occur (i.e., strategies used in enhancing their reading comprehension and writing in MSA).

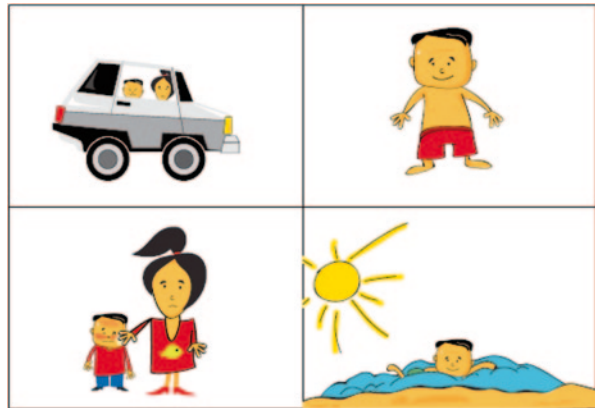
### **Narrative**

In this portion of the exam, children are presented with two picture books with a simple narrative structure and no written text. They are prompted to tell a story in PSA and another story in MSA. During our pilot data collection, the order of presentation for these was counter-balanced across participants. The two picture books are illustrated in Figs. 13.7 and 13.8. The narratives produced are later analyzed at the macro level (for basic story grammar features) as well as at the micro level for detailed features of complexity of sentence type and lexical diversity).

**Fig. 13.7** PCA narrative elicitation picture book. (Used with permission from Khamis-Dakwar and Makhoul (2009), *Arabic Diglossic Knowledge and Awareness Test*. 1st edition)



**Fig. 13.8** MSA narrative elicitation picture book. (Used with permission from Khamis-Dakwar and Makhoul (2009), *Arabic Diglossic Knowledge and Awareness Test*. 1st edition)



### Sociolinguistic Diglossic Knowledge and Awareness in Arabic: Preliminary Results

The development of the ADAT is in its early stages. The stimulus items were determined based on the literature reviewed above, the two authors' experiences and the outlined aim of each of the test tasks. Pictured pages were constructed with the assistance of a Palestinian artist who was instructed to make illustrations that are colored, clear, child-friendly, and culturally appropriate.

The first field tests began in October 2010 wherein the *ADAT* was administered to 40 monolingual native Palestinian Arabic-speaking children, 20 males and 20 females, ages 6; 1–12; 6 years of age, raised in families of moderate-to-high socio-economic status (based on teachers' reports). There were eight participants at each of the following grade levels; 1, 2, 3, 4, and 5. Per teachers' reports, all the children had typical language and literacy development, and no hearing, health, behavioral, developmental and/or reading difficulties. All children were exposed to Palestinian



Arabic of northern dialect at home and had their first intensive exposure to MSA upon entering the school.

This first pilot study aimed to examine how diglossic knowledge and awareness develops with age/grade level based on the performances on *ADAT* and how similarities/differences between MSA and PSA linguistic structures feature in children's performance on the ADAT items.

### **Preliminary Descriptive Data**

*Diglossic awareness:* The findings of the study reveal that by the 1st grade, all children can explicitly identify the context of use for the two language varieties, if given prompting (i.e. when prompted to tell when we use each of the language varieties), and without prompting by 5th grade (i.e., when asked to tell what he/she knows about the two language varieties). Moreover, children at the 1st and 2nd grade levels were able to explicitly think about similarities and differences between the two language varieties, but only in the phonological and lexical domains. Children in 3rd, 4th, and 5th grade group however, outlined morphosyntactic and pragmatic differences.

Lastly, when children were administered the sociolinguistic knowledge of diglossia sub-test and were asked whether they think in spoken Arabic or in MSA before they write down their thoughts and answers, no clear trend was found with regard to children's tendency to either think in spoken Arabic or MSA before writing about a topic in MSA. Further data is needed to elucidate this cognitive strategy. Interestingly, most children at the 3rd, 4th, and 5th grade levels reported to like speaking and writing in MSA. However, children in the 1st and 2nd grade groups reported liking to write in MSA but preferred PSA for speaking. Of note, the sample in this pilot was very small in each group (8 children per grade level).

