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Article Production Accuracy of an Arabic–English Bilingual Child: A Case Study

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ABSTRACT

Purpose: This single-subject case study examined the article production accuracy of an Arabic–English bilingual child. The aim of the study was to determine whether the child's Arabic language background interacted with his accuracy of article production in English based on the Arabic article system, which, unlike English, does not contain the indefinite article.
Method: The child was audio-recorded interacting with his paternal aunt and grandmother at two time points, when the child was aged 3;2 (years;months) and 3;6. A word-level coding system was developed to track the child's accurate and inaccurate production of article types in English including errors of substitution, addition, and omission.
Results: Findings from this single-subject case study demonstrated that the child produced definite, indefinite, and null articles in English. The child's most frequent error was substitution of definite article *the*. In addition, the child spoke primarily in English with his caregivers. The findings supported prior work of bilingual children speaking a range of native languages, who also frequently misused the definite article *the*.
Discussion: The child's article production accuracy and the more frequent definite article errors are discussed in the context of existing literature on article production by monolingual and bilingual children. The absence of the indefinite article in Arabic, the child's other language, could have driven the inaccurate/overuse use of the definite article in English. Nevertheless, the findings from this single-subject case study provide support for a child raised in an Arabic–English bilingual household who displayed development in his English article production accuracy in English comparable with that of bilingual children and monolingual English-speaking children.

The number of individuals in the United States who speak languages at home other than or in addition to English is continually growing. Specifically, Arabic is the fifth most common language spoken at home in the United States, reported by over 1.2 million individuals (U.S. Census Bureau, 2018). Most studies conducted on bilingual children in the United States have investigated Spanish–English speakers, whereas developmental research on bilingual children other than Spanish–English speakers remains limited. To date, less than five empirical studies in the communication sciences and disorders discipline have been conducted on the language development of Arabic–English bilingual children in the United States (e.g., Sabri & Fabiano-Smith, 2018; Saiegh-Haddad & Geva, 2007), and none have focused on article production accuracy.

A question that arises in examining data from bilingual language development studies is whether the reported linguistic inconsistencies are similar to that of monolingual children, or whether they result partly from co-development across two languages. The present single-subject case study investigated the short-term development of article production in English by a bilingual Arabic–English 3-year-old

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child, living in the United States. This child's article production was compared with the results of existing studies of article use in monolingual (English-speaking) children and that of other relevant bilingual studies. This case study thus provides data that can yield further insight into potential causes of inconsistencies in the English article production.

Article Comprehension and Production: English and Arabic

Article systems, which are a key linguistic feature of noun phrase construction, differ markedly in English and Arabic. English contains definite and indefinite articles *a*, *an*, and *the* as well as the null article (no article; used in contexts where no article is needed). In contrast, Arabic only contains the null article and the definite article, which is marked morphologically with an *al-* prefix on singular or plural nouns and mass nouns. Although Arabic does not have a morpheme for the indefinite article, indefiniteness is marked phonologically at the end of the indefinite noun in Standard Arabic (Abudalbuh, 2016). To illustrate, كِتاب /kitæb/, which is the Arabic word for the noun *book* (no article), would become كِتابٌ /kitæbɔn/, *a book* (indefinite article added). Note, a tanween (nunation) diacritic has been added on the last letter /b/ (read from right to left) of the Arabic word. Nunation is simply the addition of an extra /n/ sound at the end of a root word marking it for indefiniteness. In most nonstandard varieties of Arabic, however, indefinite nouns are unmarked morphologically or phonologically (Abudalbuh, 2016).

Monolingual English-speaking children's comprehension and production of articles has been studied for decades, producing major, relevant findings. Maratsos' (1974) seminal study examined whether 3- and 4-year-old monolingual children were able to understand the system of definite and indefinite articles through two types of storytelling tasks. Maratsos found that by age 4 years, children were able to make an accurate distinction between definite and indefinite articles. Emslie and Stevenson (1981) elicited monolingual children's article production to examine their accuracy, finding a sudden increase in the productive accuracy of *a* and *the* between the ages of 2 and 3 years.

