**Enhancing Early Language and Literacy Acquisition in Arabic: A Diglossia-Centered Multi-Domain Intervention Study**

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# Early literacy acquisition

## Literacy is based on code-related language-related skills

Early literacy involves a range of essential skills for later literacy development. These skills can be grouped into two constructs; code-related skills and language or meaning-related skills (Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998). Code-related skills include phonological awareness (PA), print knowledge, and letter knowledge (Anthony et al., 2002; Rohde, 2015; Whitehurst & Lonigan, 1998). In contrast, language or meaning-related skills refers to children's ability to understand meanings and includes vocabulary, morphosyntax, narrative abilities and oral language skills (Goodrich et al., 2017; Shanahan & Lonigan, 2010). A model that captures this idea is the simple view of reading (SVR) which holds that reading comprehension is composed decoding and language comprehension skills, which are separate but equally important (Gough et al., 1996; Gough & Tunmer, 1986).

## The SVR model is not enough! => Cognition => active SVR

While the SVR model is valid for predicting RC in several languages other than English, including Hebrew and Arabic (Asadi et al., 2017; Florit & Cain, 2011; Joshi et al., 2015), it does not cover all relevant domains, such as executive functions and cognitive ablities. Cognitive abilities are addressed by the “central processing hypothesis” (Geva & Siegel, 2000) and a new model called the "active simple view of reading" (Duke & Cartwright, 2021). Unlike the SVR model, which claims that language comprehension and word recognition are separate constructs (Hoover & Gough, 1990), active SVR claims they overlap. The model also accounts for motivation engagement, EF skills, and strategy use grouped as "active self-regulation," which are claimed to affect decoding words, language comprehension and bridging processes. Bridging include print knowledge, vocabulary, morphological awareness, and cognitive flexibility that bridge the relations between language comprehension and word recognition. Even though the model hasn't been tested in an empirical way, it emphases the importance of motivation and executive functions to the reading processing in addition to word recognition and language comprehension. Our focus will be on each construct, its contribution to reading, and particularly how we can improve these skills through intervention.

## Code-related skills predicts and therefore it is important to conduct an intervention

Word reading is predicted by several code-related skills including phonological awareness, alphabetic principle, print knowledge, and decoding skills. "Phonological awareness refers to an individual's awareness of the sound (phonological) structure of spoken words" (McNeill et al., 2017, p. 302) and it's one of the important early literacy predictors to reading acquisition (Badian, 1995). Print knowledge on the other hand, refers to children's awareness of the conventions of print, differentiate between letters and words (Dickinson et al., 2003; Storch & Whitehurst, 2002), and knowledge of letters and words, including knowledge of letter names and sounds (Tangel & Blachman, 1992). Studies have shown that interventions targeting these skills can have a positive impact on reading. For example, a 10-week intervention among kindergarteners focusing on syllables, onset rhymes, phonemes, print knowledge, and multiple levels of PA resulted in improved performance in all levels of phonological awareness skills including alphabetic knowledge, pseudoword reading, and spelling (Hodgins & Harrison, 2021). Additionally, a meta-analysis of 138 studies on phonological awareness interventions among students with suspected reading disabilities from kindergarten till early school years, found that phonemic awareness had medium effect on composite and segmentation, highlighting the importance of phonemic level instruction in kindergarten (Rehfeld et al., 2022) === add herira 2021. Overall, early instruction and interventions targeting these code-related skills, particularly phonological awareness and print knowledge, are crucial for successful reading acquisition.