*Morphosyntactic knowledge:* Similar to previous findings (Khamis-Dakwar et al. 2012), children at the 1st, 2nd, and 3rd grade level exhibited more accurate judgments of PSA presentations than MSA presentations and more accurate judgments on items composed of structures that are overlapping than structures that are distinct or non-overlapping.

*Receptive vocabulary:* Children's performances in the receptive vocabulary sub-test demonstrated significant differences in performances depending on type of target lexical item but only at the 1st grade level, which revealed children had better identification percentages of words that are either similar (identical) or distinct lexemes, and lower performances in identifying items that held partial phonological overlap. No significant differences were found at later grade levels which might be related to a high ceiling effect.

*Metaphonological awareness:* Similar to those studies which reveal the effect of diglossic features on the development of children's metaphonological awareness (e.g. Saiegh-Haddad 2003, 2004, 2005, 2007), children's accuracy level for this

sub-test at the 1st grade level was significantly lower for distinct MSA target phonemes than target phonemes shared in the two language varieties.

To summarize, these exploratory findings reveal significant diglossic features defining the typical development of children's literacy-based language skills. This effect was evident at different grade levels, and in all language domains as identified by their performances at the *ADAT*.

Future work in the development of the *ADAT* test is to standardize the assessment with a larger population so as to be a valid and reliable assessment tool in examining children's language abilities, as needed for literacy development for 5–9 year-old Palestinian Arabic-speaking children. The reported preliminary screening results are just the first step in this process. Based on these results, modifications to some items and coding are underway. Later, a reduplication of the pilot study with the modified test will be administered to a larger sample, in other Palestinian regions with varying dialects. The performance of children with speech and language disorders and/or learning disability will be also examined as part of the test validation process.

The data collected will be informative in understanding the language development at the pre-kindergarten level in Arabic and can be used to guide teaching approaches and clinical practices for SLPs. The data elicited from administering the test to children with language and/or learning disabilities will enhance our understanding of the nature of these disabilities and the interaction of diglossia in children's language and reading performances.

Future studies would focus on developing the *ADAT* for adolescents, in which more age appropriate tasks are utilized, such as assessment of translation abilities and interference effects in each language variety, lexical diglossic awareness, and narrative comprehension comparisons in spoken Arabic versus MSA narrative with different concentrations of overlapping and non-overlapping structures.

## 13.2 Conclusion

In this chapter, we introduced the development of a test based on recent research findings which aims to investigate children's diglossic knowledge and metalinguistic awareness in two language varieties. The *ADAT* examines diglossic knowledge and metalinguistic awareness, which has been increasingly demonstrated by Arabic linguistic research as impactful on typical language development. By testing a child's diglossic knowledge and metalinguistic awareness, clinicians can assess how much diglossic linguistic features of Arabic and the ability to think about and use these diglossic linguistic features as arbitrary linguistic code independent of meaning may play a part in a child's academic progress with regard to language and literacy skills. The test items for *ADAT* were developed and its content validity was examined. As part of this pilot research, researchers geared these items to answer two main questions: 1) What linguistic skills develop in children learning the two language varieties in Arabic diglossic speech communities? 2) What are the

necessary skills for successfully learning to read and write in situations of mismatch relationships between oral language and literacy skills, such as Arabic? These questions could not be addressed comprehensively without the use of an appropriate tool, which addresses the specific language skills necessary for literacy and learning in the specific sociolinguistic situation of Arabic diglossia.

ADAT is an authentic language assessment tool developed while controlling for overlapping and non-overlapping features of PSA and MSA. This tool can be beneficial for better pedagogical and clinical practices, and may enhance research in this field. The shift between PSA and MSA during reading and writing in Arabic is acknowledged in the literature. Ferguson (1959, p. 329) pointed out that in all of the four languages he studied to define diglossia “it is typical behavior to have someone read aloud from a newspaper written in H and then proceed to discuss the contents in L”. In this quote, Ferguson refers to MSA and SA as H for high language variety and L for low language variety respectively. On this point, Ferguson also notes that in the Arab world in secondary schools “often a considerable part of the teachers’ time is taken up with explaining in L the meaning of material in H which has been presented in books or lectures” (Ferguson 1959, p. 329). Mainstream languages typically studied in the literature show that oral reading of a text can be relatively matched to the written parts of the text. Contrary to this, in Arabic, and other languages with mismatched home and school language varieties, children need to negotiate the idea that the written text may be either overlapping or distinct in all domains from the spoken mode representation. The development of this knowledge at elementary grade levels was assessed using ADAT and this task reveals a significant effect of overlap (i.e., match) versus non-overlap (i.e., mismatch) on children’s performances. These results add to the debate on the need for authentic assessment of reading and learning disabilities in Arabic as well. We hope that this chapter lays the groundwork for an alternative method for the assessment of learning and reading disabilities for Arabic-speaking children.