More recent work has expanded the evidence base on the comprehension and production of articles by monolingual English-speaking children. Schmerse et al. (2015) found that 2- and 3-year-old children interpreted definite expressions as referring to something that was mutually known to the speaker and conversational partner. They also found that young children were capable of understanding that indefinite expressions do not represent an item that is mutually known to the speaker and conversational partner. The findings from Schmerse et al. were congruent with those from Rozendaal and Baker (2010), who examined article production in the spontaneous language production of 2- to 3-year-old monolingual children. Rozendaal and Baker also found that children in the age range of 2;9–3;3 (years;months) begin to use significantly more definite articles for referents that are mutually known by the speaker and interlocutor. Therefore, Schmerse et al. suggest that production data from Rozendaal and Baker and comprehension data from their own study provide clear evidence that, around the age of 3 years, children have developed some foundational knowledge of definite reference with regard to the listener's state of awareness. Kemp et al. (2005) also found some evidence that, by the end of monolingual children's third year, they had developed an abstract representation of an article category. When considering the above studies, it is clear that, by the age of 3 years, monolingual English-speaking children who are typically developing are capable of making accurate distinctions between article types and accurately producing them for the most part.

Although research on Arabic–English bilingual children has been much less extensive than research on monolingual English-speaking children, studies of bilingual children speaking other language pairs have provided critical information on their patterns of article use. For example, Zdorenko and Paradis (2008) examined 17 bilingual children with the mean age of 5;4 at the beginning of the study who spoke native languages that either contained one or more articles (Spanish, Romanian, and Arabic) or did not contain any articles (Chinese, Korean, and Japanese). The authors aimed to determine how the difference in article systems of various native languages affected bilingual children's article use in English. They first examined the predictions of the Fluctuation Hypothesis (FH), which was proposed and explained by Ionin et al. (2004) as follows:

> [Second language] learners have full access to Universal Grammar (UG) principles and parameter-settings, and second language learners fluctuate between different parameter-settings until the input leads them to set the parameter to the appropriate value. (p. 16)

Ionin et al. (2004), which Zdorenko and Paradis (2008) compared with their own prior study, investigated article use in adult native Russian speakers and adult native Korean speakers who were learning English as a second language. The findings of Ionin et al. demonstrated that the adult English learners misused *the* in [+specific, −definite] contexts interchangeably with *a,* the target article, and misused *a* in [−specific, +definite] contexts interchangeably with the target article *the*, as predicted by the FH. Zdorenko and Paradis (2008) also drew upon the full transfer/full access (FT/FA) to predict that

children whose native languages contained articles would transfer the definiteness from their native languages, and those whose native languages did not contain articles would sometimes misuse *the* in specific indefinite contexts; this assumption was not supported in the study. Whereas the FH account entails article misuse rather than omission, an FT/FA account includes both misuse and zero article use.

In their 2008 study, Zdorenko and Paradis (2008) specifically examined how bilingual children's article errors in their native language were comparable with errors and rate of acquisition by the adult English learners in Ionin et al.'s (2004) study. They also examined whether there was a difference between children's appropriate use of definite and indefinite articles in all (definite, indefinite, and null) article contexts as well as whether the children's native language affected the accuracy of their usage. The results of the 2-year study produced four important findings. First, both native language groups (i.e., speakers of native languages that either contained or did not contain articles) used the definite article *the* in indefinite contexts, and it was the most frequent error across the children. Both native language groups were also found to use the target article in definite contexts more than in indefinite contexts. Second, the different native language backgrounds of the children were generally not associated with differential accuracy rates for article use over time, unlike the adult counterparts in Ionin et al.'s study, who were more influenced by their native languages in their developmental patterns and rates of article acquisition. Third, in terms of full transfer, the group whose native languages did not contain articles showed null article errors, whereas the group whose native language contained articles did not. However, these errors began to disappear at age 3;6, which the authors suggest may be a result of normal development in children's second language acquisition. Fourth, children from both groups were able to achieve a high level of article accuracy (90%) in English by the end of the study.

