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Bidirectional Crosslinguistic Influence in the Acquisition of L2 English Articles by Arabic-English Bilingual Adults and Children

Thesis submitted for the degree of Doctor of Philosophy

The Department of English Language and Applied Linguistics

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Dedication

To Zainab Ali, with all love and respect…

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Abstract

Using English articles has been viewed as a challenge for second language (L2) English learners. Two reasons were often given to explain this difficulty: 1) the complexity in mapping forms to meanings and 2) the influence of the learners' first language (L1). This has been linked to whether or not the L1 has an articles system and to the extent to which the L1 article system (if it exists) is similar to or different from the L2 English article system. In addition to these aspects, it has been found that patterns of using English articles present a variability in relation to L2 age of onset of acquisition (L2AOA) and L2 proficiency. In respect to L2AOA, it was found that early learners often demonstrate higher accuracy in using L2 English articles and their L1 has less of an influence on their performance. Among L1 Arabic-L2 English groups, prior research has focused on adult learners with little attention given to children. Moreover, attention was only given to how L1 Arabic likely impacts the use of L2 English; examining how L2 English article use might affect L1 Arabic use has not been addressed. The current project examined the use of articles in both L1 Arabic and L2 English among two populations of Arabic-English bilingual adults (N = 40) and school-age children (7–12) (N = 13) in two studies employing two different tasks: 1) a narrative-elicitation task and 2) a sentence-repetition task (SRT). The projects considered a number of factors, such as L1 (in children) and L2 proficiency, L2AOA and the length of residence in the L2 context (the United Kingdom [UK]). The studies also examined the role of crosslinguistic influence and whether the use of L2 English is impacted by the learners' L1 Arabic, and vice versa. Furthermore, in the SRT, the study examined whether adjectival noun-premodification affects the degree to which English articles are omitted. In the two studies, the performance of the two bilingual groups was compared to two control groups: monolingual Arabic speakers (N = 39) and English native speakers (N = 30).

The results of the L2 English article use varied across the two studies. In the narrative-elicitation study, the bilingual children were more target-like than the bilingual adults. Both bilingual groups shown instances of L1 influence mainly in their omission of the indefinite article, *a/an*; however, this was more prominent in the bilingual adults. In the SRT, unlike the first study, the two bilingual groups were less accurate in their use of English articles than the native English speakers. In both studies, the bilingual adults' patterns of errors showed that they generally struggle in marking noun countability. Additionally, in both studies, the results indicated increased accuracy in L2 English article use, particularly in adults with higher L2 proficiency.

The findings of both studies showed no direct L2 effects on the use of L1 Arabic articles by the two bilingual groups. However, in some of the patterns of use of Arabic articles, the bilingual adults showed an increase in accuracy with higher L2 proficiency and prolonged residence in the UK.

Declaration of Original Authorship

I confirm that this research is my own and all the other materials within are credited and properly acknowledged.

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Date:14/03/2022

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List of Acronyms

ACP	Article Choice Parameter
ASCT	Arabic Sentence Comprehension Test
BA	Bilingual Adults

BC	Bilingual children
CPH	Critical period Hypothesis
CLI	Crosslinguistic Influence
ENS	English Native Speakers
FH	Fluctuation Hypothesis
L1	First Language
L2	Second Language
L2AOA	Second Language Age of Onset of Acquisition
LOR	Length of Residence
LORBC	Length of Residence in the Birth Country
LORUK	Length of Residence in the United Kingdom
MAS	Monolingual Arabic Speakers
NP	Noun Phrase
SRT	Sentence-Repetition Task
TROG	Test for the Reception of Grammar
T1	Type 1
T2	Type 2
T3	Type 3
T4	Type 4
T5	Type 5
[+art]	Languages which include articles
[-art]	Languages which lack article

CHAPTER ONE: INTRODUCTION

The use of English articles has been a common struggle for the second language (L2) English users. Different studies have been conducted to explain the process of L2 English article use. Across these studies, several factors were considered, including the impact of age of acquisition, proficiency and length of residence (LOR) in an English-speaking country. In addressing this difficulty, two main hypotheses were often given: 1) the semantic and the pragmatic complexity of using English articles (Azaz, 2014; Ekiert, 2005) and 2) the impact of the first language (L1) on the use of L2 English articles (Ekiert, 2005; Sarko, 2008; Thomas, 1989). The first hypothesis was often linked to how English articles that express definite/indefinite meanings co-occur with specific/nonspecific contexts, often confusing the two meanings and resulting in errors (Ionin et al., 2009; Zdorenko & Paradis, 2012). Concerning the second reason, the impact of L1 has been explained under what is known as *transfer,* or *cross-linguistic influence* (CLI), identified as "the influence resulting from similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired" (Odlin, 1989, p. 27).

Developing L2 English articles in relation to L1 influence has been extensively studied in adult groups. This has been done across different L1 groups, including articles [+art] (Ionin, 2010; Sakro, 2008) and those which lack articles [-art] (Ekiert, 2005; Ionin et al., 2004). The performance of adults was often explained in relation to L2 proficiency and how the role proficiency often interacts with the L1 effect during acquisition (Chaudron & Parker, 1990; Liu & Gleason, 2002; Sarko, 2008). In contrast to adult groups, limited research also aimed to explain the acquisition of L2 English articles in children (Zodrenko & Paradis, 2008, 2012). As with adults, children's performance was often examined in relation to their L1 influence. In these studies, the impact of L2 age of onset of acquisition (L2AOA) was

addressed by comparing the process in early and late learners of L2 English (Ionin et al., 2009).

In addressing CLI, studies of L2 English articles have focused mainly on *forward CLI* (i.e., how L1 affects the performance in L2). Little attention has been given to examining the opposite pattern or what is referred to as *reverse CLI* (i.e., the effect of L2 to L1).

Concerning the research of L1 Arabic L2 learners of English, most studies also focused on adults' performance (Al-Qadi, 2015; Bataineh, 2005; Sarko, 2008; Scott & Tucker, 1974). It was found that the adults often perform better in the aspects in which Arabic and English are similar; this was observed in showing accuracy in using *the* in contrast to *a/an*, which was often omitted due to lack of indefinite articles in L1 Arabic. A minimum number of children's studies examined the performance of younger children (ages 5; 4- 6; 11) (Zodrenko & Paradis, 2008, 2012). In addition, like most L2 studies on English articles, only L1 Arabic effects on L2 English were examined; none of these studies aimed to investigate how L2 might affect the use of articles in L1 Arabic.

This project aimed to explore the process of developing the use of L2 English articles in two groups of L1 Arabic-L2 English bilinguals of adults and school-age children (age 7-12). The studies were conducted on participants who acquired their L1 Arabic in Saudi Arabia and then moved to the UK. The studies examined the use of the L2 English article by analysing production and characterising article use errors related to varied factors within two populations: children and adults. First, the studies investigated the effect of using L1 Arabic articles on L2 English articles. Second, the studies also adopts a bidirectional perspective, examining the use of L1 Arabic articles and if their use is effected by L2 acquisition of English articles. In addition, the studies examined whether individual factors play a role in

the process. The thesis based on the methodology is divided into two studies based on the task used: 1) a narrative-elicitation study and 2) a sentence-repetition study.

The project plays a vital role in language acquisition and L2 English teaching. Empirically, the studies investigate the impact between distinct factors and to what extent they influence acquiring L2 English articles in the following ways:

1. The studies add to the existing knowledge of the role of CLI in L2 development. Concerning CLI, the study examined if L1 affects article use on L2 and also whether there is any influence of L2 use of English articles on the L1 Arabic use of articles.
2. The studies also examined the impact of L2 proficiency and how likely patterns of developing article use change with an increase of L2 proficiency. The studies also tap on the role age plays in the acquisition process and whether differences were exhibited between children and adults. This aspect was never investigated among L1 Arabic speakers. The studies also investigated if the LOR in an English-speaking country and exposure to L2 are related to how children and adults acquire L2 English articles.
3. Regarding noun phrase (NP) structure, the studies examine whether an adjective within the NP increases the chances of participants' errors in their use of L2 English articles.

The studies address essential aspects of language teaching and learning by examining and exploring the difference between Arabic-English adults and children in L2 English article development. The thesis explains how acquiring L2 English forms, particularly articles, differ between children and adults. In addition, by exploring the bidirectional effects of the two languages, the study provides more understanding about the dynamic of language acquisition. The details of the analyses provided about patterns and errors of article use and whether they

are part of the natural process of L2 development or the result of other factors help make decisions regarding materials provided for L2 language teaching. English is a universal language taught in Arabic countries, including Saudi Arabian. Children's studies of L1 Arabic groups in this particular aspect of L2 English are exceedingly rare. By examining Arabic-English children's performance, this thesis contributes to helping English teaching for this specific age group of L1 Arabic speakers.

Methodologically speaking, by including two different task designs, this research goes beyond previous studies and provides comparative data, which helps reveal varying patterns that cannot be shown using only one method. In relation to the first study, article use in definite and indefinite contexts is examined within the cohesive and semi-spontaneous text, which is similar to natural everyday language use. The second study provides an innovative design to examine article use in both Arabic and English. The use of sentence-repetition has been rarely used to examine article use and often only within the limited scope of article use. In this study, this type of task covers the most relevant aspects and broadly considers a broader scope lacking in the narrative-elicitation task.

The current thesis is presented across eight chapters. Chapter 2 presents a review of the theories, concepts, and empirical research on the acquisition of L2 English articles by L2 English learners and the factors likely to impact their development, focusing more on age and L1 influence. The chapter describes how articles are used across different languages, providing more elaborated explanations of the Arabic and English article systems. The chapter presents a discussion of the common difficulties often faced in using English articles by L2 English learners and the role several factors play in the process. This chapter also discusses previous studies of L2 English users of different L1 backgrounds of both children and adults, emphasising studies on L2 English articles acquisition by L1 Arabic users. In Chapter 3, the aims, the research questions and the hypotheses are presented.

The thesis then offers three more chapters, each presenting a different study and containing their methodology, outcomes and a discussion of their findings. Chapter 4 presents the pilot exploratory study of the narrative-elicitation research, followed in Chapter 5. This study aimed to investigate the performance of Arabic-English bilingual children in using the English articles compared to Arabic-English bilingual adults and native English speakers.

Chapter 5 presents the main study of the narrative-elicitation task. The chapter adopts a similar structure to that of Chapter 4, starting with the goals, followed by an explanation of the methodology, the results and a discussion of the findings.

Chapter 6 reports on a second study conducted to examine the aims of the same narrative-elicitation survey using a different methodology, a sentence-repetition task (SRT). This experimental design made it possible to study the whole English article system and control better variables impossible to manage in the narrative. The chapter presents a structure similar to Chapter 4, although this chapter includes a pilot study for the main task design.

Chapters 7 and 8 present a general discussion of the findings and conclusions. The discussion presents the general outcomes across the two studies highlighting the similarities and differences indicating the role of task type. Additionally, the discussion presents the limitations within the current research. On the other hand, the conclusion summarises the studies and discusses the contribution of the current research within the filed.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

English article acquisition is a complex process that taps into various aspects of second language acquisition. In the light of previous research, this chapter examines several factors impacting the process, primarily language CLI and age. The chapter starts with Section 2.2. which describes how article systems function across different languages and provide a detailed description of the English and Arabic article systems. Section 2.3. offers an overview of L2 acquisition on English morphemes where the theories and hypotheses about age, L2 proficiency and CLI are discussed. In the following section (Sections 2.4), an elaborated discussion of English articles acquisition in L2 learners/users is offered. Next, Section 2.5. presents a discussion of how L1 Arabic speakers particularly perform followed by a brief review of Arabic article acquisition as a reverse phenomenon among bilingual speakers (Section 2.6).

2.2. Article Systems Across Languages

Articles are a subcategory of determiners or "function words used to specify the kind of reference a noun has" (Conrad et al., 2003, p.65). In a language that includes an article system, articles are said to encode either definiteness or specificity, but not both (Ionin et al., 2004). The meaning of definiteness resolves around the existence of shared knowledge between the speaker and an addressee (Chondrogianni et al., 2015; Conrad et al., 2003); the lack of this meaning is known as indefiniteness. English is a language that encodes definiteness in that definite nouns are marked by the definite article *the*, while the indefinite article *a/an* is a marker for indefinite singular countable nouns (Conrad et al., 2003). In Example 2.1.a, there is no shared knowledge as the noun *bag* has not been mentioned before, and therefore *a/an* is used. However, in Example 2.1.b, a continuation of Example 2.1.a, both

the speaker and the hearer are already familiar with the bag and shared knowledge has been developed. Accordingly, *bag* it is marked with the definite article *the*.

Example 2.1.

a) indefinite

Alex bought Nadine ***a bag*** for her birthday.

b) definite

Nadine wears ***the bag*** every time she goes out.

With respect to specificity, the meaning resolves around whether the speaker has a particular referent in mind (Ionin, 2006). Samoan is a language in which articles encodes specificity. The articles *le* and *se*, in Example 2.2, are used to mark specific and nonspecific nouns respectively in Samoan.

Example 2.2

a) +specific

Use of 'le' with a specific noun:

'O le uluga¯li'i, fa¯nau l = a la¯ tama 'o le teine 'o Sina

PRES ART couple give birth ART = Poss 3. du. child PRES ART girl PRES Sina

There was a couple who had a child, a girl called Sina.'

b) −specific

Use of 'se' with a nonspecific noun

Sa fesili mai se tamaitai po=o ai l=o ma tama.

PAST ask DIR ART(nsp.sg.) lady Q-PRES who ART=Poss 1.exc.du. father

'A lady asked us who our father was.' (Ionin et al., 2008, p.557)

2.2.1. The English Article System

The English article system encodes definiteness but not specificity (Conrad et al., 2003). In English, there are three articles: *a/an* and *the,* in addition to the *zero* article (Conrad et al., 2003). English articles are defined as free morphemes used to identify referents in NPs. Definite NPs are marked with the definite article *the,* as in Example 2.3. Because the *class* is known to both the speaker and the addressee, the definite article *the* was used. Indefinite nouns, however, are marked either by *a/an* in the case of indefinite singular countable nouns (Example 2.4) or *zero* with mass/uncountable nouns and plural countable nouns (Master, 1997) (Example 2.5). Because both *cake* and *chairs* are newly introduced in the sentences, no shared knowledge was developed between the speaker and the addressee. They were accordingly marked with the indefinite articles *a/an* and *zero,* respectively.

Example 2.3

He is attending a class. ***The class*** is about language and identity.

Example 2.4

She is baking ***a cake.***

Example 2.5

I asked him to bring ***(zero) chairs*** for the party.

The use of English articles is considered complex. This complexity is linked to the semantic and the pragmatic aspects of article use (Azaz, 2014; Ekiert, 2005). While English articles are markers of definiteness/indefiniteness, NPs in English co-occur within specific and nonspecific contexts (Ionin et al., 2009). This co-occurrence within specific and nonspecific context is said to confuse many L2 English learners, where by specific meaning is mistaken for definite and nonspecific is mixed-up as indefinite (Ionin et al., 2009;

Zdorenko & Paradis, 2012). An additional aspect of article use complexity is noun countability (Ekiert, 2007; Master, 1997). The use of English articles requires L2 English learners to distinguish between several types of common nouns: mass (uncountable) nouns, singular countable nouns and plural countable nouns. The use of *a/an* and *zero* in *generic* and *indefinite* contexts is determined by the ability to differentiate between the different types of nouns; failing to do that could lead to errors.

The complexity of English article use has been of interest to many researchers. Many models have been suggested to explain articles and their semantic and pragmatic meanings. Bickerton (1981) analysed NPs environments based on their semantic contexts. In his model, NPs were classified based on specificity and if they were assumed to be known to the addressee (i.e., definite) or not. Therefore, according to Bickerton (1981), NPs contexts are identified as: [definite, nonspecific], [definite, specific], [indefinite, specific] and [indefinite, nonspecific]. Based on this analysis, Huebner (1983) designed his model on L2 English article system identifying four types of semantic contexts for article use as follows:

1. Type 1 (T1): generic [definite, nonspecific]: encoded by either *a/an, the,* or *zero*.
2. Type 2 (T2): referential definites [definite, specific]: marked by *the*.
3. Type 3 (T3): referential indefinites [indefinite, specific]: marked by either *a/an* or *zero*.
4. Type 4 (T4): non-referential indefinites [indefinite, nonspecific]: marked by either *a/an* or *zero*.

Within this categorisation, the use of articles in Huebner's (1983) model, and many other models (Celce-Muria & Larsen-Freeman, 1999; Conrad et al., 2003; Hawkins, 1978), are categorised as generic and non-generic uses of English articles. Examples of the different uses of articles are presented in Table 2.1 based on Ekiert (2005, p.3). *Generic* use in Examples 1, 2, and 3 in Table 2.1 are identified as [definite, nonspecific] in Huebner's (1983)

model. In this case, the noun refers to an entire class of items rather than an item or more within that class (Conrad et al., 2003). Non-generic uses, on the other hand, are identified in the use of articles in the other three contexts. In [definite, specific], where only *the* is used, four categories fall under referential definites:

1) Commonly known referent by being *physically present* in the environment (Example 4 in Table 2.1).
2) *Specific referent*s in which a shared knowledge is assumed between the speaker and the addressee (Example 5 in Table 2.1).
3) *Previously mentioned referents* (Example 6 in Table 2.1).
4) *Commonly known referents* by all individuals (Example 7 in Table 2.1).

In the [indefinite, specific], the articles *a/an* and *zero* are supplied with NPs presenting *non-referential indefinites*, primarily indicated by first-mentioned nouns (Examples 8 and 9 in Table 2.1). The use of *a/an* and *zero* is also presented in the [indefinite, nonspecific] context, which is reflected in nonspecific indefinites and attributive indefinites (Examples 10, 11, and 12 in Table 2.1).

Many researchers have implemented Huebner's model in English article studies (Butler, 2002; Ekiert, 2005; Ekiert, 2007; Thomas, 1989). In these studies, a fifth type of article use was added, referred to as idiomatic and conventional. Idiomatic and conventional uses consider articles in conventional uses and fixed pattern phrases that do not fit under the other context types (Examples 13, 14, and 15 in Table 2.1).

Table 2.1
Contexts for using the English articles: the, a/an, and zero

Features	Context	Articles	Examples
Type 1: [definite, nonspecific]	• Generic	*a/an, the,* or *zero*	*(1) (zero)* fruit flourishes in the valley. *(2) The* Grenomian is an excitable person. *(3) A rabbit* is a cute pet
Type 2: [definite, specific]	• Referential definites • Previous mention • Specified by entailment • Specified by definition • Unique in all contexts • Unique in a given context	*the*	*(4)* Hand me *the cup*. *(5)* The idea of coming to the US was… *(6)* She wore a suit. *The suit* is … *(7)* The first person to walk on *the moon* was…
Type 3:[indefinite, specific]	• Referential indefinites • First-mention nouns	*a, zero*	*(8)* Sana came to the garden holding *a basket*. *(9)* She continued designing *(zero) dresses* for the company.
Type 4: [indefinite, nonspecific]	• Non-referentials • Attributive indefinites • Nonspecific indefinites	*a, zero*	*(10)* Salma is *a nurse*. *(11)* I might need to get *a new bag*. *(12) (zero)*Foreigners would come up with a better solution.
Type 5	• Idioms Other • Conventional uses	*a/an, the* or *zero*	*(13)* All of *a* sudden, he woke up. *(14)* In *the* 1950s, there weren't many cars. *(15)* His family is now living *(zero)* hand-to-mouth.

The use of articles in English has also been examined in other models by different authors. Many of them have focused primarily on using the definite article *the*. Hawkin (1978), in his classification model, identified eight uses of *the*:

1. *Anaphoric use*, in which the referent refers to a noun which has been mentioned previously in a text (e.g., *John bought a new house. <u>The house</u> is in London*).

2. *Associative anaphoric use*, where the referent is associated with or an element of a previously mentioned noun within a text (e.g., *I have attended yesterday's class. The teacher gave an interesting lesson*).
3. *Immediate situation use*, in which both speaker and addressee are familiar with the referent from the situation (e.g., *Come to work on time. The manager was upset last time*).
4. *Visible situation* use, in which the referent refers to something visible in the environment to both speaking participants (e.g., *Please, give me the pen*).
5. *Larger situation use, relying on specific knowledge*, in which the familiarity with the referent is due to the referent being commonly known within a particular community (e.g., when the residents of a particular city refer to *the hospital* or *the university* of that city).
6. *Larger situation use* when the referent is world-known by all individuals (e.g., *the Earth*).
7. *Unfamiliar use in NPs with explanatory modifiers*, when a modifier, in the form of a phrase or a clause, is used with a first-mentioned referent within a context (e.g., *We bought the books we found in best sales*).
8. *Unfamiliar use in NPs with non-explanatory modifiers*, when a non-explanatory modifier is used with a first-mentioned referent within a context (e.g., *He and I attended the same school*).