## Interventing to promote reading should combine PA + letter + print knowledge.

Working on enhancing both alphabetic knowledge and PA in interventions is effective across a wide range of orthographic depths (Verhoeven et al., 2020). Rehfeld and colleagues (2022) suggest in their review of studies on phonemic awareness in children with reading difficulties that graphemes should be utilized to encourage letter-sound correspondence interventions. In another meta-analysis on 138 intervention studies conducted by Herrera and colleagues (2021), teaching print knowledge along with phonological awareness is vital since previous studies focusing exclusively on print knowledge failed to improve children’s print knowledge as much as those focusing exclusively on phonological awareness. Similar results from an intervention with kindergarten at risk of reading difficulties found that emergent literacy activities such as PA, alphabetic skills, letter-sound correspondence, word reading, and spelling improved emergent literacy skills (Vadasy & Sanders, 2008). Engagement with invented spelling can also enhance kindergarteners' emerging literacy skills, highlighting the importance of providing opportunities for children to practice and apply their knowledge of letter-sound correspondence and phonological awareness in meaningful ways (Albuquerque & Martins, 2021; Korat et al., 2013). To conclude, a positive impact on a child's reading development can be achieved by integrating phonological awareness, print knowledge, and decoding in literacy interventions, especially for those at risk of reading difficulties. It is important to take that into consideration while planning an intervention.

## Language predicts (morpho-syntax, vocabulary, narrative…)

 Language related skills which include vocabulary, morphosyntax, narrative abilities and oral language skills (Goodrich et al., 2017; Shanahan & Lonigan, 2010) predict later reading ability. children who enter school with below-average language abilities may benefit from support in developing these skills (Phillips et al., 2021; Vellutino & Haiyan, 2008; Walker et al., 2020).

## Executive functions cognitive skills

# Intervention studies is early literacy

## Early intervention is critical to development because…. (predictors, children with DLD, children from low SES)

## One domain isn't enough

## It is important to combine language and literacy

## Cognition and EF are important factors

## Working on cognate words in linguistically related languages is effective.

## Teacher training is important to ensure proper implementation of the intervention

# Arabic literacy acquisition

## Arabic children face challenges due to lack of good education, === + diglossia

## Diglossia challenges the literacy acquisition

## Diglossia is challenging yet we can do something about it, some studies had interventions… but they didn't address diglossia in a systematic way

## Our study

***Language and literacy acquisition in Arabic diglossia***

Arabic-speaking children are born to a linguistic context known as diglossia (Ferguson, 1959), in which the child has to manage two linguistic systems within the same community, namely, spoken Arabic (SpA) and standard Arabic (StA), which is acquired in a formal manner and used for reading and writing. The differences between StA and SpA can be found across all domains of language: phonology, morphology, syntax, and lexical semantics (Saiegh-Haddad & Henkin-Roitfarb, 2014). Based on a systematic assessment of lexical-phonological distance, three types of words were identified: (a) Identical words (words with identical phonological forms in StA and SpA), for example, (/batti:x/'watermelon'), (b) Cognate words which are partially overlapping phonological forms in StA and SpA (/tura:b/ in StA and /tra:b/'soil' in SpA, StA /ðahab/ versus SpA /dahab / 'gold'), and (c) Unique words which have unique lexical-phonological forms in SpA that is totally different from the StA form (/raʤul/ in StA and /zalame/ in SpA 'man'), two-word forms for the same semantic meaning (Saiegh-Haddad & Spolsky, 2014). In accordance with the model for Arabic word reading in development (MAWRID) why is this relevant here????? Vowelization is not relevant for your study neither morphological processing proposed by Saiegh-Haddad (2018), three prominent factors shape the development of word reading in Arabic: vowelization, morphological structure, and diglossia. In the beginning stage of reading, beginners face the challenge of diglossia, specifically the phonological distance between the form of the word in SpA ad StA, which may adversely affect their ability to read fluently and accurately since reading a word in StA may cause them to activate linguistic units that they have not yet acquired (Saiegh-Haddad & Schiff, 2016; Schiff & Saiegh-Haddad, 2018).