Gusewski (2019) investigated the typical grammatical growth trajectories of bilingual Spanish–English children from preschool through early elementary. Of relevance to this case study, Gusewski examined article accuracy in Spanish and its relation to English and Spanish proficiency. Findings indicated that article accuracy in Spanish was relatively stable remaining at approximately 75% from preschool to first grade. Article accuracy did not depend on the child's grammatical skills in English as indexed by their English tense marking accuracy. Moreover, children who demonstrated higher proportions of code switching within noun phrases when retelling stories in Spanish were significantly less accurate in their article production, and those who had a low number of obligatory contexts (contexts in which the use of an article is necessary to maintain grammaticality) for Spanish articles were, on average, 13% less accurate in their article production compared to peers with a high number of obligatory contexts. These findings demonstrated that proficiency in each of the child's languages (English and Spanish) may not have been a function of each other in terms of article accuracy in Spanish.

In terms of age of mastery in article production, unlike Kemp et al. (2005), which found that, by the age of 3 years, monolingual children are producing articles accurately for the most part, Gusewski (2019) notes that this is not the case for bilingual children. She explains that the expected age of mastery of article production in bilingual children is unclear due to the limited number of longitudinal studies on bilingual children and their varying communicative commands and contexts (e.g., home language and school language).

Case Study Purpose and Rationale

Prior work that has investigated article use in monolingual and bilingual children (Emslie & Stevenson, 1981; Gusewski, 2019; Ionin et al., 2004; Kemp et al., 2005; Maratsos, 1974; Rozendaal & Baker, 2010; Schmerse et al., 2015; Zdorenko & Paradis, 2008) provides overall consistent evidence that the definite article *the* is commonly misused by monolingual and bilingual children, irrespective of whether they speak native languages that contain or do not contain articles. Existing studies also provide an approximate timeline of when children begin accurately distinguishing between and producing articles.

The purpose of this single-subject case study is to investigate the short-term development of article production accuracy in English by a bilingual Arabic–English 3-year-old child, living in the United States. Specifically, this case study will provide additional data to ascertain possible reasons for changes in article production accuracy over a short term, yet important developmental time window, and whether these changes can be attributed to regular child language development for this grammatical feature or to the child's Arabic-speaking background. Because this is a case study, which investigated this grammatical feature in one child, it is important to note that this is a preliminary step to understanding article production accuracy in young Arabic–English bilingual children.

Three specific research questions were adapted from Zdorenko and Paradis (2008) to investigate distribution of article error types in definite and indefinite contexts by the Arabic–English bilingual child in this case study. First, what was the proportional distribution of *the* misuse, *a* misuse, article omission, and article addition in nonobligatory contexts (contexts in which the use of an article is not necessary to maintain grammaticality) for this child? Second, was *a* misuse the most frequent error? Third, did the child's Arabic-speaking background interact with error

types, given that Arabic does not contain the indefinite article *a*? On the basis of the article system in Arabic, the child was expected to misuse the indefinite article *a* the most frequently.

Method

Participants

This case study, which was approved by the institutional review board of the primary investigator's prior institution (University of Northern Iowa), included a 3-year-old Egyptian Ethiopian American boy who did not attend preschool, his paternal aunt, and his paternal grandmother. Two of the child's primary caretakers were his paternal grandmother and one of his paternal aunts, who were the child's interlocutors in this case study and Arabic–English bilingual speakers with self-reported native proficiency in both languages. The child's mother was Ethiopian American and a bilingual Oromo–English speaker. The child's father was Egyptian American and a bilingual Arabic–English speaker. The father was a physician completing his residency at a university in the Midwest region of the United States, whereas the mother was completing medical school at a different university also in the Midwest region of the United States. Due to the parents residing in separate states and attending school, the child lived with his paternal grandparents and two paternal aunts.