Following Hawkin's (1978) model, Liu and Gleason (2002) narrowed the uses into four categories based on similarity of use. Table 2.2 presents how Hawkin's (1978) categories were grouped under Liu and Gleason's (2002) classification. As viewed in Table 2.2, the four categories include:

1) *Textual uses* of *the* which combined *anaphoric* or *associative anaphoric* use in Hawkin's (1978) model (e.g., *She wrote a letter. The letter was addressed to the principal*).
2) *Cultural use*, when the NP refers to a commonly known referent within a community (e.g., *She worked as a lecturer in the university*).
3) *Situational use*, when the referent is a first-mentioned noun, can be sensed by interlocutors or when the referent is known within a local community (e.g., *Please, give me the pen*).
4) *Structural use*, when the referent is a first-mentioned noun with a modifier (e.g., *The boy, who sits on the right, is very smart*).

Table 2.2
Uses of the Definite Article 'the' Across Hawkins's (1978), Liu and Gleason's (2002), and Huebner's (1983) Classification Models

Hawkins's types	**Liu and Gleason's types**	**Equivalent types in Huebner's model**
Anaphoric use	Textual use	Previously mentioned referents
Associative anaphoric use		
Immediate situation use	Situational use	physically present referents
Visible situation use		Specific referent assumed to be known by the hearer
Larger situation use relying on specific knowledge		
Larger situation use relying on general knowledge	Cultural use	Unique referents
Unfamiliar use in NPs with explanatory modifiers	Structural use	N/A (not included in the system)
Unfamiliar use in NPs with non-explanatory modifiers		

In another model, to examine article use, Ionin (2003), like Huebner (1983), categorised article use based on the meaning of definiteness as "a presupposition of uniqueness" and specificity as "speaker intend to refer." Ionin et al. (2004) claim although meanings of definiteness and specificity exist in all languages, articles in a particular language encode only one of the two meanings. In English, in which articles encode definiteness, Ionin et al. (2004) also identified four types of article use based on their semantic meaning of being definite/indefinite and specific/nonspecific. Ionin et al.'s (2004) model, however, differs from Huebner's (1983) model in the way they address the [definite, nonspecific] context. In Huebner's (1983) model, the [definite, nonspecific] context equates *generic* uses of articles (see Table 2.1), while Ionin et al. (2004) reflect the meaning of *structural* use of *the* identified by Liu and Gleason's (2002) classification on non-generic uses of *the*. In Example 2.6, which is presented as nonspecific (i.e., the speaker does not have a particular referent in mind), the referent is specified by modification following the NP (i.e., *of his school*). According to Liu and Gleason (2002), this modification also suggests the existence of shared knowledge. Accordingly, this use of *the* falls into [definite, specific] uses of the in Liu and Gleason's (2002) classification.

Example 2.6

[definite, nonspecific]

Ruby: It's already 4 pm. Why isn't your little brother home from school?

Angela: He just called and told me that he got in trouble! He is talking to_____ *the*_____ principal of his school! I don't know who that is. I hope my brother comes home soon

Among these different classification models, Huebner's (1983) seems to cover all aspects of English article use except *structural use* of *the* as indicated in Table 2.2. Therefore,

using Huebner's model, with further consideration to all non-generic uses in Liu and Gleason's (2002) model, would likely give a wholistic view of how users of English perform in their use of English articles.

2.2.2. The Arabic Article System

The use of articles in Arabic is based on definiteness. The Arabic article system consists only of one article, *al-*, which is a prefix attached to nouns to express definiteness, as presented in Example 2.7. Indefiniteness, on the other hand, is debatable in Arabic. While many grammarians state that indefiniteness in Arabic is not encoded (i.e., marked by *zero*) (Fehri, 2012; Sarko, 2008) (see Example 2.8), some consider *tanween* or *nunation* a marker of indefiniteness (Ryding, 2005). Nunation is identified by the use of diacritics (ً,ٌ,ٍ) which are pronounced as *-an*, *-un*, and *-in*, respectively, depending on the noun position in a sentence (Azaz, 2014). Even though nunation is attached to indefinite nouns in most cases, some cases prove to go against considering nunation as an indefiniteness marker. Researchers who disagree with this view argue that nunation is "merely a marker of nominality indicating indefiniteness" (Lyons 1999, p.19). Additional evidence is that nunation also occurs with proper nouns that are definite (Fassi Fehri, 1993; Lyons, 1999). The fact that nunation occurs with definite nouns (i.e., proper nouns in this case) is inconsistent with the idea that it is a marker of indefiniteness. Moreover, in speech, when in pause, nunation in indefinite nouns is not pronounced, further supporting that *zero* is the marker for indefiniteness.

Example 2.7

ذهبت ندى إلى المستشفى

Thahabat Nada ela **al[article]-mustashfa**

Verb Nada[name] preposition article (al-) noun

Translation: Went Nada to **(al-) hospital**

Nada went to **the hospital**

Example 2.8

إشترى أحمد **سيارةً**

Ishtara Ahmad **(*zero*) Sayarat-an.**

Verb Ahamad [name] preposition article (*zero*) noun

Translation: Bought Ahamad **(*zero*) car.**

Ahmad bought **a car.**

The Arabic article system exhibit some similarities and differences to the English article system. On a morphosyntactic level, while English articles are free morphemes, *al-* is a bound morpheme that cannot be used without being attached to nouns. In terms of meaning, just like English, the Arabic article system is semantically-pragmatically complex. Similar to English, Arabic articles are based on the meaning of definiteness but co-occur within specific and nonspecific contexts (Elwerfalli, 2013; Sakro, 2008). Similar to English, Arabic articles include both generic and non-generic uses (Alenizi, 2009).

Examples of the different uses of Arabic articles are presented in Table 2.3. The article *al-* is used to express both generic (see Example 1) and definite meaning (Crompton, 2011). The use of *al-* in [definite, specific] contexts, just like *the* in English assumed by Lui and Gleason's (2002) model, goes under the four categories: *textual* (see Example 3), *situational* (see Example 4), *cultural* (see Example 5), *structural* (see Example 6) Aljarim and Alameen (1999). Differences, however, can be exhibited in the *cultural* uses of *al-* and the *cultural* uses of *the*. Cultural uses of *al-* present more conditions than the *cultural* uses of *the*. In Arabic, *al-* can be used occasionally with proper nouns such as names of some countries like

Al- Iraq (Iraq), and some names of diseases like *Al-Saratan* (i.e., cancer); these types of nouns are not marked by *the* in English. For *generic* use, however, while *generic* meaning in English is expressed by any of the three articles: *a/an, the* and *zero*, *generic* use, in Arabic is only expressed with the article *al-*. Moreover, on a structural level, while generic plural noun in English is encoded only by *zero*, both generic plural and singular nouns in Arabic are encoded by *al-*. Based on the above, and according to Alenizi (2009), the use of *al-* across all contexts is classified under six categories: *textual, situational, cultural, structural, the entire class, and individual of a class.*

The article *zero* in Arabic, on the other hand, is used to express meanings of indefinite meaning in both specific (see Example 7) and nonspecific context (see Example 8). In that, the use of *zero* mirrors the use of both *a/an* and *zero* in English. In contrast to English, however, *zero* is used with plural and singular countable nouns and uncountable/ mass nouns.

Table 2.3
Environments of Using Arabic Articles

	Category	**Environment**		**Examples**
Generic	The entire class	Used to refer to the entire class of specific groups of elements	1	إن **الإنسان** لفي خسر Inn **al-insana** lafi Khusr. Truly **the man** in loss. 'Truly ***mankind*** is in loss' (Alenizi, 2009, p.11).
	Individual of a class	Used to refer to all elements or individuals within a specific class	2	الحمد لله al hamd-u lillah Every praise-be to Allah 'Praise be to Allah' (*al-* gives the meaning of *every*) (Alenizi, 2009, p.11).
[definite, specific] Non-generic uses of *al-*	Textual	Used when *al-* is used for previously mentioned nouns	3	إشتريت **كتاباً**. **الكتاب** كان عن الحرب العالمية الثانية. Ishtaraitu **Ketaban**. **Al-Ketab** kan 'an Al-harab Al-a'alamia Al-thania. I bought a book. **The book** was about the Second World War.
	Situational	Used when the noun refers to something present or visible within the context, or is generally understood by both the speaker and addressee within the context	4	أعطني **المرآة** A'atini **Al-mira'at.** Give me **the mirror.**
	Cultural	Used when the noun refers to a commonly known referent known by all individuals in a community	5	زرت **الكعبة**Aljarim and Alameen (1999, p.137) Zur-tu **alka'bah.** I visited the **ka'bah.**
	Structural	Used when the noun is followed by a modifier in the form of a relative clause	6	**الساعة** التي إرتدتها ندى جميلة **Al-sa'ah** *alti irtadatha Nada jameelah*. **The watch** Nada wore is beautiful.
[Indefinite, specific]	zero	• Referential indefinites • First-mention nouns	7	قرأت **قصة** هذا الصباح I read **a story** this morning

[Indefinite, nonspecific]	zero	• Non-referentials • Attributive indefinites • Nonspecific indefinites	8	إيمان وسلمى **معلمتان** بمدرسة Eman and Salma are **teachers** in a school

Differences between the use of Arabic articles and English articles also occur at the NP level when the NP consists of two or more words combination. The marking of the words within the NP in Arabic differs from English depending on the NP's type and structure. In Arabic, AlHawary (2011) identify four types of NPs in Arabic:

1. The noun-adjective phrase
2. The ‘iDaafa phrase (also known as annexation by Ryding, 2005)
3. The adjective ‘iDaafa phrase
4. And the demonstrative phrase

Each of the four categories presents a way of using articles that differs from the equivalent form in English. Table 2.4 shows these types and their equivalent form in English. *Noun-adjective phrases* are phrases in which the head noun is modified by one adjective or more. In the equivalent form in English, the adjective(s) comes first, followed by the noun; in English, one article marks the entire phrase (e.g., *the tall boy*/*a tall boy*). In Arabic, however, noun-adjective phrases come in a different order where the noun comes first followed by the adjective(s). In Arabic noun-adjective phrases, the adjective(s) follow the nouns they modify, agreeing with them in gender, number, and definiteness (AlHawary, 2011). Moreover, to mark (in)definiteness, each word is marked independently within the phrase. Adjectives in noun-adjective phrases are treated like nouns in terms of marking (in)definiteness. In Arabic indefinite noun-adjective phrases, each of the noun and the adjective(s) within the NP is

characterised by *zero* (see Example 1); similarly, in definite noun-adjective phrases, each of the noun and the adjective is marked by *al-* (see Example 2).

Table 2.4
Forms of the Noun Phrase in Arabic

NP type	Condition /context	Example in Arabic	Example	Equivalent form in English
The noun-adjective phrase	Indefinite	(*zero*) fatat-un (*zero*) Jameela (*zero*) girl (*zero*) beautiful	1	A beautiful girl
	Definite	الفتاة الجميلة *al*-fatat *al*-Jameela (*al*-) girl (*al*-) beautiful	2	The beautiful girl
The ‘iDaafa phrase (i.e., annexation)	Indefinite	مدير مدرسة (*zero*) mudeer (*zero*) madrasah (*zero*) principal (*zero*) school	3	A school principal
	Definite	مدير المدرسة (*zero*) mudeer (*al*-) madrasah (*zero*) principal (*al*-) school	4	The school principal
	Annexation in the case of proper nouns (Definite)	**كتاب ندى** (*zero*) Kitab Nada (*zero*) book Nada	5	Nada’s book
The adjective ‘iDaafa phrase	Indefinite	يجب أن يكون الطالب **حسن الخلق** Yajib an yakoon al- tablib (zero) hasan al-khalq Must be (*al*-) student (***zero*) well-*al*-manner**	6	A student should be **well-behaved**
	Generic	الشخص **الحسن الخلق** شخص محترم (*al*-) shakhas **(*al*-) hasan (*al*-) khalaq** shakas muhtaram (*al*-) person **(*al*-) well- (*al*-) manner** person respectful	7	A **well-behaved** person is a respectful person
And the demonstrative phrase	Definite (with no adjective)	**هذا الطالب** Hatha al-talib This (*al*-)student	8	This student
	Definite (with Adjective)	Hatha al-talib al-jadeed This (*al*-)student (*al*-)new	9	This new student

The second type of NP in Arabic is the ‘iDaafa phrase (i.e., annexation); the ‘iDaafa phrase is one that “expresses a possessive relationship between two things/nouns but consists minimally of two nouns that make up a single (compound) noun” (Alhawary, 2011). Phrases such as *the school principal* or *the principal of the school* are equivalent forms in English. Unlike other types of Arabic NPs, nouns in Arabic ‘iDaafa phrases do not agree in gender, number, case or even definiteness. In fact, the first noun is always indefinite/unmarked because definiteness is indicated by the second noun in the phrase. In Example 3, which expresses indefinite meaning, both the first and the second nouns are unmarked (i.e., marked by *zero*). In contrast, in Example 4, which expresses definite meaning, only the second is marked by *al-*. Based on Ryding (2005), in the case of definiteness, the first noun is called definite by annexation. Therefore, although it is syntactically unmarked, it is still identified semantically as definite. Moreover, the definiteness of the second noun can be expressed by the marking of *al-* or by other means (e.g., pronouns). By all means, in this case, the preceding noun is also definite by annexation without being marked by *al-* or any other ways of marking (see Example 5).

The third type is the adjective *‘iDaafa phrase* (aka unreal ‘iDafaa) الإضافة اللفظية. This type consists of an adjective followed by a noun. This phrase differs from the regular ‘iDaafa phrases in two ways: 1) when the adjective ‘idaafa phrase is treated as indefinite, the adjective is indefinite/unmarked, and the noun is definite/marked with *al-* (see Example 6), and 2) when the phrase is treated as definite, both (adjective and noun) occur as definite (see Example 7).

Finally, demonstrative phrases consist of a demonstrative pronoun and definite noun, both agreeing in gender and number (see Example 8). A demonstrative can consist of a definite adjective that is often placed between the demonstrative pronoun and the noun (see Example 9).

2.3. L2 Acquisition of English Morphemes

In earlier studies, L2 English articles acquisition was studied as a part of a more general process of acquiring other L2 English morphemes. These studies were initially based on the findings of Brown's (1973) study in which he explained the process of acquiring L1 English morphemes. In his study, he identified an order (i.e., stages) in which L1 English morphemes are acquired explaining that these morphemes vary in their difficulty. Brown (1973) aimed to explore if the same is exhibited among L2 children and L2 adults. This research concerning L2 order of acquiring English morphemes found that across the different studies, L2 learners show a similar order in the process (Bailey, Madden, & Krashen, 1974; Brown,1983; Dulay et al., 1985; Larsen-Freeman, 1975, 1976; Wolf, 1986). This order has become known as the "natural" or "universal" order of acquisition. Regardless of the amount of research to explore this natural order, Goldschneider and DeKeyser (2001) explain that no reason has been given to explain this order.

To revisit the issue of the natural order, Goldschneider and DeKeyser (2001) conducted a study using data of 12 studies on L2 order of acquiring English morphemes, over 25 years, intending to find what factors determine this order and make some morphemes harder to acquire. In the study, the authors used meta-analysis to examine the characteristics of perceptual salience, semantic complexity, morphophonological regularity, syntactic category, and frequency play a role in the variance shown in the L2 acquisition of English articles. The L1 influence was excluded from this analysis considering the difficulty of obtaining the data across these studies. In their research, Goldschneider and DeKeyser (2001) ensured that the chosen studies had similar methods of scoring accuracy using morphemes. The results showed that all the five factors combined could predict the order in L2 English morphemes is acquired. Based on the findings, Goldschneider and DeKeyser (2001) found that these factors are not entirely heterogenous and all resolve around the idea of *salience* (in a general sense).

The authors further explain that salience can be presented in many levels (phonological, morphological, syntactic, semantic, and numerical), making it easier for some grammatical structures to be inducted from the input.

In a later study, Murakami and Alexopoulou (2016) investigated if this "universal natural order" really exists, tapping on the role L1 influence can play in the process of acquiring L2 English morphemes. Murakami and Alexopoulou (2016) used corpus data (The Cambridge learner corpus) to examine seven L1 groups: Spanish, Turkish, Japanese, Russian, Korean, German and French. The findings showed that the groups varied in the order of acquisition. However, based on some L1- within differences, it was concluded that L1 influence does not change the path of development.

Dekeyser (2005) proposes a framework referring to several elements that contribute to difficulty learning particular grammatical structures. These elements are related to meaning, form or form-meaning connections. Form-complexity is associated with choosing the right morphemes out of several options and placing the morpheme in the correct position in context. On the other hand, meaning-complexity is related to the abstractness and novelty of the meaning. Form-meaning mapping is associated with transparency of the relation between form and meaning. Ekiert & Han (2016) argues this framework, stating that while these aspects of complexity are relevant, they tend to be target language-centric and neglect the role L1 might play in learners' language development.

In a narrower scope, within studies on L2 English articles, due to the challenges L2 learners experience in acquiring English articles, attempts have been made to explain the process (Ionin et al., 2004, Liu & Gleason, 2002; Master, 1994). Across these studies, patterns of article use were explored to explain this difficulty. Within these studies, different generalisations were made concerning numerous factors. Some of these generalisations claim

that there is an order of difficulty in which one article is acquired before the other. However, the process has also been linked to other factors such as language input, age/age of onset, L2 proficiency and L1 influence. Across these studies, substantial attention was given to L1 influence and age. Different theories and hypotheses were proposed in this respect. In this section, an overview of some of the factors is presented.

2.3.1. Age and Age of Acquisition

Age effects have been discussed widely in the literature in second language acquisition research (Birdsong, 1999, 2005a, 2006; Lenneberg, 1967; Marinova-Todd et al., 2000; Penfield & Roberts, 1959; Singleton, 2001). The issue of age was often discussed in relation to the difference between early learners (i.e., those who start acquiring L2 at an early age) and late learners (those who start acquiring L2 at an older age) in the L2 acquisition process (Dowens et al., 2010; Granena, 2014; Ionin et al. , 2009; Van Hell & Tokowicz, 2010). Earlier studies on age effects were based on observations of immigrants in natural language settings where it was found that children often showed better and more native-like use of L2 in comparison to adults (Hoff, 2013; Muñoz, 2010). Subsequently, based on these observations, many assumptions and generalisations were made about L2 acquisition and age, subject to controversies. Among these generalisations is that L2 acquisition comes as an easy task for early learners compared to late learners (Hoff, 2013; Muñoz, 2010; Singleton, 2001). The other assumption is that there is a time frame for an individual in which learning an L2 can result in native-like performance or what is referred to as *ultimate attainment* (Ortega, 2014).

For the second assumption, the critical period hypothesis (CPH) was proposed. Based on this hypothesis, in association with biological development, it was assumed that there is a *critical period* in age which after, achieving a native-like performance becomes almost

impossible (Singleton & Ryan, 2004). The CPH was linked with brain function and the process of *lateralization*, in which specific brain functions, including language functions, are assigned to each side of the brain (Lenneberg, 1967). The CPH was supported with evidence from the L1 acquisition about some exceptional cases and individuals from the deaf community (Hoff, 2013; Ortega, 2014). For example, the child Genie (Curtiss, 1977), who was neglected and deprived of communication until the age of 13, shows that late exposure to language results in incomplete and unsuccessful language development (Hoff, 2013; Ortega, 2014). Subsequently, extensive research using neuroimaging techniques was done to support the existence of this critical period in L2 acquisition (Chee, Tan, & Thiel, 1999; Klein et al., 1994). Different proposals were given when this period ends; however, most assign the end of this period at around puberty (Lust, 2006; Ortega, 2014).

Despite many of these studies, contradicting evidence led some researchers to question the idea behind the CPH (Ortega, 2014). One strong piece of evidence is that late adult learners who managed to reach a high level in using L2 are indistinguishable from native speakers. Ioup et al. (1994) reported the case of *Julie* and *Laura*. *They* managed to reach a high level in using L2 Arabic in a way where they were indistinguishable from native speakers of Arabic. Recent research reviewed the evidence behind the CPH assumptions. It concluded that the effects observed about age were somewhat confounded by other factors such as socio-educational and motivational factors (Birdsong, 2005a, 2006, 2018). Marinova-Todd et al. (2000), for instance, argue that motivation to L2 learning vary to a great extent between children, on the one hand, and adults and preadolescents on the other and, therefore, a better a faster L2 learning is often observed among young learners.