Start with the argument? what is the argument? A specific argument anf again the theoretical basis for it and the evidential basis. E.g., Arabic diglossia features a large phonological distance. Does this distance impact X? this question was addressed in X. the study tested ….. and they found that .. this implies that … focus on the findings and arguments you need for your study Recent years have seen an increased interest in diglossia's role in the Arabic language and reading development, including its contribution to phonological processing, reading, narrative production, and comprehension of the Arabic language (Asaad & Eviatar, 2013; Khamis-Dakwar et al., 2012; Leikin et al., 2014; Saiegh-Haddad, 2003; Saiegh-Haddad & Schiff, 2016; Schiff & Saiegh-Haddad, 2017). Saiegh-Haddad and colleagues examined the effect of phonological distance in Arabic diglossia on phonological processing skills (phonological awareness, phonological representations, phonological memory, phonological learning) and word reading accuracy and fluency and showed that the phonological distance made it harder for children to acquire these skills (Saiegh-Haddad & Haj, 2018; Saiegh-Haddad, 2003, 2004, 2007; Saiegh-Haddad et al., 2012, 2020; Saiegh-Haddad & Schiff, 2016). Accordingly, Khamis-Dakwar et al. (2012) examined the impact of morpho-syntactic distance on performance in a grammaticality judgment task and found that scores were lower when the structures were not identical. Retelling narratives in StA was less fluent, had shorter clauses and more morpho-syntactic errors compared to SpA (Leikin et al., 2014). The above findings suggest that the linguistic distance between SpA and StA does not support StA's acquisition of reading???, meta-linguistic, and, linguistic skills, therefore there is a need to intervene in this issue in the early years of children. Separate your arguments . think which arguments (and relatedly research studies) from the lit on diglossia you want to discuss in detail because the reader needs it to understand your design, tasks, findings etc. and which ones you just want to mention in passing.

***The role of intervention in enhancing langauge and literacy in children***

The effectiveness of kindergarten interventions has been extensively researched in recent yearsthis is not a good start. What is the argument? (Albuquerque & Martins, 2021; Alfonso & Lonigan, 2021; Bowyer-Crane et al., 2008; Cena et al., 2013; Hodgins & Harrison, 2021; O’Callaghan et al., 2016; Porta & Ramirez, 2020; Rehfeld et al., 2022; Vadasy & Sanders, 2008; Walker et al., 2020). Studies have shown that early intervention improves students' academic performance and has long-term effects (Bowyer-Crane et al., 2008; Engel de Abreu et al., 2020; Kjeldsen et al., 2019). In this chapter this is not a thesis so no chapters, we will discuss the factors that account for the implementation of intervention studies in kindergarten, which vary greatly in their methodologies not good. Studies used both experimental and business-as-usual designs (Albuquerque & Martins, 2021; Engel de Abreu et al., 2020; Hodgins & Harrison, 2021; Johanson & Arthur, 2015) or compared between different intervention programs and had a control group not good. You are too general. Be specific about studies. Strat from the specific argument to the more general arguments (C. J. Lonigan et al., 2011; Phillips et al., 2021; van de Sande et al., 2018). In addition, the content of the interventions greatly varied; while some focused exclusively on phonological awareness (Brown et al., 2021; Herrera et al., 2021; Hodgins & Harrison, 2021; Rehfeld et al., 2022), where are the findings ? others emphasized literacy and phonological awareness (Albuquerque & Martins, 2021; Vadasy & Sanders, 2008; Verhoeven et al., 2020), and some addressed language skills or a combination of language (Cohen-Mimran et al., 2016; Goldfeld et al., 2022; Johanson & Arthur, 2015; VanderWaal, 2020; Walker et al., 2020), cognitive skills (Keown et al., 2020; Pauli-Pott et al., 2021; Traverso et al., 2019) or a combination of all (Duncan et al., 2018; van de Sande et al., 2018).

In interventions focusing on emergent literacy, phonological awareness (PA) and print knowledge have been identified as significant predictors of reading acquisition which age? Which design was used. Instead of mapping the different designs in general terms above , be specific about specific studies (Adlof et al., 2010; Suggate et al., 2018; Zugarramurdi et al., 2022). A review study on PA-focused interventions concluded that various types of phonological awareness tasks should be used to improve PA skills this is the conclusion not the finding. Focus on findings (Herrera et al., 2021). Campbell et al. (2019) conducted a 10-week intervention focusing on syllables, onset rhymes, phonemes, print knowledge, and multiple levels of PA and showed that the experimental group demonstrated improved performance in all levels of PA skills, including alphabetic knowledge, pseudoword reading, and spelling. Based on the National Early Literacy Panel's report (Lonigan & Shanahan, 2009) emergent literacy interventions significantly improved phonological awareness, alphabetical knowledge, oral language, reading, and spelling. A meta-analysis conducted by Kim and colleagues (2019) found a moderate effect size for intervention programs. This meta-analysis also supported the importance of teacher training in kindergarten as well as a policy of systematic and direct reading instruction. Reading and spelling improved largely because of improved phonological awareness and alphabetic knowledge.