The child's family was an upper-middle class family, with all adults possessing college degrees. From birth, the child was exposed to both Arabic and English at home, making him a simultaneous bilingual learning more than one language at the same time. However, according to the child's paternal grandmother, with whom he spent the majority of his time, the child spoke considerably more English than Arabic. She reported that the child was exposed to approximately 90% input in English and 10% in Arabic along with minimal input from other languages, namely, Oromo (from the mother's side of the family), Spanish, and Russian (from cartoons). The child's English and Arabic input was provided by the child's grandmother, grandfather, and the two aunts, who all lived in the same house as the child, as well as the child's parents (who did not live in the same house), cartoons, and other environmental input from outside of the home (e.g., interactions with family friends). The child's grandmother also reported that the child, at the age of 3;4, spent a month living with his parents, who spoke primarily English to him, with minimal input in Arabic and Oromo during this time. Although the child's overall exposure to Oromo was minimal and thus had little effect on the child's use of articles in English, it may be useful to note that, like Arabic, Oromo contains the definite article *the* (*ichi* in Oromo), which is marked at the end of a noun. However, also like Arabic, Oromo does not have an indefinite article.

The child's paternal aunt was an Egyptian American undergraduate college student, who came to the United States at age 6 years and resided in the United Kingdom prior to that. She was a simultaneous bilingual of English and Arabic, having learned both languages since birth. She also received informal Arabic education through classes at the local mosque and was regularly exposed to Arabic at home from her parents. In this case study, she was the child's interlocutor for the first two audio-recording sessions, which were collected when the child was age 3;2 (years;months).

The third participant in the study was the child's paternal grandmother, who was an Egyptian American and retired physician; at the time of the audio-recording sessions, she was a stay-at-home mother. She had been living in the United States for 16 years and lived in the United Kingdom, the Kingdom of Saudi Arabia, and Egypt prior to that time. She was a sequential bilingual speaker of English and Arabic, having learned Arabic first and then English. In this case study, she was the child's interlocutor for the second two audio-recording sessions, which were collected when the child was age 3;6.

Protocol

Language samples were collected through a total of four audio-recording sessions during child play twice over a 4-month interval. The first two sessions were conducted when the child was age 3;2, and the second two sessions were conducted when the child was age 3;6. During the first two sessions, the child was audio recorded by his paternal aunt for 30 min on two separate occasions 1 week apart, during play time and while watching animated children's cartoons. This protocol was repeated by his paternal grandmother for the second two sessions when the child turned age 3;6. The activities in which the child participated in during language sampling (watching cartoons at age 3;2; free-play at age 3;2; watching cartoons at age 3;6; free-play at age 3;6) were chosen because they represented normal activities in the home for the child as reported by his paternal aunt and grandmother, who were the child's primary caretakers. Consequently, the child's paternal aunt and grandmother were chosen as his interlocutors to converse with him and respond to his utterances in a familiar environment in order to collect naturally occurring language production from the child. The primary investigator of this case study orthographically transcribed sections of the four recording sessions with the child's paternal aunt (Recording Sessions 1–2) and parental grandmother (Recording Sessions 3–4) using the Systematic Analysis

of Language Transcripts (SALT) Research software (Miller & Iglesias, 2017). The overall descriptive data for the interactions between the child and the adults at each session are detailed in Table 2. Reliability for coding accuracy was calculated by dividing the number of agreements by the sum of agreements and disagreements and then multiplying by 100. Interrater reliability for coding accuracy was high ($M_{\text{CodingAcc.}}$ = 95%; SD = 6%).

Analysis

To analyze the data on the child's use of definite and indefinite articles in English, relevant sections of the transcripts were extracted for further analysis. These sections included utterances by the child that contained accurate and inaccurate productions of article use, including substitution, omission, and addition errors. The child's productions were coded at the word level for accurate productions as well as errors using a specialized coding system designed by the primary investigator (see Table 1). Specifically, a total of eight unique word-level codes were designed to track the accurate and inaccurate use of specific article types in English. The design of this coding system was necessary given that SALT software does not automatically track article accuracy. Rectangular data files in SALT were used to generate frequency counts of the article accuracy coding system across the sessions. The resulting frequency counts for each of the eight unique word-level codes were used to determine the proportional distribution or article error types.