The most essential factor interacting with age is input/exposure (Muñoz, 2010). Interesting findings were revealed about the type of input when age effects were examined in foreign language contexts (i.e., classroom environments). In these contexts, late learners

showed better performance than early learners who continued to do so (Fullana, 2005). For previous studies in natural settings, it was found that late learners also showed better performance than children (Snow & Hoefnagel-Höhle, 1977). However, following these studies, it was found this better performance by the adults was shown only in the beginning; after around a year, children would often catch up with their monolingual peers and outperformed adults (Long, 1990). Based on these studies, Muñoz (2010) explains that age effects often relates to the amount of L2 exposure and the quality of the input, regardless of the environment. In classroom settings, L2 learners receive minimal L2 input, which lasts a few hours a week (4-5 hours). The teacher is the only source of L2 input in contrast to natural settings, which often allows for more accurate L2 input.

Age effects go hand in hand with LOR in the L2 context in natural settings. LOR is often equated with the amount of L2 exposure in natural settings (Birdsong, 2006). To observe differences among age groups, L2 exposure must be sufficient. For L2 exposure to be adequate, 10 years is often required for early learners to reach native-like levels (DeKeyser, 2000). In bilingual research, however, age effects are linked to how often L1 and L2 are used (Ortega, 2014). In their study on simultaneous Catalan-Spanish children exposed simultaneously to both languages, Sebastián-Gallés et al. (2005) found that L2 mastery of L2 depended on language dominance and whether L2 is activated enough in the daily use of the participants.

2.3.2. L2 Proficiency

Research on L2 acquisition has shown that L2 learners show variability in their performance/ mastering L2 forms across various levels of L2 proficiency (Akbaş & Ölçü-Dinçer, 2021; Chaudron & Parker, 1990; Ren et al., 2018; Young, 1996). In L2 acquisition, L2 proficiency is viewed as an indicator of L2 experience (Kim et al., 2020). According to

Kim et al. (2020), the development of L2 forms, similar to L1 development, happens progressively in which language constructions are gradually generalised through L2 experience. L1 children often take steps in building and accumulating knowledge about language forms through repeated experience over time (Sethuraman & Goodman, 2004; Tomasello, 2003). Likewise, in L2 development, figuring out language forms across different L2 proficiency levels indicate that with more L2 experience, more awareness is gained about these forms (Liang, 2002). Kim et al. (2020) found that L2 learners become better at form-meaning distinction with increased L2 proficiency.

2.3.3. Crosslinguistic Influence

CLI has been discussed widely in L2 acquisition studies and viewed as an essential contributing factor in learning and acquiring an L2. CLI has been known under different terms (e.g., interference, transfer, CLI). Although there is no agreement on a specific definition of CLI, a widely used definition of CLI is that it is: '… the influence resulting from similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired' (Odlin, 1989, p. 27). The CLI phenomenon has been classified as *positive* and *negative* (Cook & Cook, 2003). *Positive CLI* is the process in which the forms and structures of the L1 enhance or positively impact the use of L2 forms (Brown, 2007). For example, in Ringbom (1992), Swedish L1 speakers often performed better than L1 Finnish speakers in learning L2 English due to having more syntactic similarities between Swedish and English. *Negative CLI*, on the other hand, is the process in which the L1 forms have a negative impact, interfering with the acquisition of the L2 forms (Brown, 2007). In L2 English articles studies, the omission of articles by [-art] L1 groups (Ekiert, 2005; Master, 1989) is an example of negative CLI in which the absence of articles in L1 resulted in lack of use in L2 English. In numerous studies, CLI was mostly treated as a unidirectional phenomenon in which L1 knowledge has been viewed as an essential source of

knowledge for L2 learners or those learning an additional language that impacts L2 acquisition (Gass & Selinker, 1992; Ortega, 2014). However, CLI can also be observed in L1 performance (Jarvis & Pavlenko, 2008).

Recently, there has been a growing interest in CLI as a bidirectional phenomenon (Cook & Cook, 2003; Grosjean, 1998; Jarvis & Pavlenko, 2008; Pavlenko, 2000; Pavlenko & Jarvis, 2002). According to Cook and Cook (2003), L2 can influence the use of the L1, as in the case in which L1 forms impact L2 forms. CLI can occur simultaneously whereby both L1 and L2 knowledge affect the use of each other (Pavlenko & Jarvis, 2002). Despite the recent interest in bidirectional CLI, the finding that L2 can impact L1 is not new. Early on, Weinreich (1953) defined interference (i.e., CLI) as a process in which both the L1 and L2 impact one another as: "those instances of deviation from the norms of either language which occur in the speech of bilinguals as a result of their familiarity with more than one language" (Weinreich, 1953, p. 1). Based on this concept, Cook and Cook (2003) classified CLI into two categories: *forward CLI (or L1 to L2 influence),* in which L1 influences L2 patterns of acquisition, and *backward CLI (or L2 to L1 influence),* in which L1 is impacted simultaneously by L2 during the acquisition/use of L2. First language attrition studies present a straightforward case of backward CLI. In a survey of late Dutch–German bilinguals, the increase of immersion in L2 can result in phonetic attrition in L1 (Stoehr et al., 2017).

With respect to CLI, Cook and Cook (2003) explain that bilinguals differ from monolinguals in how L1 and L2 systems are presented in their minds. Based on the concept of *multicompetence* (i.e., how the knowledge of different languages might be presented in the mind), Cook and Cook (2003) identify other models which describe this relation between L1 and L2 in the brain of bilinguals. The first model is *the separation model,* which assumes that each L1 system and L2 system is presented separately with no interaction. In this model, it is assumed that neither L1 nor L2 impacts the opposite language. The second model is *the total*

integration which, contrary to the first, assumes that both L1 and L2 systems go under a single system in the mind of bilinguals. This model states that bilinguals choose which language to use depending on the situation or context, similar to when monolinguals choose which style or register to use in a particular situation.

The total integration model view is that both L1 and L2 function under one system with no influence from either language on the other. Cook and Cook (2003) argue that neither accurately describes the situation. Cook and Cook (2003) explain that the relation between L1 and L2 is presented in varying degrees somewhere between the two extreme views. This goes under what they referred to as *the linked language model* or *the partial integration model* in which L1 and L2 are likely to impact each other depending on the level of interaction /integration. The level of integration is often constrained by other factors such as language area, language distance and stages of L2 development (Cook & Cook, 2003).

In L2 acquisition, L1 to L2 influence was often examined to differentiate universal patterns from L1 influence. Regarding L1 children acquisition, there were specific common patterns between the L1 and L2 acquisition processes. For particular language areas, it was noticed that both L1 and L2 users follow the same stages or order of acquisition in acquiring specific language forms. For example, L2 English learners (e.g., Korean and Japanese L1 groups in Oshita, 2000) overgeneralised the *-ed* form in using the simple past form to irregular verbs before they fully mastered the use of the form in the same way L1 children produce them. The same overgeneralisation pattern was exhibited by L1 children even though they had no prior L1 knowledge (Marcus et al., 1992; Maratsos, 2000). These patterns were exhibited by L1 children, despite the lack of previous language knowledge. Because the same patterns were exhibited by different L2 users, regardless of their L1, there is a specific natural universal order exhibited in both L1 and L2 across the stages of acquisition. Cook and Cook (2003) argue that generalising an order of acquisition to L2 learners follows a separation

model and that L2 develops separately without considering the role of L1. Murakami and Alexopoulou (2016) concluded that L2 English learners experience a similar difficulty leading to acquiring English morphemes in a similar order. L1 has contributed to some extent in making changes in acquiring these morphemes. In L2 English articles studies, although it is assumed that acquisition of definite *the* presents an ease compared to acquiring *a/an* (Master, 1987; Zodernko & Paradis, 2008), studies have shown that L1 knowledge of the learners has often contributed to changing that order where *a/an* was shown to be easier (Diez-Bedmar & Papp, 2008; Ekiert, 2005, 2007).

Crosslinguistic Influence and Other Factors

CLI, in either direction, is often constrained by other factors. For proficiency, both L1 and L2 proficiency can play a role (Jarvis & Pavlenko, 2008). Concerning L1 to L2 influence, in respect to L1 proficiency (i.e., the source language), the stronger is the L1 knowledge, the more likely it is to be reflected in L2 performance. Regarding L2 proficiency, Jarvis (2000) explains that L1 to L2 influences can be presented in varying degrees depending on the extent of similarities and differences between L1 and L2. In addition, Jarvis and Pavlenko (2008) contend that this also depends on how language proficiency is actually measured, and what language area is being investigated. However, language proficiency in L2 to L1 influence is often assumed that L1 is already fully developed. Exhibiting L2 to L1 influence usually requires high levels of L2 proficiency (Major, 1992; Kecskes & Papp, 2003). In comparing L1 to L2 influence and L2 to L1 influence among bilinguals, Kecskes and Papp (2003) explain that CLI is unidirectional (i.e., from L1 to L2) until L2 learners reach a particular threshold in L2. When reaching that level, L2 to L1 become apparent; Kecskes and Papp (2003) explain that this threshold level can be obtained only with a high level of L2 proficiency and sufficient L2 exposure.

In addition to proficiency, L2 exposure also plays an essential role in the phenomenon. Language exposure can often be a general term that includes several aspects. In natural settings, L2 exposure is often equated with LOR in the L2 environment (Muñoz, 2010). Concerning forward CLI, Jarvis and Pavlenko (2008) state that L1 to L2 effects are likely to decrease with more extended residence in the L2 context. L2 to L1 influence, on the other hand, is more likely to increase with more extended residence in L2 settings. Laufer (2003) found that L1 Russian-L2 Hebrew bilinguals showed features of their L2 collocational use in their L1 use with more extended residence in the L2 context.

CLI can also vary with age and L2AOA depending on the direction of CLI and the language area under investigation. Accordingly, for instance, L1 to L2 influence can be more prominent among older learners than in early learners in areas such as phonology (Flege et al., 2003). Still, it might not be the case in lexis and morphology (Jarvis, 2000). In the reverse L2 to L1 influence, early starters are more likely to exhibit L2 effects than older learners (Jarvis & Pavlenko, 2008). The relationship between age and CLI can be explained by the level of integration of L1 and L2 in the multicompetence across both early learners and older learners. Mihaljević Djigunović (2010) found that early L2 starters showed a higher level of interaction between L1 and L2 than late starters in the overall language performance of both L1 and L2 and reading, writing and listening skills in both L1 and L2. Mihaljević Djigunović (2010) explained that early starters received more input than late starters, enabling them to reach the needed threshold in L2 often required for bidirectional CLI.

Confirming the Existence of Crosslinguistic Effects

Jarvis and Pavlenko (2008) found that previous CLI research reported some discrepancies in their findings. Based on that finding, Jarvis and Pavlenko (2008) proposed criteria to confirm whether particular patterns are the result of CLI or due to other factors.

Jarvis and Pavlenko (2008) suggest the need for three types of evidence: 1) intragroup homogeneity, 2) Intergroup heterogeneity, and 3) cross-linguistic performance congruity. The rationale behind the first type of evidence is that the patterns revealed in the performance are not merely an isolated incident but a common tendency of this specific group who share the same two languages. In ration to the second type of evidence, the performance of the tested group should not be identical to that of other languages groups of different source language or recipient language. This is necessary to exclude any universal or general tendencies common to all users but should be specific to the group in the question. Concerning the final type of evidence, the performance of the tested group in the target language should result from their use of the other language. The participants' patterns should reflect the similarities and differences in the performance between the two languages, the source and the target language.

2.4. L2 Acquisition of English Articles

L2 English learners/users exhibit specific patterns in the use of English articles, indicating difficulty in using English articles by English learners (Ekiert, 2005; Sinha, 2014). In the process of acquiring L2 English articles, adult learners produce many errors that might persist even at advanced levels. A substantial number of studies has been conducted to examine L2-English article use by L2 learners (Al-Qadi, 2017; Chung, 2011; Dağdeviren, 2010; Lopez 2015; Mei, 2013; Park, 2013; Parrish, 1987); several proposals have been suggested to explain why English learners produce errors and struggle in acquiring English articles. Many proposals often associate this difficulty with the function and use of the articles, noun countability and/or the influence of the L1 of the learners. Concerning function, L2 users, particularly children, appear to show similarity to that of the process of L1 children. In the following lines of this discussion, we address this difficulty among L2 learners. Considering the similarity observed among L1 and L2 children, the first section (2.4.1.)

explains how L1 children acquired the English article system. Following that, the second section (2.4.2) presents the proposals assuming that English article L2 acquisition is associated with the use and function of articles in the grammar system in adults; additionally, Section 2.4.3. explains how factors such as structure are likely to result in errors. Section 2.4.4 describes the difficulty with noun countability. Section 2.4.5 discusses the role of L1 influence in the process. Finally, Section 2.4.6. introduces studies of the process in L2 children and how they are likely to differ from adults.

2.4.1. Acquiring English Articles in L1 Children

Many studies have explored the acquisition of English articles by L1 children in both natural (Brown, 1973) and experimental settings (Schafer & de Villiers, 2000; Warden, 1976; Zehler & Brewer, 1982). In Brown (1973), English articles were treated as one complete form and accordingly, it was hard to determine if their individual use varied in difficulty. In the following research, however, considerations were made in examining the use of each article individually and determining their order of acquisition (Warden, 1976; Zehler & Brewer, 1982). According to Brown (1973), English articles are often acquired early by L1 English-speaking children around the age of 2;8 to 3;8. However, they often continue to produce errors before they fully master their use by the age of four. Warden (1976) found that L1 children's error production persisted until they were nine and examined the use of *the* and *a/an* for first and second mentioned nouns. In Warden (1976), children were able to fully master the use of *the* in definite contexts at seven. However, they continued to overuse *the* by 18% in the indefinite context until nine.

Overuse of *the* in indefinite contexts was exhibited in both natural studies (Brown, 1976) and experimental studies by Warden (1976) and Zehler and Brewer (1982). Two explanations were presented concerning this error. First, this error is attributed to egocentricity and children failing to estimate the hearer's knowledge (Brown, 1973; Warden,

1976). Alternatively, the error is attributed to linguistic reasons (Zehler & Brewer, 1982; Czico, 1986). In linguistic terms, children acquire specific-nonspecific distinctions earlier than definiteness.

In determining the order of acquisition of the three articles, Zehler and Brewer (1982) identified three stages by which L1 children of age two to three acquire English articles. Based on his study, both *a/an* and *zero* were used in the first stage. However, in this stage, while *a/an* was supplied correctly in *a/an* contexts, *zero* was overused, mainly in *the* context, which led Zehler and Brewer (1982) to conclude that *zero* is associated with definiteness in children. In the following stage, the children used *the* while correctly using *a/an*. In the final stage, children began to overuse *the* before they gradually gained complete competence.

In a more recent study (Schaeffer & Matthewson, 2005) examining L1 articles used by children (age 2-4) and adults, different stages were identified in which children acquire English articles. Based on research by Schaeffer and Matthewson (2005), L1 English children acquire the distinction between specific and nonspecific meanings earlier than shared knowledge (i.e., definite/indefinite). Failing to realise the addressee's knowledge often leads children to deal with [definite, specific] and [indefinite, specific] context as one context contrasting with the [indefinite, nonspecific] context. Accordingly, during the acquisition process, the use of *the* is applied to the [definite, specific] and overgeneralised in the [indefinite, specific]. In contrast, *a/an* is used correctly in the [indefinite, nonspecific] context. In the study, the children showed significantly more overuse of *the* in the [indefinite, specific] than in the [indefinite, nonspecific] context. In comparison to the adult group, the children also produced significantly higher proportions of *the* in the [indefinite, specific] than the adult participants. Accordingly, the results confirmed the prediction that children acquired specific/nonspecific distinction earlier than definite/indefinite distinction.

2.4.2. L2 Acquisition of English Articles: the Difficulty Associated with Function

Across L2 English articles studies, there is an agreement that there is a difficulty associated with the function of L2 English articles (Azaz, 2016; Ekiert, 2007; Ionin et al., 2008; Sarko, 2008, 2009). This is often attributed to the semantic and pragmatic complexity that underlies the uses of the three forms (i.e., *the*, *a/an* and *zero*) (Ekiert, 2005, 2007; Ekiert & Han, 2016; Ionin *et al.*, 2004; Robertson, 2000). To explain these difficulties, errors in English article use were often examined. About this complexity, one hypothesis was proposed from a formal generativist perspective to explain overuse errors produced by L2 learners of English. Ionin et al. (2004) associated error patterns by L2 English speakers with the fluctuation between the semantic and the pragmatic contexts in which articles are used. Another hypothesis, however, was proposed by Trenkic (2008, 2009), stating that overuse errors in L2 English articles are due to misanalysing articles as adjectives by learners whose L1 lacks articles.

Ionin et al.'s (2004) hypothesis was derived using the analysis of errors, exclusively errors of substitution, which often occur in the use of L2 English articles, related to the Article Choice Parameter (ACP) and the Fluctuation Hypothesis (FH). Based on ACP, in two-article languages, NPs are distinguished based on the setting of either specificity or definiteness. Articles in English are markers of definiteness differentiating definite and indefinite nouns, whereas, in Samoan, which encodes specificity, articles are markers for specific and nonspecific nouns (see Section 2.2.). The meanings of definiteness and specificity are universal, and learners of [-art] L1 have access to them, even though they are not marked by articles. When [-art] L1 learners learn [+art] L2 English, they can fail in setting the correct parameter; consequently, learners might fluctuate between the two settings and, as a result, produce substitution errors in which *the* is used in an indefinite specific

context as shown in Example 2.9. Ionin et al. (2009, p. 340) found that *a/an* is used in definite nonspecific contexts (Example 2.10) (Ionin et al., 2009, p.340).

Example 2.9

[+definite,−specific]: target *the*

predicted learner pattern: overuse of *a*

Ruby: It's already 4 p.m. Why isn't your little brother home from school?

Angela: He just called and told me that he got in trouble! He is talking to ***the*** principal of his school! I don't know who that is. I hope my brother comes home soon.

Example 2.10

[−definite, +specific]: target *a*

predicted learner pattern: overuse of *the*

Grandfather comes for a visit Grandfather: Where is my little granddaughter Beth? Is she home? Father: No...She is not going to be back till late. She is having dinner with ***a*** girl from class – her name is Angie, and Beth really likes her.

Regarding the second hypothesis, Trenkic (2009) assumes that the communicative redundancy of articles (i.e., being unnecessary to express definite meaning) leads L2 users of English to produce errors in their use of articles. Trenkic (2009) built her argument on the idea that meanings of definiteness are expressed in all languages irrespective of whether they include an article system. The importance of (in)definiteness can be conveyed through context even without the use of articles (Trenkic, 2009). For example, in a room where there is only one *mug* on a table, it is enough for the speaker to say "*give me mug*" without using *the* before the noun, considering the reference is already clear due to its *existence* and its

uniqueness (i.e., being the only mug on that table); therefore, using *the* is not required here. Accordingly, the use of articles is unnecessary to express these meanings. In her argument, Trenkic refers to Hawkins's (2004) statements that the primary function of English articles is merely to mark nouns and differentiate them from verbs. Therefore, marking definite and indefinite nouns can be considered a secondary function for English articles.

Trenkic (2009) further explains that articles' parallel demonstratives (e.g., this, these …etc.) occur in all languages, including those lacking articles. He elaborates that demonstratives are considered a form of *procedural adjectives*, regarded as a subcategory of adjectives. In considering [-art] L1 learners of English, it is assumed that learners do not have expectations about how articles are used due to the lack of articles in their L1. This lack of expectations, along with the similarities between demonstratives and articles, is predicted to cause confusion. Consequently, articles *the* and *a/an* could be treated as adjectives that express meanings of "definite/identifiable" and "indefinite/unidentifiable" respectively (Trenkic, 2009).

Similar studies (Pongpairoj & Trenkic, 2007; Trenkic, 2008; Trenkic, 2007, 2008) argue against Ionin et al.'s (2009) hypothesis. In his studies, Trenkic (2007, 2008) claims that overuse errors are not impacted by specificity but result from the familiarity of the referent identified in the sentence in the forced-choice elicitation task Ionin et al. (2004) used in their study. The article *the* was overused in the [indefinite, specific] context due to the presence of an attribute or what the author refers to as *explicitly stated knowledge* (ESK) within the context, which led learners to consider the referent "identifiable." Based on his studies, Trenkic (2007, 2008) concludes that providing an attribute in the sentences, as in Example 2.11(Ionin et al.,2009, p.340), in which the attribute is the mentioning of the name *Angie*, caused participants to overuse *the*. In contrast, Example 2.12 (Ionin et al.,2009, p.353) shows

that due to the lack of ESK, learners assumed the opposite (unidentifiability), and accordingly, *a/an* was supplied.