It has also been demonstrated that combining alphabetic knowledge with PA makes an effective intervention program across a wide range of orthographic depths (Verhoeven et al., 2020). According to the review by Herrera and colleagues (2021), teaching print knowledge and phonological awareness is vital since previous studies focusing exclusively on print knowledge failed to improve children’s print knowledge as much as those focusing exclusively on phonological awareness. The results were similar for children at risk of reading difficulties. A review of studies on phonemic awareness in children with reading difficulties by Rehfeld and colleagues (2022) revealed that phonological awareness instruction should emphasize phonemic awareness, while graphemes should be utilized to encourage letter-sound correspondence interventions. Similarly, another study found that emergent literacy activities such as PA, alphabetic skills, letter-sound correspondence, word reading, and spelling improved emergent literacy skills among kindergarten children at risk of reading difficulties, regardless of whether the intervention was conducted in dyads or small groups (Vadasy & Sanders, 2008). The above studies indicate that integrating phonological awareness, print knowledge, and decoding enhance decoding abilities and the vice versa; engagement with invented spelling enhances kindergarteners’ emerging literacy skills (Albuquerque & Martins, 2021; Korat et al., 2013).

###  Language intervention: can you really separate the literature without being redundant?

Early language skills predict later reading ability (Kim et al., 2013); therefore, children who enter school with below-average language abilities may benefit from support in developing these skills (Phillips et al., 2021; Vellutino & Haiyan, 2008; Walker et al., 2020). However, few studies have examined the effectiveness of language-focused interventions in kindergarten. Vasilyeva and colleagues (2006) found that passive sentence intervention improved pre-kindergarten children's understanding of stories told in the passive voice. Similarly, Bianco et al. (2010) compared between three groups assigned to three different intervention programs: phonological awareness, story reading, and multiple component skills. The group receiving multiple component skills outperformed the other groups on listening comprehension. Among Hebrew speakers, language-focused intervention that used books showed that the experimental group demonstrated increased vocabulary compared to the control group (Cohen-Mimran et al., 2016). Another study showed that a curriculum-based program targeting vocabulary, text-structure and language comprehension also promoted vocabulary acquisition and language comprehension (Johanson & Arthur, 2015). A number of factors have been claimed to affect improvement, including working in small groups (Cohen-Mimran et al., 2016; Johanson & Arthur, 2015), interactive activities, and cultural sensitivity (Kim et al., 2020; Phillips et al., 2021; Walker et al., 2020).

Previous research has indicated that intervention programs that focus exclusively on phonological awareness are insufficient, and therefore there is a need to include both phonological awareness and language skills. A study by Bowyer-Crane et al. (2008) focusing on pre-kindergarten children with vocabulary and verbal reasoning difficulties compared a phonological reading group (P+R group) and an oral language group (OL group). Findings showed that the P+R group was more successful in emergent literacy skills, while the OL group was more successful in vocabulary and grammar. It seems that an integrated approach combining oral language instruction with phonology and reading instruction proves beneficial for children entering school. An additional study compared the effectiveness of an intervention program focusing on phonological awareness to one that integrates PA with vocabulary and morphological awareness on the early language and literacy skills of kindergarteners from low-SES backgrounds. Finding showed that the combined intervention program resulted in better gains than the PA-only program and the control group. Targeting MA proved beneficial because it enabled children to apply the analytical skills to understand unfamiliar words (Porta & Ramirez, 2020). A similar conclusion was drawn after combining PA activities with oral language activities with at-risk kindergarteners, which were more effective than the control group, which received the regular curriculum on different aspects of PA (Hodgins & Harrison, 2021).