Descriptive data including the total number of utterances, mean length of utterance in words (MLUw), number of different words (NDW), number of total words (NTW), and mean turn length in utterances (MTUs) were also extracted using SALT. The child's article production accuracy and errors were examined for the influence of the child's Arabic background on his English production by identifying whether the child used the definite article *the* in place of the indefinite articles *a* and *an* as the latter do not exist in Arabic.

Results

The data collected consisted of more than 100 utterances produced by the child across the four recording sessions. For this case study, a total of 49 utterances produced by the child that included obligatory contexts for articles were included for analysis. The extracted language production data relevant to the three research questions for this case study included a total sum of 117 total words, 64 different words, and an MLUw of 2.38 produced by the child across the four recording sessions. The child code switched from English (the target language) to Arabic 4% at age 3;2 and 0% at age 3;6. Specifically, the instances of code switching to Arabic occurred only in utterances that did not contain article use. In terms of discourse, the child's MTU was 2 across the four sessions, and the adults' MTU was 1. Detailed descriptive data for the child and adults are outlined in Table 2.

This study investigated the distribution of article error types in definite and indefinite contexts (e.g., see Table 1) produced by an Arabic–English bilingual child. The child produced a total of 38 articles in English in obligatory contexts across the four recording sessions. Overall, the majority of the child's article productions were accurate with 68% accurate and 32% inaccurate productions. The most frequent error produced by the child was the use of the definite article in the indefinite context, accounting for a total of 58.3% inaccurate article productions across the four sessions. The second most frequent error was the use of the indefinite article in nonobligatory contexts, which accounted for a total of 25% inaccurate article productions across the four sessions. The child's inaccurate use of the indefinite article in the definite context and the inaccurate use of the definite article in nonobligatory contexts were minimal, each accounting for

Table 1. Word-level codes for accurate and inaccurate use of article types.

Word-level code	Accuracy	Article accuracy/inaccuracy type	Example
[AD]	Accurate	Definite *the*	What did the dog do? The[AD] dog barked.
[AI]	Accurate	Indefinite *a*; *an*	What's that? That's an[AI] ant.
[AN]	Accurate	Null (no article)	There's [AN]Mickey.
[AD:E]	Inaccurate	Definite substitution; *A/an* for *the*	What color is this bunny? That's the[AD:E] white bunny.
[AI:E]	Inaccurate	Indefinite substitution; *The* for *an*	Mickey made the[AI:E] friend
[AD:ENC]	Inaccurate	Definite addition; *The* for null	There's the[AD:ENC] Mickey.
[AI:ENC]	Inaccurate	Indefinite addition; *A* or *an* for null	There's a[AI:ENC] Mickey.
[AD:EO]	Inaccurate	Definite omission; *The* missing in an obligatory context	Where's the dog? [AD:EO]Dog is over there.

Table 2. Descriptive child and adult language production data based on child's age at 3;2 (years;months) and 3;6.

Child's age	Speaker	Total Utts	MLUw	NDW	MTUs	NTW	%CSw
3;2	Child	30	2.43	34	1.00	73	4%
	Adult	26	3.04	53	1.00	79	30%
3;6	Child	19	2.32	20	3.00	44	0%
	Adult	7	2.57	10	1.00	18	11%

Note. Utts = utterances; MLUw = mean length utterance in words; NDW = number of different words; MTUs = mean turn length in utterances; NTW = number of total words; CSw = code-switched words.

about 8.3% of inaccurate article productions. Detailed data on the distribution of the child's article misuse at ages 3;2 and 3;6 are outlined in Table 3.

Discussion

The purpose of this case study was to systematically examine an Arabic–English bilingual child's use of articles in English and determine whether article errors were a result of influence from the child's Arabic or whether they were comparable with the errors produced by bilingual children from different native language backgrounds and monolingual children with typical language development. The majority of the child's words were produced in English (97%) across the four recording sessions, which was the child's reported dominant language.