Example 2.11

[−definite] [+specific, +ESK]:

[−definite, +specific] context: **target *a***

Grandmother comes for a visit

Grandmother: Where is my little granddaughter Beth? Is she home?

Father: No…She is not going to be back till late. She is having dinner with **(a)** girl from class−**her name is Angie**, and Beth really likes her.

Example 2.12

[+definite], [+specific,−ESK]: **target *the***

Paul: Will Bob join us for lunch?

Sheila: No, he's very busy. He is meeting with **(the)** director of his company. I don't know who that person is, but he will decide whether Bob gets his promotion or not.

Evidence from an earlier study by Butler (2002) appears to support Trenkic's (2007, 2008) analysis. Butler noticed that learners tended to overuse *the* more when the referent is given a name within the sentence or when the speaker acknowledges that they know the referent. Based on the information in the sentences, the participants assume that the referent is "identifiable" and place *the* before the referent as an adjective that gives that meaning (i.e., identifiable).

The debate has continued because Ionin rejected Trenkic's proposal in her study (Ionin et al., 2009). Although Ionin et al. (2009) admit that specificity in their studies was caused by

the ESK, they disagree that the L2 English articles were misanalysed as adjectives. In this respect, Ionin et al. (2009) offer three pieces of evidence to support that position.

1. Evidence is from natural language data by which specificity is operationalised as ESK. In the English language, the use of the determiner *this* in indefinite specific context by native speakers occurs precisely in conditions where ESK is stated.
2. This evidence relates to the case of L2 English learners reporting their reasons for supplying *the* in an indefinite specific context reported in Yang and Ionin's (2009). In this study, [+ESK] and [-ESK] were presented in specific indefinite contexts and participants were asked to report their reasons for their answers in supplying *the* in indefinite specific contexts. Participants' responses stated numerous reasons, which included both specificity and ESK in addition to "uniqueness." However, most responses explaining their reasons for overusing *the* were associated with the impact of specificity (69%), while a limited number of responses linked that with ESK (7%).
3. Ionin et al. (2004) contend that articles having adjectival nature lack evidence. On the one hand, there is no support that all [-art] languages deal with determiners as adjectives. The idea that *the* and *a/an* are considered adjectives by learners is not provided by direct evidence; the only evidence is found in the case of L1 Serbian L2 English bilinguals where more article omission occurred in the case of adjectively pre-modified nouns (Trenkic, 2007).

Existing evidence seems to align more with Ionin et al.'s (2004) explanations. Even though familiarity with the referent has impacted *the* overuse errors in Ionin et al.'s (2004), this evidence does not contradict that specificity also played a role in creating this error type. In many studies on English article acquisition, including both L1 (Brown, 1973; Czico, 1986; Schaeffer & Matthewson, 2005; Zehler & Brewer, 1982) and L2 acquisition of English articles (Ionin et al., 2009; Zdorenko & Paradis, 2008, 2012), it was observed that *the* was

mostly overused in indefinite, specific contexts. In many of these studies, spontaneous (Brown, 1973) or semi-spontaneous speech (Zdorenko & Paradis, 2008, 2012) was used instead of the fill-in-the-blank task as a means of data collection. In the use of spontaneous and semi-spontaneous speech, knowledge of the referent was not necessarily stated. Ekiert (2007) and Ekiert and Han (2016) explain that the difficulty in using English articles stems from the fact that multiple forms (*the, a/an, zero*) are used to encode multiple meanings (definiteness/indefiniteness, specificity/nonspecificity, generic and number).

Using the correct form is often dependent on the level of transparency between form and meaning; forms are easier to encode when there are direct one-form-one-meaning connections (Ekiert, 2007). In contrast to English articles, learners often face difficulty matching the correct form to its correct meaning due to these multiple form-meaning connections. Hence, it can be concluded that Trenkic's (2009) explanation provides an additional contributing factor but does not exclude the impact of the complexity of the semantic and pragmatic contexts.

2.4.3. Countability and Number

Number or noun countability is an additional difficulty associated with the use of the English articles across the three contexts (Butler, 2002; Ekiert, 2007; Ekiert & Han, 2016; Master, 1989, Zodrenko & Paradis, 2008): 1) the generic, 2) the indefinite specific and 3) the indefinite nonspecific. The use of articles requires L2 English users to distinguish between several types of common nouns: uncountable/mass nouns, singular countable and plural countable nouns. In an indefinite context, indefinite singular common nouns require the use of *a/an* while indefinite mass/uncountable nouns and plural nouns are marked by *zero* (Master, 1997). Failing to do so might result in *a/an* overuse in the *zero* context or *a/an* omission errors as in Examples 1 and 2 in Table 2.5. Similarly, understanding numbers

determine the marking of generic NPs. At the same time, the articles *the* (e.g., ***The rabbit*** *is a fast animal*) and *a/an* (e.g., ***A cat*** *is an animal that has a fur*) encode generic singular common nouns, generic mass/uncountable nouns (e.g., ***Children*** *need a lot of attention*) and generic plural nouns (e.g., ***Eagles*** *can eat snakes*) are marked by *zero*. Similar patterns of errors in Examples 1 and 2 in Table 2.5, which can occur in indefinite contexts, can also occur in the generic context. In addition, the use of *the* with generic mass/uncountable nouns and generic plural nouns is ungrammatical in English and could result in an overuse of *the* (see Example 3, Table 2.5). For instance, in Fen-Chuan (2001), [-art] L1 Chinese learners produced *a/an* omission errors and overused *a/an* in *zero* contexts due to failing to identify noun countability. In Butler's (2002) on [-art] Japanese L1 groups, it was found that marking number/countability persisted longer in the use of L2 English articles than any other aspect.

Table 2.5

Types of Error Resulting from Misunderstanding Noun Countability

Error type	Example
1. *a/an* overuse in *zero* context	He had **a books** with him. (correct: He had **books** with him).
2. *a/an* omission	The boy bought **apple** and some juice. (correct: The boy bought **an apple** and some juice).
3. *the* overuse with plural generic nouns	**The elephants** are huge animals. (correct: (*zero*) Elephants are huge animals).

2.4.4. Noun Phrase Structure and Errors

Trenkic (2009) suggested that errors of substitution and omission can increase in certain conditions. Regarding omission, Trenkic suggested that the salience of the referent and whether an adjective precedes the noun in the NP can have an impact. Goldschneider and DeKeyser (2001) explain that the salience of a form often makes it easier to acquire. However, Trenkic

states that omission of *the* typically occurs more when the referent is more salient. The repetition of the referent with the discourse makes it more salient and increase the chances of omitting *the* in the repeated phrases.

Similarly, more articles are omitted when nouns are in a topic position than in a non-topic position, considering that they are more salient in the topic position (Huebner, 1983; Jarvis, 2002; Trenkic, 2002). In relation to the NP structure, omission can be more common when nouns are pre-modified with an adjective (i.e., in the form: article+ adjective+ noun) than in NPs where there is no modification (i.e., in the form: article + noun) (Goad & White, 2004; Trenkic, 2002). Trenkic (2009) explains that with an adjective pre-modified noun, more processing is required than with nouns that are not pre-modified; as a result, users are more likely to omit articles in adjective pre-modified nouns condition than in the latter.

2.4.5. L1 to L2 Influence in the Acquisition of L2 English Articles

The difficulty of using English articles has also been associated with L1 influence. Ekiert and Han (2016) states that restricting the difficulty associated with English articles to their semantic complexity has a weakness. By following this target language-centric approach, the role of L1 knowledge is overlooked. In SLA, learners already come with a system with its own complexity. Therefore, L2 development can rely on both the target language knowledge and the previous knowledge of L1 (Selinker, 1972).

The difficulty associated with L1 is explained in Ekiert (2007) based on the relation between language and thought, that language can impact thought, and thought likewise can be affected by language. Slobin (1996) distinguishes between two language categories in explaining L1 influence: 1) *thinking for speaking* categories and 2) *categories of thought*. Slobin (1996) explains that *thinking for speaking* categories corresponds with language-specific meanings while *categories of thought* refer to categories that reflect general

meanings. Murakami and Alexopoulou (2016) explain that articles go under the language-specific categories considering that the meanings articles carry are meanings that can only be experienced through language and cannot be experienced by general means through our perceptual system. On the other hand, plurality "is a language-independent concept, a category of thought (notwithstanding the typological variation in the way languages express plurality and number cross-linguistically)" (Murakami & Alexopoulou, 2016, p. 369). Ekiert (2007) explains that based on existing evidence (Pinker, 1989; Slobin 1987, 1996, 2003), language-specific meanings affect cognition. Therefore, these meanings experienced by L1 forms become a part of our thought system. Learners face difficulty learning L2 forms when they cannot escape entirely from their L1 system (Odlin, 2005). Jiang et al. (2011) explain that this is particularly difficult when L1 lacks an equivalent form or the concept underneath this form is absent from L1. The learner faces the challenge of learning meanings that might not be encoded in their L1 grammar system and not "a part of the routinely activated meanings in the learner's mind" (p. 959).

Many studies attributed L2 adults' patterns of English articles use to L1 influence (Butler, 2002; Ekiert, 2005, 2007; Ekiert & Han 2016; Leung, 2001; Robertson, 2000; Thomas, 1989; Young, 1996). Across different studies and among other L1 groups, adults' use of English articles has shown both negative and positive L1 influence. The similarities between L1 article to L2 English article systems have led to exhibit a high accuracy in English articles as L2 where these similarities occur (Ionin et al., 2008). In contrast, some error patterns were explained by the lack of articles in L1 or differences between English L2 and L1 article systems (Master, 1987; Sarko, 2008). However, L2 performance in English articles is often not restricted to L1 influence. In addition to the nature and the complexity of article use (explained in sections 2.4.2 and 2.4.3), previous studies have also considered other factors such as language proficiency and exposure. Moreover, based on Ortega's (2014)

discussion of L1 influence (provided in Section 2.3.3.), L1 influence is claimed to only impact the acquisition rate without changing the universal natural sequence of development. However, as mentioned in Section 2.3.3, L2 English learners of different L1s have shown varying order with their L1. In the following lines, L1 influence is discussed in relation to other factors. Primarily, it examines the extent to which L1 interacts with the natural development of acquiring English articles.

Regarding L1 and the sequence of L2 English articles acquisition, across the different studies, different conclusions were given for [-art] and [+art] L1 groups. In general, there is a suggestion that the order of acquisition is uniform for both [+art] and [-art] L1 groups. In all L1 groups, it has been stated that *the* use is established earlier than *a/an* (Chaudron & Parker, 1990; Haiyan & Lianrui, 2010; Huebner, 1983; Master 1997; Parrish, 1987; Thomas 1989). This is often followed by a phase in which *the* is overused in what is referred to as the "the-flooding" phenomenon before maximum competence is achieved (Huebner, 1983; Master 1997). However, some studies say that in [-art] L1 groups, acquiring L2 English articles is initiated by the use of *zero,* followed by the emergence of *the* and *a/an,* respectively (Master, 1987). While Parrish (1987) suggests that *zero* is acquired first, Master (1997) states that it is not clear whether the initial spread of *zero* was a sign of acquisition or that the use of *zero* was by default, indicating non-use and omission at the beginning. In a re-examination of Master (1997), Lui and Gleason (2002) provide a further explanation of the use of *the*, which proposes that patterns of *the* omission early on is instead an indication that both articles, *the* and *zero*, are instead acquired late.

In a study of an [-art] L1, Ekiert (2005) examined Polish English second language (ESL) and English foreign language (EFL) learners' accuracy sequence in the use of each of the three articles across the five types of semantic context: generic, [definite, specific],

[indefinite, specific], [indefinite, nonspecific] and idiomatic across three levels of proficiency: high-ability, intermediate-ability and low-ability learners. In the results, learners in two groups (ESL and EFL) showed their highest accuracy in using *a/an* and *zero* in the [indefinite, nonspecific] in all three levels. The use of *a/an* and *zero* presented a struggle for low-ability learners. However, with increased proficiency, learners of intermediate- and high-ability were able to score better in these contexts, achieving their second-best scores. The results in the two indefinite contexts indicated it was relatively easy for learners to detect indefiniteness.

As for the use of *the* in definite specific contexts, learners in both settings showed a rapid increase in accuracy from 22.2% and 28.8% for low-ability learners in both ESL and EFL, respectively, to 60.0% and 73.3% for high-ability learners. For generic, conventional and idiomatic uses, a different pattern was exhibited. For generic, in the ESL group, intermediate-ability learners scored lower than both low- and high-ability learners who had achieved similar results. In generic for EFL, accuracy showed improvement in the intermediate-ability learners followed by reduced accuracy, which was even lower than low-ability learners. For idiomatic use, for both EFL and ESL groups, the low-ability learners achieved higher scores than both intermediate- and high-ability learners. The results of both generic and idiomatic contexts indicate that higher accuracy achieved by the low-ability groups was mainly by default. Overall, both ESL and EFL learners performed similarly, with EFL slightly outperforming ESL. Both EFL and ESL groups exhibited the highest accuracy in using *zero* followed by *a/an* and *the*. Ekiert (2005) concludes that the result generally contradicts the general pattern mostly found in L2 English article acquisition research in which mastering *the* comes first. The result exhibits an order reflecting the natural pattern found during L1 children acquisition (Cziko, 1986; Zehler & Brewer, 1982) in which the

same order was displayed. The results were further consistent with Thomas' (1989) natural order of acquisition in which L2 learners are said to follow the L1 children sequence.

Diez-Bedmar and Papp (2008) examined L2 English article acquisition using the corpora of two L1 groups: [-art] L1 Chinese and [+art] L1 Spanish group and compared them to three corpora of native English speakers, native Chinese and native Spanish speakers to determine the impact of L1 in the use of L2 English articles by bilingual groups. As in Ekiert (2005), the study examined article use using Huebner's (1983) model in four semantic contexts: generic, [definite, specific], [indefinite, specific] and [indefinite, nonspecific]. It was hypothesised that the Spanish L1 group might experience what was referred to as a *pragmatic problem* (Thomas, 1989), mainly in using *zero* and the indefinite article in the generic context in L2 English article use. This was explained in that *zero* is not used in generic context in L1 Spanish; in addition, for the indefinite article in L1 Spanish, even though it can be generally used, it was not used by the native Spanish speakers in the corpora. Chinese learners, on the other hand, were expected to exhibit both *a grammatical problem* in having a large number of omissions and a *pragmatic problem* in failing to assign articles to their correct definite/indefinite contexts. The study results revealed that the Chinese L1 group had exhibited its highest accuracy in using *zero*, followed by *a/an* and *the*, respectively.

On the other hand, Spanish learners showed higher accuracy in using *a/an* followed by *the* and *zero*, respectively. Both groups had more accuracy in using *a/an* than in using *the*. However, for the Chinese L1 group, it was unclear whether their use of *zero* indicated accuracy or failure in using other articles. In using English articles across the four semantic contexts and each of the three articles (*the*, *a/an* and *zero*), the Spanish L1 group had a higher accuracy rate than L1 Chinese except for generic *zero*. Both groups had a similar rate of accuracy. Moreover, the Chinese L1 exhibited more problems using articles in indefinite nonspecific contexts and frequent errors in using generic *a/an*. Even though Spanish L1

achieved an (85.99%) in using *zero*, in comparison to the native English speakers, Spanish L1 used the *zero* article more often, which was explained to be due to teachers' instruction and overstressing the use of *zero* in generic as well as differences in the generic use form between L1 Spanish and English. Overall, the results contradicted most previous research, which stated that *the* is often acquired before *a/an.* Diez-Bedmar and Papp (2008) explained that their findings confirm Thomas' (1989) hypothesis of having a natural language order of L1 English speakers, which is further indicated by *the* overgeneralisation in indefinite contexts (both specific and nonspecific), which is also a common pattern in L1 English.

The results of Diez-Bedmar and Papp (2008) and Ekiert (2005) confirmed Ortega's (2014) statement that the two groups followed the same order found in L1 children. The two groups also exhibited L1 influence and other factors, as indicated. However, the results remain questionable compared to the many L2 studies in which a different order has been found. Ekiert (2005) admitted the small number of participants in her study was a limitation and that the findings require further confirmation in future studies.

In another study of an [-art] Polish L1 speaker, Ekiert (2007) discussed the relation between the complexity in the use of L2 English articles and the role of L1 influence on the process regarding Slobin (1987, 1993, 2003) on the relation between thought and language. In the study, Ekiert (2007) discussed the previous generalisation studies claiming that definiteness is acquired before indefiniteness (Huebner, 1983; Master 1987; Parrish, 1987). Ekiert (2007), however, mentioned that instead of what is common among L1 Slavic groups, a near-native use of *a/an* was observed among low-proficiency learners. In an aim to re-examine the use of the indefinite article *a/an* among L1 Polish, Ekiert (2007) collected different sets of elicited data over 15 months: free compositions, limited responses, introspective data. The findings confirmed the former study (Ekiert, 2005) in which the use of *a/an* was mastered first. Ekiert's (2007) findings showed that Polish L1 played a role in both

difficulty and ease of using L2 English articles, which explains the order of accuracy L1 Polish learners exhibit in using L2 English articles.

In addition to the acquisition sequence, L1 influence can be presented in the errors learners produce in L2 English articles. Omission errors are often a common pattern among [-art] groups in the initial stage of L2 acquisition. In comparing [+art] L1 to [-art] L1 groups, Thomas (1989) found that [-art] L1 learners exhibited a higher number of omission errors. Similarly, in Parrish's (1989) study, [-art] L1 Japanese speakers produced many article omissions early on before they started using *the* and *a/an*. Likewise, in Ekiert's (2005) study comparing ESL and EFL, low-ability learners showed a high number of omissions; even though the rate of omission errors decreased with increased proficiency, learners continued to produce this error even at late stages. Consequently, [+art] L1 often shows higher accuracy in using English articles than [-art] L1 due to the knowledge they have from their L1 resulting in fewer errors. In Ionin et al.'s (2008) study, [+art] L1 Spanish speakers were better at assigning articles in their correct semantic contexts based on definiteness, unlike the [-art] L1 Russian group, which showed fluctuation. Similarly, high accuracies were shown by [+art] L1 French and Arabic speakers (Sarko, 2008). The error patterns learners produced in the L2 English article use (whether developmental or resulting from L1 influence) varied based on L2 English proficiency. In many studies, error patterns change with participants' level of proficiency (Butler, 2002; Liu & Gleason, 2002; Haiyan & Lianrui, 2010). Liu and Gleason (2002) found that with increased proficiency, *the* omissions decreased.

Similarly, the extent of *the* overuse, highest among intermediate-level learners, was reduced among advanced learners. This changing pattern in the use of *the* reflects the "*the-flooding*" phenomenon referred to by Master (1997) and Huebner (1983). The same phenomenon was found in other studies on changes in proficiency levels (Haiyan & Lianrui, 2010) in which the use of *the* is overgeneralised. In Haiyan and Lianrui's (2010) study of [-

art] L1 Chinese learners, participants also exhibited reduced errors with increased language proficiency. Omission errors produced by low and intermediate-proficiency participants showed a decrease among advanced-proficiency learners. Likewise, overusing *a/an* also decreased along with a change in proficiency. L2 English articles use seems to align with Butler (2002) explains that with increased proficiency, awareness of article use increases. The findings on proficiency reflect what is presented in Sections 2.4.2 and 2.4.3, where, based on L2 experience, more understanding about the form-meaning connection is gained (Kim et al., 2020).

Based on the findings, the effect of L2 proficiency on L1 influence is not always linear. As Jarvis and Pavlenko (2008) stated, the effects of proficiency in the L2 English article and L1 influence varies depending on how similar or different the L1 and L2 are in relation to the language area. For L1/L2 similarity, more change in accuracy (with increase in L2 proficiency) is observed in which the two languages are different than where they are similar. Jarvis and Pavlenko (2008) state that in acquiring morphemes, the relationship of L2 proficiency to L1 influence often tends to be curvilinear. In L2 English article use, while omission often shows a constant decrease with an increase in L2 proficiency, this is not the case with *the* overuse errors in indefinite contexts. Overusing *the* is more associated with intermediate proficiencies; *the* overuse often appears low in lower L2 proficiency levels, increasing gradually among the intermediate and then decreasing again with higher L2 proficiency.

2.4.6. Acquisition of English Articles in L2 Children

Interestingly, the difficulties observed in L2 adult learners learning English articles are not necessarily observed in L2 children acquiring English. Based on the relation between L2 development and age discussed in section 2.3.1, children as early learners might present differently when compared to late learners during L2 acquisition. Some L2 English article

studies aimed to explore the process in children where some differences were observed (Morales-Reyes & Gómez Soler, 2016; Zodrenko & Paradis, 2008). This section presents an overview of some of these studies.