**Acknowledgements** This research was supported in part by a generous grant from Oranim College and the Faculty Development Grant at Adelphi University. The authors wish to thank Karen Froud, Peter Gordon, Felicidad Garcia and Elinor Saiegh-Haddad for invaluable encouragement and support, as well as Toraya Kubetty for her professional support. A special thanks to Abed Tamesh for his artistic creativity and contribution. The authors also thank the children who participated in this study, their parents, and the teachers for their kind cooperation. Address correspondence to Reem Khamis-Dakwar, Communication Sciences and Disorders, School of Education, Adelphi University, Garden City, NY 11553. E-mail: khamis-dakwar@adelphi.edu, <http://home.adelphi.edu/~nslplab>

## References

- Abou-Elsaad, T., Baz, H., & El-Banna, M. (2009). Developing an articulation test for Arabic-speaking school-age children. *Folia Phoniatrica Logopedia*, 61, 275–282.
- Abu-Rabia, S. (2000). Effects of exposure to literary Arabic on reading comprehension in a diglossic situation. *Reading and writing*, 13(1–2), 147–157.

- Abu-Rabia, S. (2002). Reading in a root-based-morphology language: The case of Arabic. *Journal of Research in Reading*, 25(3), 299–309.
- Abu-Rabia, S., & Shalhoub Awwad, J. (2004). Morphological structures in visual word recognition: The case of Arabic. *Journal of Research in Reading*, 27(3), 321–336.
- Abu-Rabia, S., & Taha, H. (2004). Reading and spelling errors analysis of native Arabic dyslexic readers. *Reading and Writing: An Interdisciplinary Journal*, 17, 651–689.
- Abu-Rabia, S., & Taha, H. (2006). Phonological errors predominate in Arabic spelling across grades 1–9. *Journal of Psycholinguistic Research*, 35(2), 167–189.
- Abu-Rabia, S., Share, D., & Mansour, M. (2003). Word recognition and basic cognitive processes among reading-disabled and normal readers in Arabic. *Reading and writing*, 16, 423–442.
- Al-Khaledi, M., Lincoln, M., McCabe, P., Packman, A., & Alshatti, T. (2008). The attitudes, knowledge and beliefs of Arab parents in Kuwait about stuttering. *Journal of Fluency Disorders*, 34, 44–59.
- Amara, M. (2002). The place of Arabic in Israel. *International Journal of Sociolinguistics and Language*, 158, 53–68.
- Amayreh, M. (1994). *A normative study of the acquisition of consonant sounds in Arabic*. Ph.D dissertation, University of Florida.
- Azzam, R. (1990). *The nature of Arabic reading and spelling errors of young children: A descriptive study*. EDD dissertation, Teachers College, Columbia University.
- Charity, A., Scarborough, H., & Griffin, D. (2004). Familiarity with school English in African American children and its relation to early reading achievement. *Child Development*, 75, 1340–1356.
- Connor, C., & Craig, H. (2006). African American preschoolers' language, emergent literacy skills, and use of African American English: A complex relation. *Journal of Speech Language and Hearing Research*, 49, 771–792.
- Craig, H. K., & Washington, J. A. (2004). Grade-related changes in the production of African American English. *Journal of Speech Language and Hearing Research*, 47, 450–463.
- Craig, H. K., & Washington, J. A. (2006). *Malik goes to school: Examining the language skills of African American students from preschool- 5th grade*. Mahwah: Erlbaum.
- Eviatar, Z., & Ibrahim, R. (2000). Bilingual is as bilingual des: Metalinguistic abilities of Arabic-speaking children. *Applied Psycholinguistics*, 21, 451–471.
- Ferguson, C. (1959). Diglossia. *Word*, 15, 325–340.
- Foster, W. A., & Miller, M. (2007). Development of the literacy achievement gap: A longitudinal study of kindergarten through third grade. *Language Speech Hearing Service in Schools*, 38, 173–181.
- Gonzalez, J., & Hernandez, V. I. (2000). Word identification and reading disorders in the Spanish language. *Journal of Learning Disabilities*, 33(1), 44–60.
- Haeri, N. (2003). *Sacred language, ordinary people. Dilemmas of culture and politics in Egypt*. New York: Palgrave Macmillan.
- Human Rights Watch. (2001). *Second class discrimination against Palestinian Arab children in Israel's schools*. New York: Author.
- Khamis-Dakwar, R. (2005). Children's attitudes towards the diglossia situation in Arabic and its impact on learning. *Language Communities and Education*, 1, 75–86.
- Khamis-Dakwar, R., & Crowley, C. (2005). *Language testing for Arabic-speaking individuals in Israel*. Poster presented at American Speech, Language & Hearing Association Convention, San Diego, November 2005.
- Khamis-Dakwar, R., & Froud, K. (2007). Lexical processing in two language varieties: An event related brain potential study of Arabic native speakers. In M. Mughazy (Ed.), *Perspectives on Arabic linguistics XX* (pp. 153–166). Amsterdam: John Benjamins.
- Khamis-Dakwar, R., Boudelaa, S., & Froud, K. (2009). *Lexical processing in diglossic code switching between Modern Standard Arabic and Palestinian colloquial Arabic: An event-related brain potential study of Arabic native speakers*. Poster presented at Cognitive Neuroscience Symposium. San Francisco, March 2009.
- Khamis-Dakwar, R., & Froud, K. Aphasia, language, and culture: Arabs in the U.S. In M. Gitterman, M. Goral, & L. Obler (Eds.), *Multilingual aphasia book*. Bristol: Multilingual Matters (under review).