To address the first question of this case study with regard to the proportional distribution of errors of article use, the findings demonstrated that the distribution of article substitution, addition, and omission errors was not balanced. The child's most frequent error (58.3%) was the substitution of the article *the*, as in the child used the definite article *the* in place of the indefinite article *a/an*. The second most frequent error was the addition of an article, mostly the indefinite (24%) in a nonobligatory context. The addition of the indefinite article a/an in nonobligatory contexts made up about 8.3% of errors. Last, the substitution of the article *a/an*, as in the child used the article indefinite *a/an* in place of the definite article *the*, was the remaining 8.3% of errors. There were no omission errors.

The second question of this case study was to determine whether the errors of indefinite article use would be the most frequent in the child's language production. On the basis of the article system in Arabic, which does not contain the indefinite article, the child was expected to misuse the indefinite article the most frequently. However, the child exhibited more accurate use of the indefinite article relative to the definite article. Interestingly, this finding agrees with Zdorenko and Paradis (2008), who found that bilingual children who spoke native languages that either contained articles (Spanish, Romanian, and Arabic) or did not contain articles (Chinese, Korean, and Japanese), all misused the definite article *the* the most frequently. Further agreeing with Zdorenko and Paradis, this finding did not support the FT/FA account, which would predict that children whose native languages contain articles (such as Arabic) would transfer definiteness from their native language to English. Thus, this finding also provides support for the child in this case study, making errors in article use comparable with those identified in the English of bilingual children as well as that of English monolinguals (e.g., Kemp et al., 2005; Rozendaal & Baker, 2010; Schmerse et al., 2015) with typical development.

The expectation that the child's most frequent error would involve the indefinite article *a/an* was not supported in this case study. However, it could be that the more frequent definite article errors indicate that, since the child's other language (Arabic) only contains the definite article (as well as the null article), he could have been overusing it and, therefore, generalizing it. If this was the case, then this answers the third question of the study in that the child's Arabic background could be interacting with error types, yet not in the way initially expected. Overall, this finding supports previous findings from Zdorenko and Paradis (2008), which indicate that native language influence in bilingual children's rates of article acquisition in English is limited.

One interesting finding of this study was that the child's use of articles was inconsistent at age 3;2, when all

Table 3. Proportional distribution for article error types based on child's age at 3;2 (years;months) and 3;6.

Child's age	DA sub error	IA sub error	DA add error	IA add error	DA om error	IA om error
3;2	58.3%	8.3%	8.3%	25%	0%	0%
3;6	0%	0%	0%	0%	0%	0%

Note. DA = definite article; IA = Indefinite article; sub = substitution; add = addition; om = omission.

article errors occurred, whereas the child did not produce any article errors at age 3;6. The errors produced at age 3;2 included the substitution and addition errors. Examples of the child's errors at age 3;2 and improvement at age 3;6 are illustrated in the four examples below.

Example 1: Inaccurate use of *the* in null article context (age 3;2)

Child: The[AD:ENC] Goofy monster!
Aunt: The Goofy monster?
Child: X.
Aunt: Oh no!
Child: I can't see!
Child: I can't see!
Aunt: [Name of the child] what do you mean you can't see?

In the above example, a relevant excerpt has been extracted from a longer conversation. The child was watching *Mickey Mouse Clubhouse*, a children's cartoon, with his aunt. According to the aunt's report and the recording, which included this interaction, the child saw Goofy, a character in the cartoon, and referred to him as "The Goofy monster." The aunt asked the child "the Goofy monster?" to clarify what the child meant. Here, the child inserted an unnecessary definite article before a proper noun.

Example 2: Inaccurate use of *a* in null article context (3;2)

Child: {Gasping} Oh my God!
Child: There's a[AI: ENC] Mickey!
Aunt: Oh my God! {Laughing}
Child: There's a[AI:ENC] Mickey!
Aunt: A Mickey!
Child: X.
Aunt: Oh.
Child: Wow!
Child: A[AI:ENC] Goofy monster!