In examining younger children's performance, Zdorenko and Paradis (2008) investigated L2 English article use by different L1 groups of children (mean age 5;4), of both [+art] and [-art] languages in a longitudinal study of two years employing a story-telling task. The data were examined to determine how children's performance was impacted by L1 influence and if *fluctuation* (i.e., substitution errors between *the* and *a/an* due to confusing specificity for definiteness) is exhibited in their use. In the initial stages, omission errors occurred more among [-art]L1 groups than [+art] L1 groups. However, both groups started to show similar patterns in the following stages. Generally, both groups exhibited higher accuracy in using *the* within definite contexts than *a/an* in indefinite contexts. Moreover, both groups showed *the* overuse in specific indefinite contexts, a common pattern among L1 children. Overall, the results indicated a minimal effect of L1influence. However, compared to previous research on adult learners, children were better and faster in mastering the use of L2 English articles. Generally, children's results suggest that the fluctuation in their performance (i.e., in *the* overuse) is a progressive pattern and unlikely to be impacted by L1.

In a follow-up study, Zdorenko and Paradis (2012) further examined if children's (aged 5–6;11) performance was affected by L1 influence and if the morphosyntax and semantics interface in English article use introduces challenges for L2 children. Children's performance was also compared to that of L1 children. Additionally, children's performance was compared to patterns often observed by L2 adult learners. Four L1 groups were recruited, including the [+art] languages: Arabic and Spanish and the [-art] language: Chinese and Hindi/Urdu/Punjabi. The performance resulted in more omission errors produced by [-art] than [+art] L1 groups. Furthermore, higher accuracy using English articles was shown by

[+art] groups (i.e., Arabic and Spanish) compared to [-art] L1 groups. In comparing omission among [+art] L1 groups, both Arabic and Spanish L1 groups produced similar omission errors. In particular, similar amounts of omission for the indefinite article *a/an* were revealed for both [+art] L1 groups even though Arabic, as opposed to Spanish, lacks indefinite articles. The results present interesting patterns about L1 influence. While the high accuracy of Arabic and Spanish can be attributed to their L1, the limited amount of *a/an* omission by Arabic L1 children suggests that L1 influence is limited.

In addressing similarities and differences to L1children, children in Zdorenko and Paradis's (2012) study showed similar error patterns to that of L1 children. Children exhibited fluctuation by which they overused *the* in indefinite specific contexts. Children also showed patterns similar to L2 adults because they had higher accuracy in using *the* in definite contexts than in using *a/an* in indefinite contexts. A large amount of *a/an* omission and *the* overuse errors is the reason for the lower accuracy observed in the indefinite contexts. Based on the findings, L2 children in Zdorenko and Paradis's study (2012) shared similarities with both L1 children and L2 adults.

In considering preadolescents, Ionin et al. (2009) examined [-art] L1 Russian adults and L1 Russian children (age 10-12) in the use of L2 English articles. The study examines whether children exhibited similar patterns to adults concerning errors and the impact of specificity. Explicit tasks were employed for the analysis, including a fill-in-the-blank form containing 60 dialogues with filler items; participants were instructed to fill the blanks without mentioning articles. The result of the study revealed that adults exhibited specificity impact within both indefinite and definite contexts where both *the* and *a/an* were overused. However, in the children's results, the specific impact appeared only in specific indefinite contexts where *the* was overused. Adult performance was attributed to their use of explicit strategies, likely to result from classroom instructions. On the other hand, children's patterns

were attributed to their domain-specific knowledge. Children's *the* overuse simulates the use of the determiner *this* in indefinite specific context by English native speakers.

Regarding [+art] L1 groups, Morales-Reyes and Gómez Soler's (2016) study investigates English articles acquisition patterns of Spanish children age 8-10, considering the length of exposure to the English language. A shorter version of Ionin et al.'s (2004) written fill-in-the-blank task was used to cover the four semantic contexts of articles. Participants' performance in the study reflected patterns found in L2 children and adults in previous research. As with L1-Spanish adults, Ionin et al. (2008) found that children in their study could transfer their L1 skills to the use of L2 English articles exhibiting a high accuracy in performance. Children experienced more difficulty using *a/an* than using *the*, a pattern was found in both L2 children (Zdorenko & Paradis, 2008, 2012) and adults (Ionin et al., 2008). This was attributed to the fact that the use of indefinite articles, unlike *the*, requires the ability to understand countability and number in English. In terms of errors, overuse of *the* in the indefinite specific context was more prominent contradicting [-art] L1 adults in Ionin et al. (2009), who experienced both *a/an* and *the* overuse in definite/nonspecific and indefinite/specific contexts, respectively.

Error patterns of the participants indicated that, unlike adults, the participants did not rely on explicit strategies. Their performance reflected what is found in natural languages in extending specificity to indefinite contexts only. Moreover, even though children experienced overuse of *the*, this pattern was limited by only 14%, which in comparison to children in Zdorenko and Paradis's (2008, 2012) study, indicated a better performance. This was explained by the fact that children in Morales-Reyes and Gómez Soler's (2016) study were older and had more prolonged exposure to English compared to children in Zdorenko and Paradis's (2008, 2012) study.

Based on L2 adults and L2 children studies, L1 influence is also present in children' performance, but the impact of L1 in children is limited compared to adults (Morales-Reyes & Gómez Soler, 2016; Zodrenko & Paradis, 2012). This is indicated by the high accuracy of using English articles by [+art] L1 groups, whereby L1 experience facilitates the use of articles in L2 English. On the other hand, although errors can be attributed to L1 as the case of omission by [-art] L1 groups, many of these errors can be attributed to the natural development process. While patterns of articles substitution in adults can be attributed to explicit strategies in which both *a/an* and *the* overuse were exhibited. In children, substitution was similar to that of L1 children, in which patterns of *the* overuse were exhibited more.

2.5. Acquisition of L2 English Articles by L1 Arabic Speakers

Similar to other L1 groups, L1 Arabic learners may show differences in their L2 English article acquisition (Al-Qadi, 2017; Sarko, 2008). While there are patterns attributed to L1 Arabic, other patterns can be attributed to acquiring L2 English articles. Moreover, like other L1 groups, the performance of L1 Arabic speakers can be impacted by factors such as proficiency level, language teaching instruction, the complexity of definiteness and specificity, and task type resulting in various patterns.

Based on a review of the errors L1 Arabic speakers produce in writing L2 English, Scott and Tucker (1974), using means of error analysis, examined the writing of 22 students with a low-intermediate-level of English proficiency at the American University of Beirut. It was found that omitting *a/an* was common among the students and attributed to a lack of indefinite articles in Arabic. Similar findings were seen in later studies in which *a/an* omission was among the most prominent patterns (Bataineh, 2005; El-Sayed, 1983; Zughoul, 2002). Accordingly, *a/an* omission was often associated with L1 Arabic effects. Regardless of that, in some studies, other error patterns were sometimes more dominant among L1

Arabic speakers (Al-Qadi, 2017, Diab, 1996). These other errors were sometimes explained concerning the participants' stages of L2 acquisition or proficiency.

In examining Saudi Arabic speaking students' use of English articles using a multiple-choice test, Al-Qadi (2017) found that error patterns can result from an incomplete understanding of the rules in using English articles. In the study, three error patterns were identified: 1) omission, 2) substitution (in cases in which *a/an* was used for *the* and *the* replaced *a/an*), and 3) article addition (i.e., adding *the* or *a/an* in *zero* obligatory contexts). The highest number of errors was exhibited in article addition, followed by substitution and omission. Overall, *the* addition dominated over other patterns and was explained due to the frequent high use of *al-* in Arabic. However, errors like *a/an* substitution and *a/an* addition were not attributed to L1. Al-Qadi (2017) attributed these error types to a lack of knowledge or application of L2 English article use rules resulting in these patterns.

In considering the use of *the,* some studies have shown that L1 Arabic speakers experience difficulty using L2 English articles in a generic context (Alzamil, 2019; Crompton, 2011; Farghal & Al-Zou'bi, 2004). Lyons (1999) states that generic use in Arabic, unlike English, is always marked by the definite article *al-*; this could result in overusing errors of *the*. In Crompton (2011), English articles were examined by comparing English written corpus data of L1 Arabic speakers and native English speakers. The study found that overusing *the* was very frequent, occurring primarily in the use of *generic* in English. A study examining translated Qura'anic texts in English, Farghal and Al-Zou'bi (2004) analysed translation errors in three different translations of the Qura'an and found that the text included a high frequency of *the* overuse in contexts of generic *zero.* The authors explained the findings due to differences in article use between Arabic and English in a generic context.

Regarding fluctuation errors, as stated in Section 2.5, Ionin (2003) and Ionin et al. (2004) explained that this phenomenon occurs only among [-art] L1 groups (e.g., Korean and Russian) due to confusing meanings of definiteness and specificity. Learners of [-art] L1 groups overuse *the* in indefinite specific contexts and overuse *a/an* in the definite specific context. Existing research on the acquisition of L2 English articles [+art] L1 (Hawkins et al., 2006; Ionin et al., 2008; Snape, 2006) further supports Ionin's claim by not finding fluctuation errors. Ionin (2003), Ionin et al. (2004), and Sarko (2008, 2009) questioned if the same phenomenon can also occur among [+art] L1 French and [+art] Arabic L1 groups. In two of his studies, Sarko (2008, 2009) examined the use of L2 English articles, considering semantic accuracy and countability, among Arabic L1 and French L1 groups of different proficiency levels and whether the errors the two groups produced were related to fluctuation or L1 influence.

Sarko (2008) examined the use of English articles in L1 French and Syrian Arabic adult speakers in light of the FH and the Full Transfer/Full Access Hypothesis. Considering that L1 Arabic lacks the syntactic feature of an indefinite article, the study examined whether L1 Arabic would perform like other [-art] L1 in which fluctuation occurs between *the* and *a/an* in the indefinite, specific contexts. The study also examined whether Arabic L1 adults would recognise, from early on, that use of *a/an* and *zero* with singular and plural/mass nouns, respectively, occurs only in indefinite contexts. The study employed three different tasks: a forced-choice elicitation task, an oral production task and a written production task. Participants were divided into four groups based on their proficiency levels: 1) lower intermediate, 2) upper-intermediate, 3) advanced, and 4) very advanced. Both L1 language groups, regardless of their proficiency levels, showed a native-like performance in the definite context, both specific and nonspecific and with all noun categories in the L2. The L1 groups, however, performed differently in the indefinite contexts across the four proficiency

levels. The two least-proficient levels (low and intermediate levels) of the L1 Arabic group exhibited lower accuracy in indefinite specific contexts than indefinite nonspecific contexts. The participants showed an overuse of *the* with both noun categories, singular and plural/mass nouns. Based on Ionin et al. (2004), overuse of *the* is often attributed to fluctuation, but Sarko (2008) explained that the presence of a relative clause modifying the NP in the sentences of the tasks caused the participants to assume definiteness, causing the overuse of *the*. Sarko (2008) concluded that this was due to L1 influence as overuse of *the* hardly occurred among L1 French and the English native speakers' control.

Sarko (2009) also investigated the use of English articles by two [+art] L1 groups (i.e., Syrian Arabic and French speakers) using two tasks: a written forced-choice elicitation task and an oral story recall task. The participants were divided into two proficiency levels: intermediate and advanced. The study aimed at investigating three hypotheses in the two L1 groups: 1) the Full Transfer/Full Access Hypothesis, 2) the FH, and 3) the missing surface inflexion hypothesis. The use of articles was examined across the four semantic contexts (i.e., [definite, specific], [definite, nonspecific], [indefinite, specific] and [indefinite, nonspecific]), and across three noun categories: singular noun, plural nouns and mass nouns. The findings of both tasks showed that with the definite contexts, the performance of the two L1 groups (of intermediate and advanced -proficiency) was consistent with the Full Transfer/Full Access Hypothesis in which both groups, the French and the Arabic, generally exhibited a target-like ability in these contexts, especially with singular count nouns.

In using mass and plural count nouns in *the* context, however, intermediate-proficiency participants of both L1 groups showed omission of *the* to some extent which was due to variability in the input whereby, in English, *the* with plural nouns is grammatical in the definite specific context but not in the generic. In the indefinite contexts, for the forced-choice elicitation task, [indefinite, nonspecific] contexts exhibited more target-like

performance by both L1 groups for all noun categories. However, a different pattern was shown in [indefinite, specific] contexts by which the L1 Arabic group overused *the* especially with singular nouns (i.e., where *a/an* should be used). Although *the* overuse might initially appear to result from fluctuation, Sarko (2009) explained that *the* overuse impacted the presence of a relative clause modifier in the examples of the [indefinite, specific] due to the L1 effect. In Arabic, in sentences with a relative clause modifier, where there is an overt complementiser, *al-* must be inserted. Accordingly, Sarko associated *the* overuse with L1 influence instead of fluctuation. In the story recall task, on the other hand, in [indefinite, nonspecific] contexts, the Arabic L1 group, in contrast to the French L1 group, exhibited *a/an* omission error by both intermediate (22%) and the advance group (15%). Considering that this pattern occurred only among the L1 Arabic group, Sarko (2009) suggested that L1 plays an important role.

The results of both of Sarko's studies can be explained with both L1 influence and the internal developmental patterns of L2 English learners in L2 use of English articles. The high accuracy of using articles in the definite specific contexts could be an effect of L1 Arabic influence due to similarities of using *the* and *al-* (Sarko, 2008, 2009). However, this pattern also indicates a common developmental pattern among L2 learners of English in which mastering the use of *the* comes first in the process of acquiring English articles. The presence of *the* overuse among intermediate-level participants suggests another developmental pattern. Omission of *a/an* by low- and intermediate- levels in Sarko's (2009) study suggests L1 Arabic influence and that omission of *a/an* is generally common among L1 Arabic speakers due to a lack of indefinite articles in this language.

Regarding fluctuation, Sarko (2008, 2009) found that *the* overuse in indefinite specific contexts in both studies was attributed in most cases to the presence of a relative clause. Although Sakro (2008, 2009) attributed *the* overuse in [indefinite, specific] contexts to L1

influence, the pattern can also be explained to the use of explicit strategies by L2 learners (Ionin et al., 2009) in which the presence of the attribute (i.e., the relative clause in this case) lead learners to assume definiteness. Regarding understanding number/countability, the results of the two studies indicate L1 Arabic did exhibit a struggle in differentiating several types of nouns. Both studies generally showed an early accuracy in supplying *a/an* with singular nouns in indefinite contexts.

The two studies also observed an impact of proficiency whereby participants generally improved performance with increased proficiency. This is supported by the fact that omitting *a/an* in indefinite context (Sakro, 2009) and *the* omission errors with plural and mass nouns (Sakro, 2008, 2009) occurred only among lower-proficiency levels. Similarly, for *the* overuse in the indefinite specific contexts, in both studies, this pattern of error gradually decreased as learners moved from intermediate to advanced level. In Sarko (2008), participants at the maximum level of proficiency (i.e., higher advanced level) could completely avoid producing *the* overuse error and correctly supply *a/an* in indefinite specific contexts. The overall performance of L1 Arabic learners relative to proficiency aligns with Butler's (2002) claim. With the increase in L2 English proficiency, L2 English learners gain more awareness about L2 English article use, resulting in better performance as learners reach advanced levels. However, this varied concerning L1/L2 similarities where more change was observed in contrasting aspects (i.e., indefinite contexts). Relative to *the* overuse, similar to other L2 groups (see section 2.4.5), the patterns are not consistent across the various proficiency levels; it is more prominent in the intermediate levels than in low and advanced proficient learners.

The performance of L1 Arabic groups suggests that the patterns observed resulted from multiple factors where both complexities of form-meaning connections, L1 influence and L2 proficiency play a role. The findings indicate that different patterns are observed across the

stages of L2 developments, whereby more understanding of L2 English articles is observed. The participants initially struggled in countability, an area that tends to be generally problematic for most L2 learners (Butler, 2002; Master, 1987; Zodrenko & Paradis, 2012), as well as L1 influence. As these patterns decrease with higher L2 proficiency levels, the role of L2 experience whereby learners gain more awareness about form-meaning distinctions increases in accuracy and exhibit less L1 influence. Concerning task type, the fact that learners' performance varied across the different tasks highlights the potential for more methods to examine L2 patterns. This would allow observation of more patterns in L2 development which might not be observed using one method.

2.6. Reverse Crosslinguistic Influence (L2 to L1 Influence) in Article Acquisition

Based on the concept of multicompetence by Cook and Cook (2003), CLI is a phenomenon in which both L1 and L2 may impact each other. Recent interest has been given in studying this reverse pattern in SLA. *Reverse CLI* or *backward CLI* is the process, as mentioned in Section 2.3.3, is the process by L1 use is simultaneously impacted by acquiring L2 (Cook & Cook, 2003). Studies that examined reverse CLI in relation to L2 English article acquisition are also minimal. Among the studies investigating article use and NPs in two languages (i.e., bidirectional) in bilingual groups, two opposing groups of bilinguals were recruited (Azaz 2014; Ionin et al., 2013). In Azaz (2014), articles were used to examine both Arabic and English in distinct groups of bilinguals. While the use of English articles as L2 was examined among L1 Arabic-L2 English bilinguals, the use of Arabic articles was also examined in L2 Arabic among L1 English-L2 Arabic bilinguals. Similarly, Ionin et al. (2013) followed a similar pattern in which the use of plural NPs was examined in both English and Spanish as L2s within two L1 Spanish- L2 English and L1 English- L2 Spanish bilinguals, respectively.

In considering Cook and Cook's (2003) definition, reverse CLI can occur within the same group of bilinguals in which the use of L2 can also impact L1. In another study by Azaz and Frank (2018) examining the container-content relations in NPs in English, Arabic and English, L1 English speakers' of L2 Spanish and L2 Arabic patterns were also reviewed. Azaz and Frank (2018) based their hypotheses on the *structural overlap theory* (Hulk & Müller, 2000; Müller & Hulk, 2001; Yip & Matthews, 2009), which states that:

> "if language A allows more than one option for a structure, and language B overlaps with one of those options, crosslinguistic influence may occur. In this case, the language B-type option in language A is favored over the option not overlapping with language B, which could result in the bilingual child producing utterances in language A with the language B-type option for the target structure more often than monolinguals." Foroodi-Nejad and Paradis (2009, p. 411).

Foroodi-Nejad and Paradis's (2009) definition of the *structural overlap theory* states that in bilingual children, when one of the two languages (language A) has more than one structure for a particular option/function while the other language (language B) has only one structure for that option/function, overlapping with only one of the structures in A, CLI is likely to occur unidirectionally (i.e., in one direction) from language B towards A, where the use of overlapping structure in A is emphasised and used more by bilinguals of those languages. Bilinguals are likely to use the overlapping form in language A even more than among monolingual speakers of A.

In his study, Azaz and Frank (2018) studied reverse CLI among L1 English speakers of L2 Arabic and L2 Spanish, examining the container-content relations in NPs in English compared to Arabic and Spanish. In English, the container-content relationship is expressed in two ways: 1) left-headed/head-first and 2) right-headed/head-final constructions, presented either in N1PN2 (e.g., a cup of coffee) or N2N1 (coffee cup). Unlike English, in Arabic and

Spanish, only one of the two structures is allowed (i.e., left-headed/head-first constructions). Arabic allows for N1N2 structures in what is known as annexation (i.e., ‘iDafaa phrases), which follows the order of N1PN2 in English, where the head word (i.e., the container) is on the left side (see Example 2.13). On the other hand, Spanish allows for N1PN2, which is identical to one of the English structures (Example 2.14).

Azaz and Frank (2018) hypothesised, based on the structural overlap theory, that a reverse CLI was likely to occur among advanced L1 English- L2 Spanish and L1 English-L2 Arabic bilinguals due to the impact of the overlapping order in Arabic and Spanish, which will result in more use of N1PN2 among bilinguals compared to monolingual English speakers. The results confirmed Azaz and Frank’s (2018) hypothesis as both groups of L1 English- L2 Spanish and L1 English-L2 Arabic bilinguals produced more of the overlapping structure (i.e., N1PN2).

Example 2.13

N1N2 NP structure in Arabic

مدير المدرسة

mudeer (N1) al-madrasah (N2)

principal (al-) school

Translation: the school principle or the principal of the school

Example 2.14

N1PN2 NP structure in Spanish

Taza (N1) de (P) café (N2)

Translation: coffee cup or cup of coffee

When applying the concept of the *structural overlap theory* on English and Arabic article systems, in most cases, English is language A, which provides more structures than Arabic (i.e., language B). In addition, structures in the Arabic article system overlap with structures in English. Regarding generic use, in English, the three articles *a/an*, *the,* and *zero* are used to express generic, while in Arabic, only *al-*, overlapping with *the,* is used.