- Khamis-Dakwar, R., Froud, K., & Gordon, P. (2012). Acquiring diglossia: Mutual influences of formal and colloquial Arabic on children's grammaticality judgments. *Journal of Child Language*, 39, 1–29.
- Korenbrodt, F., Hertzano, T., & Ben Aroya, A. (2002). Emerging issues in Israel: Commentaries in a global context. *Folia Phoniatrica Logopaedica*, 54, 72–74.
- Kotby, M. N., El-Sady, S., & Hegazi, M. (2010). Thirty five years of care of child language in Egypt. *Topics in Language Disorders*, 30(1), 8491.
- Labov, W. (2003). When ordinary children fail to read. *Reading Research Quarterly*, 38(1), 128–131.
- Landerl, K., & Wimmer, H. (2000). Deficits in phoneme segmentation are not the core problem of dyslexia: Evidence from German and English children. *Applied Psycholinguistics*, 21, 234–262.
- Maamouri, M. (1998). Language education and human development. Arabic diglossia and its impact on the quality of education in the Arab world. The World Bank: The Mediterranean Development Forum: Marrakesh.
- Mahfoudhi, A., Elbeheri, G., Al-Rashidi, M., & Everatt, J. (2010). The role of morphological awareness in reading comprehension among typical and learning disabled native Arabic speakers. *Journal of Learning Disabilities*, 43(6), 500–514.
- McDonald, C., & Craig, H. (2006) African American preschoolers' language, emergent literacy skills, and use of African American English: A complex relation. *Journal of Speech Language and Hearing Research*, 49, 771–792.
- Miles, E. (2000). Dyslexia may show a different face in different languages. *Dyslexia*, 6(1), 193–201.
- Moreno, E., Federmeier, K., & Kutas, M. (2002). Switching languages, switching palabras (words): An electrophysiological study of code-switching. *Brain and Language*, 80, 188–207.
- Morrison, F. J., Bacham, H. J., & Connor, C. M. (2005). *Improving literacy in America: Guidelines from research*. New Haven: Yale University Press.
- Patel, R., & Khamis-Dakwar, R. (2005). An AAC training program for special education teachers: A case study of Palestinian Arab teachers in Israel. *Journal of Augmentative and Alternative Communication*, 21(3), 205–217.
- Pearson, B. P., Velleman, S. L., Bryant, T. J., & Charko, T. (2009). Phonological milestones for African American English-speaking children learning mainstream American English as a second dialect. *Language Speech and Hearing Service in Schools*, 40, 229–244.
- Romaine, S. (2000). *Language in society*. Oxford: Oxford University Press.
- Saiegh-Haddad, E. (2003). Linguistic distance and initial reading acquisition: The case of Arabic diglossia. *Applied Psycholinguistic*, 24, 115–135.
- Saiegh-Haddad, E. (2004). The impact of phonemic and lexical distance on the phonological analysis of words and pseudowords in a diglossic context. *Applied Psycholinguistics*, 25, 495–512.
- Saiegh-Haddad, E. (2005). Correlates of reading fluency in Arabic diglossic and orthographic factors. *Reading and Writing*, 18(6), 559–582.
- Saiegh-Haddad, E. (2007). Linguistic constraints on children's ability to isolate phonemes in Arabic. *Applied Psycholinguistics*, 28, 607–625.
- Saiegh-Haddad, E. (2011a). The effect of exposure to standard Arabic and linguistic distance from spoken Arabic on lexical processing in standard Arabic. In D. Aram & O. Korat (Eds.), *Literacy and language: Interaction, bilingualism, and difficulties* (pp. 321–336). Hebrew: Magnes Press.
- Saiegh-Haddad, E. (2011b). Phonological processing in diglossic Arabic: The role of linguistic distance. In E. Broselow & H. Ouli (Eds.), *Perspectives on Arabic linguistics XXII* (pp. 269–280). John Benjamins Publishers.
- Saiegh-Haddad, E. (2012). Literacy reflexes of Arabic diglossia. In M. Leikin, M. Schwartz, & Y. Tobin (Eds.), *Current issues in bilingualism: Cognitive and sociolinguistic perspectives* (pp. 43–55). Springer.
- Saiegh-Haddad, E., Hende, N., & Ziv, M. (2011). The linguistic affiliation constraint and phoneme recognition in diglossic Arabic. *Journal of Child Language*, 38, 297–315.