In this exchange, the child inserted an unnecessary indefinite article before another proper noun, Mickey. The child did this again with Goofy. The child referred to characters in the cartoon *Mickey Mouse Clubhouse* with a preceding definite or indefinite article. However, he did so inconsistently. Since characters' names are proper nouns, a null article would be the appropriate choice. However, the child began by referring to Goofy as "the Goofy monster," adding an unnecessary definite article before the proper noun, Goofy. Later in this example, he referred to Mickey as "a Mickey." Instead of saying, "There's Mickey!" he said, "There's *a* Mickey!" Here, he added an unnecessary indefinite article before a proper noun. He then referred to Goofy as "a Goofy monster" after having referred to him as "the Goofy monster" in previous utterances. This demonstrates errors in the use of the definite and indefinite articles before proper nouns. It is important to note that this utterance may be interpreted as the child using an adjective (i.e., goofy) to describe a noun (i.e., monster). In this case, the use of a definite or indefinite article preceding "Goofy monster" would not be an inaccurate use of the article. To address this possible concern, the first author contacted the child's paternal aunt at the time of transcribing the data to inquire about whether this was the case in this context. The paternal aunt confirmed that "Goofy Monster" is what the child thought the character's name was (i.e., proper noun) and was not referring to a monster as being goofy (i.e., adjective + noun). She further explained that he did not know what a goofy monster (i.e., adjective + noun) meant to describe a monster as such.

Example 3: Inaccurate use of *the* in indefinite context (3;2) with Arabic translation italicized

Child: The[AD:E] cake!
Child: Wow!
Aunt: Oh, that's not a cake, that's a hot dog.
Child: The[AD:E] cake!
Child: The[AD:E] hot!
Aunt: No, it's a hot dog.
Aunt: Da (*that's a*) sandwich.
Child: They're racing!
Child: The[AD:E] yellow car!
Child: Uh-oh!
Child: They can't see the cars.
Child: The cars can't see!
Child: There's the {pause} the pink car!
Aunt: They're racing zay ma enta olt. *Like you said*
Child: X.
Child: The[AD:E] kitty-cat!
Child: X.
Child: The elephant!

In this interaction, the child used the definite article *the* before most of the nouns he referred to in his utterances. Considering that these nouns are distant (on the screen) and the child is only pointing out their presence, and not saying anything particular about them, the appropriate choice of articles in this context would have been the indefinite articles *a* or *an*. Thus, although these utterances are not ungrammatical, the child used the definite article *the* before a noun to point out the noun, which in English requires an indefinite article. Context is a vitally important factor to consider when addressing a child's use of articles. For example, Warden (1976) concluded that to make an accurate referring expression, a speaker must choose from various options so that it is appropriate for the context of the conversation: "He must decide, for

example, whether his referent is something that requires introduction and explanation, or whether it may be assumed to constitute common knowledge between himself and his audience" (p. 101). In the above interaction, the child failed to produce accurate referring expressions when pointing out what he was seeing on the screen as he watched cartoons. However, Polite et al. (2011) explain as follows:

> Assume a child is at home and approaches a box of toys. After rummaging through the box, the child holds up a toy truck. An utterance such as *Here's a truck!* might be expected if the child had forgotten the contents of the toy box or had not seen the toy truck before. On the other hand, the utterance *Here's the truck!* might be expected if the child had been looking for the particular toy truck. Unfortunately, the context does not permit a judgement as to which of these interpretations is the correct one. Therefore, there is no way of knowing with confidence if the child's choice of article was appropriate; only the fact that an article was required can be determined with confidence. (p. 292)

As noted earlier with regard to Zdorenko and Paradis' (2008) study with bilingual children who spoke native languages that either contained or did contain any articles, all the children were found to use the definite article *the* in indefinite contexts irrespective of their native language background. This could provide support that the Arabic–English bilingual child in this case study is displaying development comparable to the English of other bilingual children as well as that of English monolinguals.

Example 4: Accurate use of indefinite article (3;6)

Child: A[AI] truck!
Grandmother: "What is this?"
Child: A[AI] tracker!
Grandmother: What is this?
Child: A[AI] car!
Child: A[AI] fire truck.
Grandmother: A[AI] fire engine.
Child: Fire engine.
Child: A[AI] train.
Child: A[AI] airplane.
Child: A X.
Child: A[AI] motorcycle.
Child: A[AI] truck.