The development of phonological awareness, this is not language emergent literacy, and language skills has been shown to be influenced by cognitive skills (Albuquerque & Martins, 2021; O'Callaghan et al., 2016; Pears et al., 2016). O'Callaghan et al. (2016) found that despite outperforming business-like controls in emergent literacy, vocabulary, and comprehension, almost one-third of children with dyslexia did not improve. When emergent literacy interventions do not demonstrate a positive effect on children, the authors often recommend taking cognition into account. For example, Albuquerque and Martins (2021) demonstrate that scaffolding strategies facilitate children's learning of the alphabetic principle and their ability to solve problems by focusing on mediation and scaffolding of metalinguistic skills. In a study of Spanish-English bilinguals, EF skills were associated with language and code-related skills in both English and Spanish, demonstrating that EF skills contribute to the development of early reading skills (Alfonso & Lonigan, 2021). Duncan and colleagues (2018) report that children who participated in combined emergent literacy and self-regulation intervention had significantly more gains in self-regulation than those who participated in an exclusively emergent literacy program. According to Van de Sande, Segers, and Verhoeven (2018), integrating exercises that support EF skills into early literacy instruction increased program effectiveness. Through the embedded activities in the EF program, children were instructed to ask each other questions in order to scaffold each other's learning. Results indicate that the experimental group outperformed the control group on letter knowledge as well as executive function scores, suggesting that kindergarten children can regulate their own learning. Still, they require external scaffolding from educators to do so. The above evidence points to the conclusion that intervention programs should include both combined domains and take cognitive skills related to these domains into consideration.

###  Interventions with linguistically diversity children

So far, we have discussed different aspects of intervention studies among kindergarteners from monolingual societies, yet the challenge of “the dialect variation” and the effect that it has on reading among linguistically diverse children must be taken into consideration. Children from linguistically diverse societies undergoing educational interventions that should receive special attention. Some languages share cognates, which are defined as “a word in one language which is similar in form and meaning to a word in another language because both languages are related” (Richards & Schmidt, 2010, p. 90). Based on the majority of studies reviewed by Squires and colleagues (2020), bilingual kindergarteners are sensitive to cognate word vocabulary. There is a higher level of sensitivity among Spanish-English kindergarteners if they are exposed to Spanish more frequently, which implies a transfer between the two languages (Pérez et al., 2010a). It has been suggested that cognates can be used to enhance the vocabulary in L2 by making use of knowledge from L1 (Kambanaros et al., 2017; Kelley & Kohnert, 2012; Pérez et al., 2010b). As demonstrated by Kambanaros and colleagues (2017), cognate training in English with a trilingual child resulted in increased proficiency in both Bulgarian and Greek. The intervention program, which focused on reading, writing, and decoding among bilingual kindergarteners speaking both Luxembourg and German, which have cognate words, resulted in gains in the experimental group that were maintained 9 months after the intervention program (Engel de Abreu et al., 2020). Several studies have demonstrated that learning in L1 is beneficial to promoting explicit and systematic content learning and literacy acquisition in L2 (Kim et al., 2020). In implementing an ecological approach to treatment and intervention, it is also imperative to take into account the socio-cultural context of literacy, particularly in the case of children from linguistically diverse backgrounds (Borre et al., 2019).

### Intervention programs in Arabic too many section. Make the previous section an introduction to Arabic and within the same section

The number of intervention studies conducted in Arabic-speaking kindergartens is scarce (Ahmed Mostafa, 2016; Dallasheh-Khatib et al., 2014; Elmonayer, 2013; Korat et al., 2022; Levin et al., 2008), and none addressed diglossia systematically. According to Elmonayer (2013), what did he test? where? Which Arabic language variety? dialogue readingwhat is this ? you did not explain improved phonological awareness at all levels which levels? compared to a control group age/. Furthermore??? The arguments have to be linked coherently, Dallaseh-Khatib et al. (2014) demonstrated that phonological training in kindergarten enhanced PA skills, while morphological awareness reinforced PA and MA performance even more effectively than PA. It is evident???? from these findings that morphological awareness is essential for Arabic-speaking children as early as kindergarten. The vocabulary skills of kindergarten children were improved through exposure to standard words through stories and repeated vocalizations (Korat et al., 2022). Levin et al. (2008) compared the letter knowledge, alphabetic awareness, and PA of low SES kindergarten children to a control group and found that the experimental group outperformed the control group on all measures. It is believed that several factors contributed to the success of the participants in the intervention program, including the teacher's training and the child’s individual tutoring. The one intervention study in which diglossia was taken into account evaluated the effects of reading a book on vocabulary, story comprehension, and recall among children aged four to five (Massarwe, 2018). Storytelling with mediation was conducted under three conditions; only in spoken language (SpA), a combination of both SpA and StA, and only in StA, while the control group listened to a book in StA without mediation. The results of this study indicated that the three conditions improved vocabulary more effectively than the control group. Additionally, the standard group demonstrated significant improvement in listening comprehension and retelling stories compared to the spoken group. It will be necessary to revise kindergarten educational programs in order to overcome the linguistic distance imposed by diglossia. In accordance with Levin et al. (2008) on the Arabic curriculum in Israel and Al-Azraqi (2014) on the Arabic curriculum in Saudi Arabia, it is necessary to review teacher training and adapt the kindergarten program to address diglossia-related challenges.very long paragraphs