- Scarborough, H. S., Terry, N. P., & Griffin, D. M. (2007). *Addressing dialect differences: Advances in policy, research, and practice*. Paper presented at the Annual Convention of the American Speech-Language Hearing Association, Boston, MA.
- Share, D. L. (2008). On the Anglocentricities of current reading research and practice: The perils of overreliance on an "outlier" orthography. *Psychological Bulletin*, *134*(4), 584–615.
- Spolsky, B. (1997). Multilingualism in Israel. *Annual Review of Applied Linguistics*, *17*, 138–150.
- Terry, N. P. (2010). Examining relationships among dialect variation and emergent literacy skills. *Communication Disorders Quarterly*, *x*(x), 1–11.
- Terry, N. P., Connor, C. M., Thomas-tate, S., & Love, M. (2010). Examining relationships among dialect variation, literacy skills, and school context in first grade. *Journal of Speech Language and Hearing Research*, *53*, 126–145.
- United Nations Development Programme. (2003). *Arab human development report 2003: Building a knowledge society*. New York: UNDP, Regional Bureau for Arab States.
- United State Department of Education, National Center for Education Statistics. (2003). The nation's report card. *Reading highlights* (No. NCEES 2004–452). Washington, DC: Author.
- Wiig, E. H., & El-Halees, Y. (2000). Developing a language screening test for Arabic-speaking children. *Folia Phoniatrica et Logopaedica*, *52*, 260–274.
- Wilson, M. E. (1996). Arabic speakers language and culture, here and abroad. *Topics in Language Disorders*, *16*(4), 65–80.
- Wimmer, H., Mayringer, H., & Landerl, K. (2000). The double-deficit hypothesis and difficulties in learning to read a regular orthography. *Journal of Educational Psychology*, *92*(4), 668–680.
- Zoccolotti, P., De Luca, M., Rico, D. P., Judica, A., & Spinelli, D. (1999). Markers of developmental surface dyslexia in a language (Italian) with high grapheme-phoneme correspondence. *Applied Psycholinguistics*, *20*, 191–216.