In this final example, the child demonstrated improvement in his use of indefinite articles when pointing out an item. He used the indefinite article *a* as he pointed out different items in a book to his grandmother. As in the prior illustrated interaction (Example 3), the child was only pointing out these items and not providing any extra information following the noun. Therefore, an indefinite article would have been the most appropriate article to use in this context. Although the child still made errors at this stage such as using the wrong indefinite article (e.g., using *a* before the word "airplane" instead of *an*), the child's misuse of the definite article in this context at age 3;2 was no longer evidenced at age 3;6.

In summary, the child frequently used articles inaccurately during the first two sessions when he was age 3;2. The most common error was the overuse of the definite article *the* in inappropriate contexts. The child's misuse of the definite articles outnumbered his misuse of the indefinite article. This could be related to the child's knowledge of Arabic, thereby indicating other language influence/transfer. It could be that the definite article was more relevant in the context of the child's language while watching cartoons and playing with toys. In other words, it could be that there were more opportunities for the child to use *the* more frequently than the other articles and therefore more of a chance to misuse it. Four months later, the child used the definite, indefinite, and null articles accurately in English in his utterances when he was age 3;6, which aligns with existing findings from the article system development in the English of bilingual children from various native language backgrounds and of monolingual English-speaking children.

Summary

This single-subject case study provided evidence of an Arabic–English bilingual child's inconsistent use and misuse of articles at the age of 3;2, which may be secondary to possible Arabic influence on the child's spontaneous language production in English. When compared with studies of typically developing monolingual and bilingual children's errors, similarities in the patterns of the bilingual child in this case study could be identified. This indicates that the child's errors at age 3;2 were possibly a combination of both other language influence as well as typical developmental errors for children his age. Although developmental improvement in article accuracy would be expected for children with typical development, this particular child demonstrated surprisingly rapid improvement in article use in a 4-month time window displaying 100% article accuracy at age 3;6. Of particular interest is that the monolingual children's data from Rozendaal and Baker (2010) indicate that, around 3 years old, children's use of articles was nowhere near adultlike use, particularly in terms of whether the referent was a commonly shared experience by the speaker and the listener. It is important to note that findings from this case study although yielded important findings on the developmental patterns of English article production accuracy in a

child raised in an Arabic–English bilingual home, more research needs to be conducted and ideally based on large-scale group studies of Arabic–English bilingual children.

Limitations and Future Directions

One limitation of this case study is that it was a short-term study with only two time points. The child showed marked improvement at age 3;6 relative to when he was age 3;2. However, if a longer term case study had been conducted with language samples collected every two months from age 2;0 through age 4;0, it would have provided more nuanced information on this child's developmental trajectory. It may have also been more efficient and or productive to have a more structured task for the child to complete to analyze the child's use of articles in all contexts and more precisely measure article production accuracy.

Another limitation is that single-subject case studies are inherently restricted in their generalizability. The findings of this case study are only a preliminary step to studying this topic. Future research on larger groups of participants needs to be conducted in order to begin to generalize the findings to young Arabic–English bilingual children.

A third limitation is that the original audio-recording sessions were unrecoverable, which did not permit reliability for transcription accuracy to be calculated. The primary investigator, who is a native Arabic–English speaker, transcribed the original audio recordings.

Future directions include shifting from a case study to a group-level quantitative study. Future studies may include Arabic–English bilingual children as well as age-matched monolingual English-speaking children to provide more evidence to inform claims regarding explanations of dual language influence and or similarities to monolingual child language development.

Data Availability Statement

All data obtained and/or analyzed are available from the authors upon reasonable request.

Author Contributions

Rana Moustafa: Conceptualization (Lead), Data curation (Lead), Formal analysis (Equal), Methodology (Equal), Writing – original draft (Lead). **Raúl Rojas:** Conceptualization (Supporting), Data curation (Supporting), Formal analysis (Equal), Methodology (Equal), Writing – original draft (Supporting).

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