Similarly, for both [indefinite, specific] and [indefinite, nonspecific] context, while both *a/an* and *zero* are used to express the indefinite meaning in English, only *zero* is used in Arabic. It is only in the [definite, specific] context where both languages use the article almost identically, given that in both languages, one article (a definite article) is used. Based on *the structural overlap theory*, a unidirectional CLI is likely to occur from Arabic to English in generic, [indefinite, specific] and [indefinite, nonspecific] contexts. Consequently, among bilinguals, the use of *the* is more likely to be present in generic context than *a/an* and *zero*. Similarly, the use of *zero* is more likely to be present in indefinite contexts. Previous studies have found the overuse of *the* in the generic across L2 English articles studies among L1 Arabic speakers (Crompton, 2011; Farghal & Al-Zou'bi, 2004). Likewise, *a/an* omission (i.e., supplying zero) in indefinite contexts was produced by L1 Arabic speakers (Bataineh, 2005; El-Sayed, 1983; Scott & Tucker, 1974; Zughoul, 2002). Both patterns confirm the predictions of the *structural overlap theory*.

Relative to article use, Azaz (2016) examined the acquisition of determiner phrases (DPs) in L2 Arabic in an opposing case, among L1 English-L2Arabic, of two proficiency levels: 1) low-proficiency and 2) advanced-proficiency groups. In his study, Azaz (2016) examined L1 English CLI in L2 Arabic articles using a grammatical judgement task (GJT). A forced-choice task (FCT) reviewed three types of DPs: 1) DPs

which denote unique entities (e.g., the sun, the moon) which often marked by *the* in English; 2) DPs denoting abstract concepts (e.g., peace, fear, love), materials (e.g., coffee, juice), and areas of study (e.g., chemistry, math, literature) often unmarked in English, and 3) generic singular NPs which can be marked by either *a/an* or *the* in English. Predictions stated that L1 influence is likely to occur for 1 and 2. However, in 3, a fluctuation between *al-* and *zero*, or consistently transferring either of them, is expected. The result indicated that instances L1 CLI effect were detected in the three cases by the lower-proficiency group. These instances were more prominent in the mismatched cases in the NPs in English. This effect, however, was significantly less among the advanced-level group, indicating that they were better at overcoming the L1 influence. Overall, the participants were better with NP patterns related to unique entities than those denoting abstract concepts, materials and areas of study. As for generic singular NPs, the lower-proficiency group showed more fluctuation between the use of *al-* and *zero* than the advance group, which were more target-like.

Based on article studies among Arabic-English and English-Arabic bilinguals, many considerations can be taken when examining bidirectional CLI among L1Arabic-L2 English bilinguals. First, on a structural level, based on the structural overlap theory, when considering the use of articles in each semantic context, it is unlikely for reverse CLI to occur from English to Arabic in the generic and both indefinite contexts. As for each of these semantic contexts, English presents more structures than Arabic. In theory, it is more likely for learners to have performed similarly in both languages for a specific context.

Upon further considerations, *the case of structural overlap* cannot be applied entirely in the case of bidirectional CLI. When examining NPs in both languages, meanings denoted in NPs in each of the two languages present some variability between the two languages. This can be indicated in how abstract nouns are expressed in each language. In addition, more

variability is also demonstrated when referring to the *cultural use* of the definite article in each language (see Section 2.2.2.). Arabic presents cases in which some proper nouns are marked by *al-*, cases which are not marked by *the* in English. Moreover, for Azaz (2016), the fact that L1 English to L2 Arabic also occurred suggests that the semantic differences present further complexities, which cannot only be due to overlap in structure. Furthermore, regarding language dominance between language A and B, the case can be different when B is L1 and not A. An assumption can be made that, at least in adults, L1 is likely to dominate in bilinguals and accordingly, more impact is expected.

2.7. Conclusions

In L2 English acquisition, L2 English learners are often found to show similar order in acquiring different morphemes in L2 English, which is explained by the variability in the difficulty in which these forms are obtained (Bailey et al., 1974; Hedges & Olkin, 1985; Larsen-Freeman, 1975, 1976; Wolf, 1986). Several factors such as perceptual salience, semantic complexity, morphophonological regularity, syntactic category, and frequency have been proposed on why certain forms are more difficult or easier to acquire than others (Goldschneider & DeKeyser, 2001). Additionally, it has been found that some change is observed across the different L1 groups leading to conclude that L1 has specific effects on the process of L2 acquisition (Murakami & Alexopoulou, 2016).

Based on the relation between language and thought, it is often assumed that L1 impacts the meaning and concept in the mind. Because these underlying meanings of L1 can remain activated, they exert an influence when acquiring an additional language (Odlin, 2005). Based on the concept of multicompetence, Cook and Cook (2003) found that L1 and L2 in the minds of bilinguals are presented differently from that of monolingual speakers of these languages. In the mind of bilinguals, L1 and L2 deliver an integration in which L1 is

likely to impact L2; likewise, L2 can affect L1 (Cook & Cook, 2003). This integration can vary depending on several factors that include language area, language distance and the stage of L2 development.

Among the different L2 morphemes, L2 English articles acquisition present a challenge to L2 English learners where several factors can contribute to the process. The difficulty of using English articles is primarily attributed to form-meaning connections where several forms (*the*, *a/an* and *zero*) are used to mark different meanings (definiteness/indefiniteness, specificity and number) (Ekiert, 2007; Ekiert & Han 2016). However, this complexity can vary across meanings (i.e., across the semantic contexts) and in relation to form (i.e., based on obligatory contexts). Accordingly, it has been generally found that expressing definite meaning in L2 English article use comes easier for L2 English learners considering that only one form (i.e., *the*) is used in the [definite, specific] context (Chaudron & Parker, 1990; Haiyan & Lianrui, 2010; Huebner, 1983; Master 1997; Parrish, 1987; Thomas 1989). Indefinite and generic contexts, however, are often observed to be more challenging when more complexity is added (in addition to the semantic aspects) with the need to mark *number* when making a distinction between different types of nouns (mass/uncountable, singular countable and plural countable) is required to choose the correct form (Ekiert, 2007, Ekiert & Han, 2016; Master, 1987). In addition to complexity in form and function, L2 English articles use have also shown to be affected by L1 influence (Ekiert, 2005, 2007; Ekiert & Han, 2016; Master, 1987, 1997; Sarko, 2008, 2009; Thomas, 1989).

Across the different studies, it has been found that learners show different order in their acquisition of the three forms (*the*, *a/an*, and *zero*) and across the different semantic contexts (Diez-Bedmar & Papp, 2008, Ekiert, 2005, 2007; Master, 1987; Sarko, 2008, 2009). This order is often determined by whether L1 of the learners has an article system or not and to what extent that article system (if it exists) is similar to L2 English article meanings (Sarko,

2008, 2009). Additionally, among [-art] L1, this can also be related to how meanings of definiteness and specificity are expressed in the L1 (Ekiert, 2007). Higher accuracy in using L2 English articles are often found among [+art] L1 groups where familiarity with article use from their L1 (Sakro, 2008, 2009; Thomas, 1989) in contrast to [-art] L1 who often struggle more (Diez-Bedmar & Papp, 2008; Thomas, 1989). Omission errors were found to be more common among [-art] L1 groups than in [+art] L1 groups (Diez-Bedmar & Papp, 2008; Parrish, 1987; Thomas, 1989). Moreover, [-art] L1 groups have shown more struggle in mapping meaning of definiteness and specificity, resulting in overusing *the* in [indefinite, specific] context and *a/an* overuse in [definite, nonspecific] contexts (Ionin et al., 2004).

In addition to meaning-complexity and L1 influence, Trenkic (2009) proposed additional conditions where the salience of the referent can lead to omission errors. Among these conditions is where the NP is preceded with an adjective. Trenkic (2009) states that L2 learners tend to show more omissions in their use of L2 English articles with nouns pre-modified by adjectives than with cases in which there are no adjectives.

In addition to these aspects, the use of L2 English articles is confounded by L2 experience, where both L2AOA and L2 proficiency can have an impact. With increased L2 proficiency, L2 learners generally show more accuracy in using L2 English articles when errors often decrease. With respect to L2AOA, children as early learners have shown to be better and often progress faster than adults as late learners (Zodernko & Paradis, 2008, 2012). However, this depends on the level of L2 exposure; the longer the L2 exposure, the more accurate are the learners (Morales-Reyes & Gómez Soler, 2016).

For L1 Arabic groups, their L2 acquisition of English articles has been influenced by similar factors. L1 Arabic adults learners show more accuracy in aspects where there is more similarity to L1 Arabic article use and less complexity in form and meaning is observed. This

was evident primarily in the high accuracy of L1 Arabic learners using *the* in the definite contexts instead of using *a/an* and expressing generic and indefinite meanings (Sarko, 2008, 2009). Due to the lack of indefinite articles in Arabic, L1 Arabic learners were often observed to omit *a/an* in the indefinite contexts (Bataineh, 2005; El-Sayed, 1983; Zughoul, 2002). Similarly, considering how marking generic meaning differs across L1 Arabic and L2 English, L1 Arabic learners tend to overuse *the* in generic contexts (Crompton 2011; Farghal & Al-Zou'bi 2004). Like other L2 learners, L1 Arabic adults also vary in performance concerning L2 proficiency. For age groups, the use of L2 English was hardly examined in L1 Arabic children compared to adults (Zodernko & Paradis, 2008, 2012).

This study explores the process of L2 English acquisition among Arabic- English bilingual adults and school-age children (7-12) in two studies using different testing methods: 1) narrative-elicitation and 2) sentence-repetition. The studies present a case of L1 Arabic speakers who moved and were living in the UK at the time of the survey. In the two studies, the patterns of L2 English article use were examined about the individual factors of age and L2AOA, L1/L2 proficiencies and LOR in the UK. Moreover, in the sentence-repetition study, an additional factor related to NP structure and whether more article omission errors occur when nouns are pre-modified by an adjective or not was examined. Based on the concept of multicompetence, the studies adopt a bidirectional perspective where L1 Arabic use is also examined. In this respect, this project investigates whether L2 use of English articles influences L1 use of Arabic articles. L1 Arabic article use is also examined concerning background variables of age and L2AOA, L1/L2 proficiencies and LOR in the UK. For comparison, the studies include two control groups: English native speakers (ENS) and monolingual Arabic speakers (MAS).

CHAPTER THREE: THE CURRENT STUDIES

3.1. Introduction

Considering the gaps in the literature, this study aims to: 1) examine the acquisition of L2 English article acquisition by Arabic-English bilinguals adults and children and 2) determine the factors that could influence the acquisition process:

1. The L1 effect, age of acquisition, L2 proficiency and exposure likely to impact the process.
2. The impact of L1 in L2 English article acquisition by Arabic-English bilinguals.
3. Comparing the process of English article acquisition in early L2 learners and late L2 learners.

For the study, two Arabic-English bilingual groups were examined in their L2 and L1 article use: Arabic-English bilingual adults and Arabic-English bilingual children (aged 7-12). The article acquisition process was explored in relation to the order of acquisition and error patterns and how those patterns reflect both complexity of forms and CLI. Also, the study evaluated how individual and extralinguistic factors such as L2AOA, LOR in an English-speaking country and proficiency affect the acquisition of L2 English articles and how L1 Arabic article use modulates the acquisition process. The study aimed to answer the following research questions:

1. What patterns of English article use do bilingual Arabic-English-speaking intermediate-to-advanced adults and children exhibit during the acquisition of the English language?
2. How do individual factors of age, L2AOA, L1 (in children) and L2 proficiencies, LOR in an English-speaking country (i.e., the UK), and linguistic aspects of L1 article

system and NP structure impact the acquisition patterns of L2-English articles in adults and children?

3. Does L2 affect L1 use of Arabic articles in Arabic-English bilingual adults and children?

4. How do age, L2AOA, L1 (in children) and L2 proficiencies and LOR in an English-speaking country (i.e., the UK) impact using L1 Arabic articles in adults and children?

To answer these questions, the patterns of L2 English and L1 Arabic article use by Arabic-English adults and Arabic-English children with different L2AOA, L2 English proficiency, and length of time living in an English-speaking country were studied. Data was collected via two tasks: 1) narrative-elicitation and 2) sentence-repetition. Each task is presented in a separate study.

In the first study, the narrative-elicitation task was employed to test and extract communicative and approximate naturalistic data. Narratives are categorised as semi-structured experiments in which certain stimuli were used to control the type of elicited data. In this study, participants were presented with pictures of four main stories from the Edmonton Narrative Norms Instrument (www.rehabresearch.ualberta.ca/enni), containing pictures without written text that could be narrated freely by observing what is presented in each image.

Narratives were used across different language acquisition studies and considered useful for examining language patterns in cohesive, communicative forms of text, giving them an advantage over types of data (Tarone, 1985; Tarone & Parrish, 1988). The communicative demands of narratives where participants' intend to create clear descriptions in their narratives resulted in better use of articles (Tarone & Parrish, 1988).

Despite their usefulness, narratives had shown certain limitations in examining English article use. First, limited contexts can be elicited using the narratives, mainly articles in generic and [indefinite, context] (Tarone & Parrish, 1988; Zodrenko & Paradis, 2008). In addition, the use of the visual in the narrative was criticised for the way it established shared knowledge, in which indefinite nouns were mistakenly treated as definite (Van Hout et al., 2010). Regardless of the limitations, narratives remain useful in eliciting communicative data to achieve authentic patterns in English articles. When combined with other methods, these limitations can be reduced.

In the second study, the sentence-repetition task (SRT) was employed. SRT has been used as a clinical marker to assess children's language abilities (Vinther, 2002). In clinical research, SRT has demonstrated great sensitivity in identifying language impairments among monolingual children (Conti-Ramsden et al., 2001; Marinis & Armon-Lotem, 2015). The technique was then extended to include child language acquisition (Ambridge & Pine, 2006; Eadie et al., 2002; Hirata-Edds, 2011), second language research and neuropsychological studies (Bley-Vroman & Chaudron, 1994; Erlam, 2006; Schwartz & Daly, 1976). In L2 research, SRT has been used to examine learners' interlanguage systems, their memory system and various aspects of their grammatical knowledge (Bley-Vroman & Chaudron, 1994; Hamayan et al., 1977; Munnich et al., 1994).

In conducting SRTs, the participants are asked to repeat an oral stimulus (in the form of phrases or a sentence), which is pre-recorded or read aloud by an examiner, as correctly as possible (Hamayan et al., 1977; Vinther, 2002). SRT is a means of measuring the implicit knowledge of language learners (Erlam, 2006). According to Ellis (2005), linguistic competence is based on implicit rather than explicit language knowledge.

Despite its extensive use, many researchers have questioned the usefulness of SRT in assessing language skills (Fraser et al., 1963; McDade et al., 1982). One of the most common criticisms is that repetition is merely rote-imitation of the sounds rather than language knowledge (McDade et al., 1982). However, Erlam (2006) argues that the design of the task plays a dominant role in determining if the task actually measures learners' skills. In the second study, measures were taken to ensure the usefulness of the task.

In this study, we designed an SRT in which participants repeat sentences containing all the possible articles in all possible contexts of use. Correct use and error patterns were studied.

3.2. Hypotheses and Predictions

Based on previous findings, we formulated the following hypotheses and predictions.

1. **Hypothesis 1 concerning the first question:**
    a. ***Order of accuracy:*** based on the relation between language and thought, meanings of definiteness encoded by articles go under *thinking for speaking* categories as language-specific concepts (Slobin, 1996). Under the concept of multicompetence (Cook & Cook, 2003) and the fact that L1 knowledge can influence the minds of bilinguals, it predicted that both complexity and L1 influence would be reflected in the patterns of L2 English article use in the Arabic- English bilinguals. Considering aspects of similarity and difference between L1 Arabic and L2 English, Arabic- English bilinguals are expected to show higher accuracy in using *the* and expressing definite meanings than using *a/an* and *zero* and expressing generic and indefinite meanings.
    b. ***Errors:*** based on *the structural overlap hypothesis* (Hulk & Müller, 2000; Müller & Hulk, 2001; Yip & Matthews, 2009) and the lack of indefinite articles in

Arabic, *a/an* omission (i.e., *zero* overuse in *a/an*) is likely to occur within indefinite contexts. Similarly, because of the dominance of the definite article *al-* in Arabic, overuse of *the* could also be present, particularly in a *generic* context.

2. **Hypothesis 2 concerning the second research question:**
   a. ***Age and L2AOA:*** relative to L2AoA, children were expected to be more similar to adults than younger L1 Arabic children (Zodernko & Paradis, 2008, 2012). Children were expected to have higher accuracy in using *the* and in [definite, specific] contexts than other contexts. They might also exhibit developmental errors in overusing *the* present among both L1 Russian (Ionin et al., 2009) and Spanish groups (Morales-Reyes & Gómez Soler, 2016). However, due to the lack of indefinite articles in Arabic, it was not clear to what extent *a/an* omission was likely to occur. However, it was assumed that the occurrence of *a/an* omission among children would be less prominent than it is in adults.
   b. ***L2/L1 proficiency:*** According to Kim et al. (2020), with increased L2 proficiency (an indicator to L2 experience), the ability for learners to make form-meaning distinctions. Based on that and the existing evidence in L2 acquisition of L2 English articles (Ekiert, 2005; Sarko, 2008, 2009), Arabic-English bilinguals are likely to show more accuracy in L2 English articles with fewer errors. Reduced errors will result from L1 and L2 differences, and accordingly, less negative L1 influence will occur with higher L2 proficiency. For L1 proficiency, as explained in Jarvis and Pavlenko (2008), the more is L1 developed, the more prominent is L1 influence.
   c. ***LOR:*** considering that LOR, as with L2 proficiency, is a part of the L2 experience, with increased LOR, more accuracy in using L2 English articles is

likely to occur with higher proficiency levels. Accordingly, based on Jarvis and Pavlenko (2008), less L1 influence is expected to occur with longer the LOR.

d. ***Noun phrase structure:*** Based on Trenkic (2009), more processing is required in (Article+ adjective + noun) forms than in (article + noun) forms. Therefore, article omission is more likely to occur with (Article + adjective + noun) forms than (article +noun) forms.

3. **Hypothesis 3 concerning the third research question:** Based on *the structural overlap theory* (Hulk & Müller, 2000; Müller & Hulk, 2001; Yip & Matthews, 2009), it is more likely that unidirectional CLI from L1 Arabic to L2 English will occur. Therefore, negative L2 to L1 influence is less likely in Arabic-English bilinguals' performance.

4. **Hypothesis 4 concerning the fourth research question:**

   a. ***Age and L2AoA:*** it would be more likely to exhibit L2 to L1 influence among children than in adults considering that their exposure to L2 English and their L2 age at the onset of the acquisition has started considerably earlier than the adults who have lived most of their life in Saudi Arabia and only extensively exposed to L2 English in a native speakers environment as adults.

   b. ***L2/L1 proficiency:*** According to Cook and Cook (2003), the integration between L1 and L2 systems depends on the stages on which L2 is developed in the bilinguals; the more is developed in L2, the more likely it is to exhibit L2 to L1 effects. According to Kecskes and Papp (2003), L2 begins to show the impact on L1 use when L2 learners reach a particular threshold in L2 to which both L2 proficiency and L2 exposure contribute. Accordingly, with increased L2 proficiency the participants are more likely to exhibit L2 to L1 effects. Considering that L1 is the source language, in this case, based on

Jarvis and Pavlenko (2008), the more developed the L1, the more likely it is to show effects in L2 use.

c. ***LOR:*** As mentioned in Hypothesis 4c, based on Cook and Cook (2003) Kecskes and Papp (2003), with increase of L2 exposure (equated by LOR), the participants are more likely to exhibit L2 to L1 effects.

CHAPTER FOUR: THE NARRATIVE-ELICITATION PILOT STUDY

4.1. Introduction

This project began with an exploratory pilot study[1], which investigated the patterns of L2−English article use among Arabic−English bilingual children and the effect of the individual variables of age, L2AOA and length of residence in the UK (LORUK) on the process of L2 English article acquisition. The study additionally examined whether the children's performance exhibited any influence of their L1 or, by contrast, was more like that of L1 English native-speaking children. For these aims, we tested three groups of participants: 15 Arabic−English bilingual children (BC), 15 Arabic−English bilingual adults (BA) and 15 adult English native speakers (ENS) for the control group. The BA group and the control group were added for comparison purposes. The study was mainly exploratory to discern how Arabic−English bilingual children in L2 natural settings would generally perform and what aspects of L2 English article use are likely to be exhibited using narrative-elicitation. Three pictorial stories were used for the purposes of this study.