Link with the previous paragraph and this section which is not about teachers .

Besides… research has also suggested that Ongoing teacher training might play an important role in intervention. Based on their meta-analysis, Kim and colleagues (2020) found that the effects of the interventions were greater when teachers received ongoing support during implementing. Similarly, Thomas et al (2020) found small effect size of their interventions and attributed this, among other factors , to the short-term teacher training. Another study focusing on the effectiveness of an intervention on language and literacy among who? Which age is the most important variable here reported low effect sizes which attributed, according to the researchers’ interpretation, among other factors , to to the short-term teacher training, (Thomas et al., 2020). An additional study investigated the effectiveness of an intervention program and compared different teacher training programs (workshops vs. workshops and online-learning course) and found that neither were effective, suggesting that more intensive modeling is required to support teachers in implementing the intervention (Mashburn et al., 2016).this last study seems off

Because the program is delivered by teachers in a naturalistic setting in which teachers are viewed as change agents, not a good strat. we propose a unique program that is based on the ecological approach (Bronfenbrenner, 1979), according to which, the child functions within the context of his/her environment. Numerous studies have indicated that improved quality of teaching may lead to improved language skills (Harjusola-Webb & Robbins, 2011) and that teachers play an influential role in the achievements of students (Porta & Ramirez, 2020). The proposed intervention program has several unique characteristics. First, the intervention is systematic and intensive in order to ensure that it is implemented effectively and consistently. It has been suggested by Thomas and Colleagues in 2020 that a non-consistent implementation that provides teachers with too many choices can result in limited gains as different teachers may emphasize different domains, resulting in lack of uniformity (Mashburn et al., 2016). Second, a multivariate intervention program should include language, emergent literacy skills, and metalinguistic skills that can predict the acquisition of reading skills. Third, EFdid you talk about EF in the lit review ? activities are embedded to enhance children's general metacognitive skills of controlled analysis and switching, thereby facilitating scaffolding, learning, and generalization. Finally and most importantly, the program also accounts for the linguistic distance between StA and SpA by training children in SpA linguistic skills and awareness as a complement to the standard variety of teaching children linguistic representations in StA as well as their awareness of the distance between StA and SpA (Elinor Saiegh-Haddad et al., 2020; Elinor Saiegh-Haddad & Ghawi-Dakwar, 2017).this whole paragraph is not necessary. You can write this in the discussion at the very end

Start here and link with the previous paragraph. Find a way to move coherently to your study The study's objective is to test the effectiveness of a diglossia-centered multi-domain intervention program targeting language, emergent literacy, and executive functions in producing gains in language, cognitive and meta-cognitive skills of Arabic-speaking children compared to a control group receiving "business as usual" instruction. There are three components? to this objective. The first objective? of this intervention program is to determine whether or not it increases language abilities. Second, focuses on determining whether this intervention program results in gains in Metalinguistic skills. Thirdly, we investigate whether the intervention program impacts children's general cognitive skills, such as working memory, rapid naming, and lexical retrieval????. We hypothesize that the intervention program will produce gains in language abilities, metalinguistic skills and cognitive skills beyond the characteristics of the teachers did you discuss this in the literature? No. then it’s not part of the prediction. You can only mention it in the analysis and results who implemented the intervention.