Research Questions

1. Concerning children's acquisition of L2 English articles:

a. To what extent do bilingual Arabic L1−English L2 children understand English article usage?

b. To what extent do bilingual Arabic L1–English L2 children produce omission and commission errors?

2. How do the individual variables of age, L2AOA and amount and length of exposure to L1 and L2 influence children's English article usage?

[1] This pilot study has been previously submitted as a first dissertation (Hamadah, 2018) as a requirement of the Applied Linguistics (Taught-Track and Thesis) PhD programme.

4.1.1. Hypotheses

Hypothesis 1: Addressing RQ1a

Given that encoding definiteness is less complex in terms of form−meaning mapping (Ekiert, 2007; Ekiert & Han 2016) and considering the similarity between Arabic and English article systems, it was predicted that children would be more accurate in encoding definiteness than in encoding indefiniteness in their use of L2 English articles.

Hypothesis 2: Addressing RQ1b

Based on the patterns observed in children (Ionin et al., 2009; Morales−Reyes & Gómez Soler, 2016; Zdorenko & Paradis, 2008, 2012), children in this study were expected to exhibit L1 influence in their L2 use of English articles. It was expected that they would omit *a/an*. They were likely to follow the same developmental stages as L1 children. Accordingly, they were expected to show *the* overuse in indefinite contexts as an intermediate stage.

Hypothesis 3: Addressing RQ3

a. Age and L2AOA: Respecting previous studies (Ionin et al., 2009; Morales−Reyes & Gómez Soler, 2016; Zodernko & Paradis, 2008, 2012) and the difference observed between children and adults, it is expected that the earlier the L2AOA, the higher the accuracy. Arabic−English bilingual children were expected to demonstrate more accuracy and less L1 influence in their L2 English article use than Arabic−English bilingual adults.

b. L1/L2 exposure: In Zdorenko and Paradis's (2008) longitudinal study, with time, children received more L2 input and accordingly their accuracy increased. Therefore, regarding L2, with longer exposure to L2 in the UK and the more frequent its use, the more accurate are the children in their use L2 English articles in general. Equally, in respect to L1, although it was expected

that children were likely to show less L1 influence in their performance than in adults' use, this was relevant to the amount of L1 exposure the children received (Zdorenko & Paradis, 2008). Based on Zdorenko and Paradis (2008) and respecting Jarvis and Pavlenko (2008), it was expected that L1 influence would be more apparent with longer time spent in the L1 Arabic context and the more frequent its use.

c. L1/L2 proficiency: Based on previous findings regarding L2 proficiency (e.g. Butler, 2002; Kim et al., 2020; Sarko, 2008, 2009), it was expected that, with greater L2 proficiency, the more accurate the children would be in using L2 English articles and the less the L1 influence would be. Conversely, regarding L1 proficiency, based on Jarvis and Pavlenko (2008), the higher the L1 proficiency, the likelier it would be for the L1 influence to occur.

4.2. Methodology

4.2.1. Participants

Three groups of participants were recruited for this study. The main group (BC) included 15 Arabic−English bilingual children. The second group (BA) comprised 15 Arabic−English bilingual adults, and the last was the control group (ENS), with 15 English native speakers.

The BC group consisted of seven male and eight female children; most were considered sequential bilinguals. Hoff (2013) defined *sequential bilinguals* as children who start acquiring their L2 after developing their L1. Most of these children were sequential bilinguals who had previously acquired Arabic in their home countries and then acquired English as an L2 after the age of three, while the others were viewed as simultaneous bilinguals. Thirteen of these children were from Saudi Arabia, while two were from Oman. Both are countries where Arabic is the native language.

Before the experiment, the parents of the children were given a questionnaire investigating the linguistic and social background of the children (Anderson et al., 2017; see Appendix 1). The questionnaire had three parts. The first part generally asked for the educational, linguistic and professional backgrounds of the participant's parents. It also collected general information that included gender, age, place of birth and LORUK and the length of residence in the birth country (LORBC). The second part of the questionnaire was the language background investigating the L2 age of onset (L2AOA) and the duration spent learning the L1 and L2. This part of the questionnaire required the participant (or the parents in the case of children participants) to rank the proficiency of each of L1 and L2 in the four language skills (speaking, understanding, reading and writing) from 1 to 10, 1 indicating the lowest proficiency and 10 indicating the highest. The last part investigated community language behaviour and the engagement of using each language within different contexts, engaging in different activities and talking with different people across different life stages. It also examined how often the subjects code switched between L1 and L2 in different situations.

Respecting the aims of the study, certain aspects were selected to represent its independent variables (see Table 4.1). As presented in Table 4.1, the ages of the children varied from 6.33 to 10.92 (M = 9), while the L2AOA ranged from birth to seven years of age (M = 3.75). LORUK, however, varied from nine months to eight years (M = 3.25), while LORBC ranged from one year to eight years (M = 5.17). Based on parents' responses, the L1 speaking proficiency of children ranged from 4 to 10 (M = 8.2). The L2 speaking proficiency ranged from 6 to 10 (M = 8.3).

Table 4.1

Linguistic and Social Information of the Bilingual Children

	Age	L2AOA	LORUK	LORBC	ProfL1	ProfL2
Range	6.33-10.92	6	0.67-8	1-8	4-10	6-10
Mean	9	3.9	3.5	5.3	8.2	8.3
Standard deviation (SD)	1.56	1.67	1.55	1.91	2.30	1.44

Note. L2AOA: second language age of acquisition, LORUK: length of residence in the UK, LORBC: length of residence in birth country, ProfL1: proficiency of L1, ProfL2: proficiency of L2

The second group was the BA group, which was added for comparison purposes. Fifteen female participants were recruited in this group. Thirteen were Saudi, and two were from Oman. The participants were students of disparate educational backgrounds and degrees at the University of Reading when this study was conducted. This group included 11 PhD students, one MA student, and three taking pre-sessional English courses. This group of participants were late learners of English who had started acquiring English in their birth countries at the ages of 11−12 and were first exposed to English in a natural environment upon their arrival to the UK for studying.

The last group was the ENS group, which consisted of 15 native English speakers. All the individuals in this group had a university degree in various domains. Most participants (14) of this group were from the UK, and one was from the US.

4.2.2. Ethics

Before conducting the experiment, the participants (or the parents in the case of the children) were given a consent form and an information sheet to sign (Appendix 2). In the information sheet, explanations of the task and how it was performed were mentioned. The participants were informed about how the confidentiality of the data was maintained in that the data would be recorded and kept in a password-protected laptop and/or in a locked drawer, which only the researchers of this project could view.

There were two versions of the information sheet for each of the adult participants and the children. Besides information about the task, in the children's version, a section was

added with a questionnaire about the child's sociolinguistic background that a parent was asked to fill out about the child.

Signing the consent form confirmed that the subjects or the child's parents agreed to take part in the experiment and that she/he understood all the requirements of participation (or the child's participation in the children's version). In the consent form, a statement explained participation was voluntary and subjects had the right to withdraw at any point she/he chose (or when the child chose, in the case of the children).

4.2.3. Materials

A narrative-elicitation task and an audio recorder were used in the study. The narrative-elicitation task was adopted from the Edmonton Narrative Norms Instrument (www.rehabresearch.ualberta.ca/enni). The task took the form of two sets of stories (A and B) and a training story (T). The training story presented two characters (a boy and a shopkeeper) in a supermarket. Set A of the stories included three stories: A1, A2 and A3, telling stories sharing the same characters, a male giraffe and a female elephant, and relating their adventures. Set B also included three illustrated stories: B1, B2 and B3. The stories in this set depicted tales about a rabbit and his friend (a dog). For this study, two stories from the B set were selected (B1, B2) besides the training story (Appendix 3). The stories came in the form of A4 images. The training story was only used to familiarise the participants with the task and was not included in the analysis. Each of the main stories (B1, B2) presented distinct sets of events. In each story, various objects and characters were introduced. The second story, B2, was slightly longer and included more complex events than B1.

The audio recorder used is an application on a mobile device. The data were transcribed and analysed using the CLAN and CHILDES tools (MacWhinney, 2000).

4.2.4. Rationale

Narrative-elicitation is useful in providing data that are semi-spontaneous and simulate natural speech. The use of narratives helps to extract the use of articles in cohesive (Tarone, 1985) and communicative forms of texts (Tarone & Parrish, 1988). It was found that, in the intention of participants to provide a clear description of their narrative, they performed better using English articles (Tarone & Parrish, 1988).

Regardless, the use of narratives has presented limitations with regard to article use. This was mainly found in the tendency for participants to produce fewer articles in the generic and the nonspecific contexts. Due to using visuals to elicit data, most nouns produced are specific (Tarone & Parrish, 1988; Zodrenko & Paradis, 2008). Furthermore, using pictures can lead individuals to falsely assume shared knowledge and treat indefinite nouns as definite (Van Hout et al., 2010).

To reduce these limitations, the study followed the instructions provided by Zodrenko and Paradis (2008, 2012) to prevent subjects from falsely assuming shared knowledge with the examiner. By following Zodrenko and Paradis (2008, 2012), the pictures only faced the participants, and the examiner could not see the pictures. In addition, participants were told that the examiner knew nothing about the story (or to assume that in the case of adults) and they must describe everything they saw.

4.2.5. Procedure

The task was performed individually by each participant in the three groups. The session started with the examiner stating the instructions, which were repeated for each story. During the session, the images of the stories were presented so only subjects could see them, not the examiner. The instructions stated that the participant should describe the story in English. The subject was told to describe everything he/she saw and was notified the examiner could not see them. All three stories were introduced in the same session for each

participant. The sessions ranged from six to 10 minutes, and the narration of the participants was audio-recorded using an application on a mobile device. Following the session, the narrations of the two stories by each participant were transcribed using the CLAN and CHILDES tools.

4.3. Analysis

To answer the research questions of the study, it was essential to first determine the types of contexts in which the articles were used with discourse analysis. The analysis first identified the contexts of article use, correct and incorrect uses of articles and error types. Analysis of the narrative data were based on Zdorenko and Paradis (2008, 2012). However, while the analysis of Zdorenko and Paradis's (2008, 2012) studies was limited to common nouns referring to characters and objects in the story, in this study, all common nouns were used to describe the stories analysed. The analysis of nouns was based on articles used in the semantic contexts identified by Huebner's (1983) four-way typology (explained in Section 2.2.1., Chapter 2): generic, [definite, specific], [indefinite, specific] and [indefinite, nonspecific]. Another type of semantic context was considered: conventional and idiomatic uses of articles, which many researchers identify as the fifth type (e.g. Ekiert, 2005).

The identification of semantic contexts was based on the following: i) if the children could detect whether a shared knowledge existed between the speaker and the listener (i.e. the participant and the examiner in this case), ii) if the children could make a specific and nonspecific distinction and iii) if the children could understand noun countability.

To identify semantic aspects, the following criteria were used. First, specificity was determined when the nouns indicated that the speaker had a particular referent in mind, which was the case with most of the nouns, considering that nouns used in the participants' narrations were presented directly in the images in front of the participant. Definite and indefinite nouns, however, were identified based on whether shared knowledge existed

between the listener and the speaker. Accordingly, indefinite nouns were often determined by newly introduced items or characters, except nouns used to refer to common knowledge in communities (e.g. the park, the hospital). Definite nouns, however, were determined by previously mentioned nouns in the narration or nouns mentioned in association with previously mentioned nouns. Based on this criterion, nouns likely to be indefinite in stories B1 and B2, the stories were classified and presented in Table 4.2. Further details on identifying indefinite nouns are provided in Appendix 4.

Table 4.2

Possible Indefinite Nouns in the Narration

The story	Newly introduced items/characters
The training story	(a) boy (a) shop/supermarket (a) box (a) shopkeeper/man
Story B1	(a) rabbit (a) dog (a) bucket (zero/a) sand/sand area
Story B2	(a) rabbit (a) dog (a) picnic (a) mat/picnic blanket (a) carrot (zero) sandwiches (zero) cheese (zero) pickles (a) cake (a) doctor

After determining their semantic context, further analysis was based on obligatory contexts (i.e. for each article as a form). Correct and incorrect uses of each English article (*the, a/an*

and *zero*) were identified across the four semantic contexts besides the conventional, idiomatic uses of English articles. The obligatory contexts of English article use in subjects' narratives are identified under the obligatory contexts of *a/an* and *zero*. Identifying obligatory contexts was essential to determine the accuracy of using each article individually to determine the order of acquiring English articles. In addition, errors of article use errors were identified and categorised across all semantic contexts.

4.4. Data Coding

Coding the data included all patterns of correct and incorrect uses of articles exhibited by the participants. Table 4.3. presents the patterns exhibited in the data across the four semantic contexts identified by Huebner (1983) and the conventional and idiomatic uses identified by Ekiert (2005).

1) For *generic* use, the data were very limited and occurred once in the entire data, which was exhibited in the correct use of *zero*, as in Example 1.
2) In the [definite, specific] context in which only the article *the* was used, the data exhibited the correct use of *the* as in Example 2, in which the NP was a second-mentioned noun, and in Example 3, in which the NP represented the *cultural use* of *the*. As for errors, the omission of *the* (as in Example 4) occurred in the data.
3) In the [indefinite, specific] context were the correct uses of *a/an* with singular countable nouns (as in Example 5) and *zero* with mass and plural countable nouns (as in Example 6). The errors in this context, however, included the overuse of *the* in the *a/an* context (Example 7), *a/an* omission (Example 8) and the overuse of *a/an* in the *zero* context (Example 9).
4) In the [indefinite, nonspecific] context, the correct uses of *zero* with mass and plural countable nouns (as in Example 10) were exhibited. Errors, conversely, included only *a/an* omission (as in Example 11).

5) Regarding conventional and idiomatic uses, the data included the correct use of *the* (as in Example 12). Errors, however, included *a/an* omission (as in Example 13).

Table 4.3

Analysis of Participants' Use of English Articles across the Five Contexts

Semantic Context	Category of use	Uses	Examples
Type 1 (-SR, +HK) Generic Use	Correct uses	Correct use of *zero*	(1): *KAT: And the doctor examines him and takes, checks his tongue and do whatever doctors do.
Type 2 (+SR, +HK), referential definites	Correct uses	Correct use of *the*	**(2):** *JOR: They both made a sandcastle together. *JOR: The rabbit pours a bucket full of sand on the sandcastle. **(3):** *ALX: It was a normal day, and two rabbits decided to go to the sandpit.
	Errors	Omission of *the*	**(4):** *ARW: Then, they have their picnic spread out. The rabbit seems to have lots of food, sandwiches, chips and cookies, and the puppy is shocked **by the amount of food** and he seems to consume everything at the same time.
Type 3 (+SR, -HK), referential indefinites	Correct uses	Correct use of *a/an*	**(5):** *JOR: There is a dog and a rabbit. They are friends; I bet they are friends.
		Correct use of *zero*	**(6):** *CLA: Rabbit had a massive picnic in his basket full of carrots and sandwiches and cakes and everything.
	Errors	Overuse of *the* (substituting *a/an* for first-mentioned nouns)	(7): *FAH: So, the story starts when the rabbit...it's a cartoon and rabbit meet, it looks like a mouse to me, and she is a girl, and they are like playing in playground or something.
		a/an omission	**(8):** *GHD: This picture shows a rabbit and a dog with a basket, uh...with each one.
		a/an overuse (substituting *zero* before a mass noun)	**(9):** *JAM: I can see a rabbit and a dog, and the dog is, like, building a castle with **a sand.**
Type 4 (-SR, -HK) and non-referential indefinites	Correct uses	Correct use of zero	**(10):** *ALX: Bored with **sand pits**, the rabbits decided to go in a picnic in a wood.
	Errors	*a/an* omission	**(11):** *ARW: And then she's...magically found this female doctor wearing these pearls and having her...all her medical instruments with her...and she got her, and she is wearing these glasses that she seems like **very great doctor.**
Type 5 (idiomatic and conventional use)	Correct uses	Correct use of *the*	**(12):** *SAR: When he finished, the girl ate her food, but she didn't bring the same as him.
	Errors	*a/an* omission	**(13):** *SHM: Uhhh. The female rabbit, because there were two rabbits, one male and the other female, the female rabbit was very sad and started crying because it took them a long time to build it, and all of sudden, everything fell.

Data coding included some exceptional cases, such as the use of other types of determiners (e.g. *some*, *a lot*, *lots*). In addition, the data exhibited cases of omission with nouns referring to the characters in the story, which were not considered errors. This occurred mainly with the ENS, and the BC was considered in cases in which the nouns referring to the characters (i.e. the animals) were used more like proper nouns, as in examples 4.1 and 4.2 below. Using common nouns referring to animals as proper nouns (i.e. names) seems to be common in narrating children's stories in schools in the UK. Accordingly, based on how it was used in the context, it was not considered an error for the participants in the ENS and BC groups. However, for the BA group, since it was unlikely that they were exposed to aspect in narration and it often occurred inconsistently in the BA data, it was considered an error in this case.

Example 4.1

*JAN: She was very, very proud of her sandcastle. **Rabbit** decided that he would try to help either build another sandcastle or make her sandcastle better.

Example 4.2

*CHR: **Rabbit** ate too much and is feeling very ill.

4.5. Statistical Analysis

First, it was important to confirm whether the data were normally distributed and if they were homogenous to determine which test to apply to the data. SPSS software was used to perform the statistical tests for the data. The normality of the distribution and homogeneity of the variance were checked for accuracy measures for all three groups. Moreover, the normality of the distribution and homogeneity of the variance were examined for error-type proportions by the BC and BA groups. For this purpose, a Shapiro−Wilk normality test and Levene's tests were performed to examine the normality of distribution and homogeneity of

variance for the data of the three groups: BC, BA and the ENS. Descriptive statistics of the mean and standard variation were also obtained to obtain a general overview of the groups' performance.

Table 4.4
Shapiro−Wilk and Levene's Test Results for English Article Use in the English Narrative Pilot Study

		Shapiro−Wilk			*Levene's tests*
		statistic	df	Sig.	Sig
Semantic contexts	[definite, specific]	.334	45	< .001	*p = 0.038*
	[indefinite, specific]	.856	45	*p* < .001	*p = 0.003*
Obligatory contexts	[indefinite, nonspecific]	.342	45	*p* < .001	*p = 0.037*
	the context	.854	45	*p* < .001	*p* < .001
	a/an context	.664	45	*p* < .001	*p* < .001
Errors	*the* overuse in *a/an* context	.661	45	*p* < .001	*p* < .001
	the overuse in *zero* context	.365	45	*p* < .001	*p = 0.330*
	a/an omission	.749	45	*p* < .001	*p = 0.376*
	the omission	.555	45	*p* < .001	*p = 0.794*
	a/an overuse in *zero* context	.378	45	*p* < .001	*p < .001*

Between-group and within-group analyses were conducted. The data was not normally distributed (see Table 4.4). For all accuracy measures and error-type proportions, a Kruskal−Wallis H test, with pairwise *post-hoc* tests, was conducted to examine group disparities in these aspects.

To conduct within-group analyses for the BC, Spearman's correlations were conducted to examine the relationship between the background variables (age, L2AOA,

LORUK, L1 proficiency and L2 proficiency) to the accuracy scores and error-type proportions.

4.6. Results

4.6.1. Use of English Articles per Semantic and Obligatory Context

Tables 4.5 and 4.6 present the number of articles produced across semantic and obligatory contexts, respectively. Based on the results, all three groups (ENS, BA and BC) mostly produced articles within the [definite, specific] context, followed by the [indefinite, specific] context, the idiomatic and the conventional uses of articles, the [indefinite, nonspecific] and the generic contexts, respectively. Concerning the obligatory contexts, the groups mostly produced *the* article, followed by producing *a/an* and *zero*, respectively.

Since the articles produced for the idiomatic and the conventional uses of articles and the [indefinite, nonspecific] and the generic contexts were quite limited by the BC group, the groups' performance was analysed only for the use of English articles in the [definite, specific] and [indefinite, specific] contexts. Table 4.5 presents the results of the descriptive statistics of the mean and the standard variation for the number of items produced in each of the two semantic contexts and obligatory contexts.

Table 4.5
Proportions of Articles Produced per Semantic Context

	Generic	[definite, specific]	[indefinite, specific]	[indefinite, nonspecific]	Idiomatic and conventional uses	Total number of articles produced
ENS	0%	(334) 69.15%	(140) 28.99%	(4) 0.82%	(5) 1.03%	483
BA	0%	(281) 63.15%	(153) 34.38%	(4) 0.90%	(7) 1.57%	445
BC	0%	(250) 71.23%	(99) 28.02%	(0) 0%	(2) 0.57%	351
Means	0%	(865) 67.63%	(392) 30.65%	(8) 0.63%	(14) (1.09%	1,279

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

Table 4.6.

Proportions of Articles Produced in Obligatory Contexts

	The context	*A* context	*Zero* context
ENS	(334) 63%	(126) 26%	(63) 11%
BA	(287) 60%	(126) 29%	(52) 11%
BC	(250) 68%	(86) 25%	(24) 7%
Mean	(871) 64%	(338) 27%	(139) 10%

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

4.6.2. Accuracy of Using L2 English Articles: Analysis of the Language Groups

Descriptive statistics of the mean and standard deviation of the accuracy measures by the three groups are provided in Table 4.7. For overall accuracy in using English articles, the highest accuracy was obtained by the ENS group (M = 99.21), followed by the BC group (M = 88.53) and then the BA group (M = 81.93), respectively. The results of the between-group Kruskal−Wallis tests revealed that the three groups were markedly different from each other ($\chi^2(2) = 24.24$, $p < 0.001$). Post-hoc pairwise comparisons showed that the BA group varied from the ENS group ($p < 0.001$), and the BC group diverged from the ENS group ($p < 0.001$). In addition, the BC appeared to have slightly higher accuracy in the overall use of L2 English articles than BA, but there were no significant differences between the two groups (p= 0.258).

Concerning the accuracy of using L2 English articles in semantic contexts, the groups presented a similar pattern in the [definite, specific] context] in which the Kruskal−Wallis test results revealed significant distinctions between the three groups ($\chi^2(2) = 7.178$, p = 0.028). The follow-up tests showed that the accuracy of the ENS in the [definite, specific context] was significantly higher than the BA group (p = 0.042)**;** similarly, the ENS was markedly higher than the BC group in this aspect (p = 0.012). Moreover, the BC showed a slightly

higher accuracy than the BA in this pattern, but there were no significant divergences between the two groups ($p = 0.625$).

In the [indefinite, specific] context, the highest accuracy was obtained by the ENS group, followed by the BC and then the BA groups, respectively. The results of the between-group Kruskal−Wallis tests revealed that the three groups were importantly divergent in terms of this aspect ($\chi^2(2) = 22.302$, $p < 0.001$). Post-hoc pairwise comparisons showed that the groups were partially different in which the ENS was significantly higher than each BA in ($p < 0.001$) and the BC and ($p < 0.001$) in this context. The BC appeared to have a slightly higher accuracy than the BA in the [indefinite, specific] context, but there were no significant disparities between the two groups ($p = 0.397$).

Within the obligatory context, the use of *the* exhibited the highest accuracy by the ENS group, followed by the BC and BA groups, respectively. The Kruskal−Wallis test results showed significant differences between the three groups ($\chi^2(2) = 7.178$, $P = 0.028$). The follow-up tests showed that the accuracy of the ENS in the [definite, specific] context was notably higher than the BA ($p = 0.042$). Similarly, the ENS was markedly higher than the BC group in this aspect ($p = 0.012$). Additionally, the BC showed a slightly higher accuracy than the BA in using *the*, but there were no significant disparities between the two groups ($p = 0.625$).

Regarding the use of *a/an*, the findings showed that the highest accuracy was achieved by the ENS group, followed by the BC and the BA groups, respectively. The Kruskal−Wallis test results revealed significant distinctions between the three groups ($\chi^2(2) = 20.97$, $p < 0.001$). The follow-up tests showed that the accuracy of the ENS in the [definite, specific] context was markedly higher than in the BA ($p < 0.001$). Likewise, the ENS was significantly higher than in the BC group for the use of *a/an* ($p < 0.001$). The BC revealed a

slightly higher accuracy than the BA in using *a/an*, but there were no significant distinctions between the two groups ($p = 0.379$).

Respecting the use of *zero*, the highest accuracy was achieved by the ENS group, followed by the BC and BA groups. The Kruskal−Wallis test results revealed significant disparities between the three groups ($\chi^2(2) = 12.949$, $p = .002$). The follow-up tests revealed that the accuracy of the ENS in the *zero* context was markedly higher than that of the BA ($p < 0.001$). Additionally, the ENS was slightly higher in the *zero* context than the BC, and the BC was slightly higher in the *zero* context than the BA. However, no crucial variances were found between the ENS and the BC groups ($p = 0.72$) or between the BA and the BC groups ($p = 0.72$).

In summary, the findings suggest that neither the BC nor the BA demonstrated target-like performance in their use of L2 English articles. In all aspects of L2 English article use, apart from the use of articles in the *zero* context, the two groups (the BC and the BA) were markedly less accurate than the ENS group. In the *zero* context, the BC group, unlike the BA group, demonstrated a similar level of accuracy in the ENS group. In comparing the age groups, the BC were generally more accurate than the BA, but no significant distinctions were observed between the BA and BC groups. For all the groups, the findings suggest that more accuracy appears in expressing definiteness and the use of *the* than in expressing indefiniteness and using the indefinite articles *a/an* and *zero*.

Table 4.7

Kruskal−Wallis H and Post-Hoc Pairwise Comparison Results in the Accuracy of Using English Articles in the Pilot English Narrative Study for the ENS, BA and BC groups

		ENS		BA		BC		Kruskal−Wallis H results	Post−hoc pairwise comparison		
Accuracy scores/ number of correct uses		*M*	*SD*	*M*	*SD*	*M*	*SD*		BA-ENS	BC-ENS	BA-BC
General accuracy		99.21 (479.18)	2.23	81.93 (364.59)	13.19	88.53 (310.74)	7.60	(χ^2 = 24.24, p < 0.001, df = 2)	p < 0.001	p < 0.001	p= 0.258
Accuracy per semantic context	[definite, specific] scores	100.00 (334)	.00	93.73 (263.38)	17.86	96.13 (240.33)	6.01	(χ^2 = 7.178, p = 0.028, df = 2)	p = 0.042	p = 0.012	p = 0.625
	[indefinite, specific] scores	97.33 (136.26)	7.04	58.53 (89.55)	26.40	67.47 (66.80)	26.98	(χ^2 = 22.302, p < 0.001, df = 2)	p < 0.001	p < 0.001	p = 0.397
Accuracy per article	Accuracy of using *the*	100.00 (334)	.00	93.93 (269.58)	17.09	96.13 (240.33)	6.01	(χ^2 = 7.178, p = 0.028, df = 2)	p = 0.042	p = 0.012	p = 0.625
	Accuracy of using *a/an*	97.27 (122.56)	7.90	55.07 (69.39)	28.82	64.40 (55.38)	29.42	(χ^2 = 20.973, p < 0.001, df = 2)	p < 0.001	p < 0.001	p = 0.379

Accuracy of using *zero*		93.33 (58.79)	25.82	52.53 (27.32)	41.85	68.87 (16.52)	44.92	(χ^2 = 12.949, p = .002, df = 2)	p < 0.001	p = 0.72	p = 0.72

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

4.6.3. Errors in the L2 English Use of Articles

Table 4.8 presents descriptive statistics of the mean and the standard deviation of the error-type proportions in the use of English articles by the BA and BC groups. The BA groups' errors were mostly in *a/an* omission (52.73%), followed by *a/an* overuse in the *zero* context (18.13%), *the* omission (12.67%), *the* overuse in the *a/an* context (10.87%) and *the* overuse in the *zero* context (5.80%), respectively. For the BC group, the highest number of errors included *the* overuse in the *a/an* context (47.33%), followed by *the* omission (15.13%), *a/an* omission (14.00%) and *the* overuse in the *zero* context (3.53%).

Between-group Mann−Whitney U-test results showed that the BA and BC groups varied significantly in two types of errors: *the* overuse in *a/an* and *a/an* omission. The BC group produced *the* in the *a/an* context significantly more often than the BA group (P = 0.010). Conversely, the BA group produced notably more *a/an* omission errors than the BC group did (P = 0.001).

Table 4.8
Mann−Whitney U-Test Results in Error Production Using English Articles in the Pilot English Narrative Task for the BA and BC Groups

Error type	BA		BC		Mann−Whitney U
	M	*SD*	*M*	*SD*	BA-BC
the overuse in *a/an* context	(0.53) 10.87	16.16	(1.2) 47.33	40.29	U = 51.500, z = -2.643, *p* = 0.010
the overuse in *zero* context	(0.2) 5.80	13.85	(0.13) 3.53	9.64	U = 105.500, z = -0.447, *p* = 0.775
a/an omission	(2.8) 52.73	29.83	(0.53) 14.00	19.71	U = 34.000, z = -3.353, *p* = 0.001
the omission	(1.3) 12.67	22.69	(0.73) 15.13	22.21	U = 104.000, z = -0.408, *p* = 0.744
a/an overuse in *zero* context	(0.6) 18.13	29.25	(0) .00	.00	U = 67.500, z = -2.672, *p* = 0.61

Note. BA: bilingual adults, BC: bilingual children

4.6.4. The Role of Background Variables in Children's Accuracy in Using L2 English Articles

Table 4.9 presents the results of Spearman's correlation tests, which were performed to examine the relationship between the accuracy measures of using English articles by the BC group and age, L2AoA, LORUK, L1 proficiency and L2 proficiency. The findings showed that there is no relationship between children's accuracy in using L2 English articles and the variables of age, L2AoA, LORUK and L1 proficiency. Concerning L2 proficiency, however, the results revealed a significant positive correlation between L2 proficiency and the accuracy of using *zero*, which suggests that, with higher L2 proficiency, children perform better in using the English article *zero*.

Table 4.9

Spearman's Correlation Test Results for the Bilingual Children's Group on the Relationship between Accuracy Measures and the Background Variables of Age, L2AOA, LORUK, L1 Proficiency and L2 Proficiency

Accuracy scores			Age	L2AOA	LORUK	L1 proficiency	L2 proficiency
General accuracy scores		*r*	0.362	-0.339	0.283	-0.454	0.229
		p-value	0.185	0.217	0.306	0.089	0.412
Accuracy per semantic context	[definite, specific] scores	*r*	0.455	-0.044	0.317	-0.256	-0.029
		p -value	0.088	0.876	0.250	0.358	0.919
	[indefinite, specific] scores	*r*	0.247	-0.380	0.348	-0.004	0.431
		p -value	0.375	0.163	0.204	0.989	0.109
Accuracy per article	Accuracy of using *the*	*r*	0.455	-0.044	0.317	-0.256	-0.029
		p -value	0.08	0.876	0.250	0.358	0.919
	Accuracy of using *a/an*	*r*	-0.350	- 0.388	0.424	-0.053	0.369
		p -value	0.200	0.153	0.115	0.850	0.175
	Accuracy of using *zero*	*r*	0.011	0.305	-0.033	-0.086	0.625
		p -value	0.970	0.269	0.906	0.760	0.013

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK

4.6.5. The Relationship between Background Variables and Children's Errors in L2 English Article Use

Table 4.10 presents the results of Spearman's correlation tests, which were performed to examine the relationship between the error proportions the BC produced in using English articles and the independent variables of age, L2AOA, LORUK, L1 proficiency and L2 proficiency. The results found none of the variables portrayed any interaction in producing any of the errors. Interestingly, a marginal positive correlation was exhibited between the L2AOA and the omission of *a/an*, which indicates that the higher the L2AOA, the likelier it is for the children to produce *a/an* omission errors.

Table 4.10

Spearman's Correlation Results for Relationship Error Production by Bilingual Children and Background Variables (age, L2AOA, LORUK, L1 proficiency and L2 proficiency).

Error type		Age	L2AOA	LORUK	L1 proficiency	L2 proficiency
the overuse in *a/an* context	*r*	-0.419	0.307	-0.095	-0.344	-0.266
	p -value	0.120	0.266	0.737	0.210	0.337
the overuse in *zero* context	*r*	0.259	0.025	-0.191	0.205	-0.364
	p -value	0.352	0.929	0.496	0.464	0.183
a/an omission	*r*	0.192	0.481	0.009	-0.005	-0.254
	p -value	0.103	0.070	0.976	0.985	0.360
the omission	*r*	-0.437	0.064	-0.316	0.248	0.02
	p -value	0.103	0.821	0.251	0.374	0.930

Note. L2AOA = second language age of acquisition, LRUK = length of residency in the UK

4.7. Discussion

This section explains the results of the pilot narrative study in light of the research questions. This study is exploratory, aiming at examining the extent to which L1 Arabic−L2 English bilingual children understand the use of English articles. This has been considered regarding the level of accuracy in using L2 English articles within the semantic contexts and obligatory contexts and the extent to which children produce errors. In examining these patterns of English article use, the children's performance was compared to L1 English-

speaking children and other L2 English-speaking children. The external variables of age, L2AOA, LORUK and frequency of using both L1/L2 were considered in discussing the findings.

4.7.1. Research Question 1: For the Acquisition of English Articles

a. To what extent do bilingual Arabic L1−English L2 children understand English article usage?

Understanding English article use requires understanding two aspects: i) the semantic and pragmatic meaning of definiteness and specificity and ii) noun countability in English. With reference to the findings, the children mostly produced articles in two contexts: T2 [definite, specific] (71.23%) and T3 [indefinite, specific] (28.02%). Due to a lack of data in generic T1 and the limited data in T4 [indefinite, nonspecific] and T5 (i.e. conventional and idiomatic uses), examining the generic meaning and specificity besides the conventional and idiomatic use of English articles was not possible with the existing data.

Based on the existing data, the children showed better use of articles in the [definite, specific] (96%) and the use of the definite article *the* (96%) than in the [indefinite, specific] (67%) context and the use of *a/an* (64%) and *zero* (86%), respectively. Accordingly, the order of accuracy starts with *the* followed by *zero* and *a/an*, respectively. These patterns of accuracy suggest that the children were more target-like in expressing definiteness and the use of the definite article *the* than in expressing indefiniteness. This lower accuracy in the [indefinite, specific] context seems to be mainly impacted using *a/an*, which the findings suggest to be more problematic than *zero*. Based on the findings, Hypothesis 1 was confirmed.

b. To what extent do bilingual Arabic L1−English L2 children produce omission and commission errors?

Concerning errors, the presented errors indicate that noun countability does not present a challenge for children. The children mostly produced errors overusing *the* in the *a/an* context

(46%), which contributed to the lower accuracy in using *a/an*. Further omitting *a/an* also resulted in lowering the accuracy of using *a/an* (12%). The groups exhibited a limited overuse of *the* in the *zero* context and no overuse of *a/an* in the *zero* context. The lack of *a/an* overuse in the *zero* context suggests that children mark plural and mass nouns correctly. Omitting *a/an*, however, could contribute to L1 influence due to the lack of indefinite articles in Arabic. The children's error patterns confirmed Hypothesis 2.

The children's performance suggests similarities with both L1 and L2 children in acquiring English articles. The BC group exhibited *the* overuse in the *a/an* context as the most commonly occurring error. In the literature, *the* overuse in the *a/an* context has been viewed as a developmental pattern in the acquisition of L2 English articles within both L1 (Brown, 1973; Warden, 1976; Zehler & Brewer, 1982; Schaeffer & Matthewson, 2005) and L2 children (Ionin et al., 2009; Morales−Reyes & Gomez Soler, 2016; Zdorenko & Paradis, 2008; 2012). Referring to L1 children, this was explained in that L1 children often recognise specificity earlier than definiteness (Schaeffer & Matthewson, 2005). Based on that *the* is associated with specific meaning in children and accordingly this results with substituting *a/an* with *the* in specific indefinite contexts more than in nonspecific indefinite contexts.

Respecting the literature, similar pattern occurred in both L2 young (Zdorenko & Paradis, 2008, 2012) and school-age children (Ionin et al., 2009; Morales−Reyes & Gomez Soler, 2016). In Ionin et al. (2009), children's overuse of *a/an* in definite contexts was limited. In Ionin et al. (2009), *the* overuse errors in indefinite specific contexts were prominent among children, unlike adults, who also had a tendency to also overuse *a/an* in definite nonspecific contexts. Considering that children in this study only produced *the* overuse in [indefinite, specific] contexts without overusing *a/an* in [definite, nonspecific] contexts, the results accordingly aligns with both findings of L1 and L2 children.

Regarding the order of acquisition, however, children's performance in this study was consistent with L2 children's performance in earlier studies, where *the* accuracy is higher than *a/an* confirming earlier mastery of *the* (Ionin et al., 2009; Zdorenko & Paradis, 2008, 2012) as oppose to L1 children where more recent studies showed that L1 children master *a/an* earlier (Schaeffer & Matthewson, 2005).

4.7.2. Research Question 2: How Do Age, L2AOA and Length of Exposure to L1 and L2 Influence Children's English Article Usage?

a. L1 influence

Given the difference between the ENS and BC groups in all accuracy measures, except the accuracy of *zero*, the results indicate that children were generally less accurate than English native speakers. However, the BC group performed well in expressing definiteness and the use of *the*. That and L1 Arabic speakers' familiarity with article use give an indication of L1 Arabic influence. In this, the results align with Master (1987), who proposed that [+ art] L1 is often better than [-art] L1 due to their familiarity with article use in their L1. Furthermore, the findings in this study are consistent with [+art] L1 Spanish speakers (Morales−Reyes & Gómez Soler, 2016; Ionin et al., 2008) and French speakers (Sakro, 2008); their target-like performance was attributed to L1 influence. Given that the Arabic use of the definite article *al-* is like that in English, it can be concluded that L1 Arabic children transferred their familiarity with using *al-* in their use of *the* in L2 English.

Concerning the lower accuracy in the [indefinite, specific] context and the use of *a/an* and *zero*, conversely, the findings are in agreement with studies of L1 Arabic adults, where lower accuracies were similarly found in expressing indefiniteness (Zughoul, 2002; Bataineh, 2005; El−Sayed, 1983). Across these studies, the lower accuracy in indefinite contexts resulted from omitting *a/an* and the lack of Arabic indefinite articles. These findings, being consistent with general findings of other [-art] L1 (e.g. Russian L1 in Ionin et al., 2008), were attributed

to L1 Arabic influence. The findings also align with Sarko (2008, 2009), in which other L1 Arabic adults showed better performance in expressing definiteness. Interestingly, similar findings of lower accuracy in indefinite contexts were found among L1 Spanish school-age children (Morales−Reyes & Gómez Soler, 2016). Unlike the case of L1 Arabic, Spanish includes both definite and indefinite articles. The lower accuracy of using the indefinite context in Morales−Reyes and Gómez Soler (2016) was attributed problematic aspects in respect to using number, as indefinite contexts in English bring additional challenges in the need to differentiate between types of nouns regarding countability.

In addressing the errors of children in this study, the BC group mostly produced errors of overusing *the* in *a/an* contexts (46%). Additionally, *the* was also overused in *zero* contexts to some extent (4%), while *a/an* omission was generally less present in the children's data (12%). Tapping on the dominance of *the* overuse errors in indefinite contexts over *a/an* omission, the results support previous findings in which *the* overuse is viewed as a developmental pattern in the process of acquiring English articles among both L1 and L2 English users (Huebner, 1983; Master, 1997). Accordingly, unlike L1 adults, children's lower accuracy in indefinite contexts is unlikely to result from L1 influence.

b. Age

Reflecting on the difference between bilingual adults and children, the two groups were generally similar in all accuracy measures. Interestingly, however, the two groups' errors varied. The two groups were different respecting two types of errors: *a/an* omission and *the* overuse in the *a/an* context. The BA was notably higher in omitting *a/an* than the BC group; *the* overuse in the *a/an* context was higher in the BC group. As mentioned in the previous section, concerning L1 influence, while *a/an* omission is viewed as a common indicator of L1 Arabic influence due to a lack of indefinite articles in Arabic (Zughoul, 2002; Bataineh, 2005; El−Sayed, 1983), *the* overuse in indefinite contexts is a general developmental pattern.

Accordingly, although the general performance of the two groups is approximately the same, the findings suggest that L1 influence in adults, unlike in children, is more prominent.

c. Influence of L2 age of onset of acquisition, length of residence in UK and L2 proficiency

In examining the impact of L2AoA, LOR in the UK and L2 proficiency, only one pattern of significance was found in which the L2 proficiency positively correlated with the use of *zero*. Given that these factors generally and unexpectedly did not present any statistical relationship with the results of the BC group, it can be assumed that these factors had no impact on children's performance, which accordingly rejects predictions in Hypothesis 3 (a, b, c). However, concerning the small number of participants, this could be due to insufficient data. Regarding L2 proficiency and the accuracy of *zero*, on one hand, the findings are consistent with previous findings in which, with an increase in L2 proficiency in adults, the awareness of the use of L2 English articles is increased (Butler, 2002). However, considering that L2 proficiency was only found in one pattern of accuracy and the subjectivity of how L2 proficiency was measured in children, this pattern could simply be random.

4.7.3. Limitations

Considering the few participants in the study and the small number of stories used to elicit narratives, the data in this study were somewhat insufficient. The limited amount of data affected the conducting of statistical tests, mainly correlation tests. It was decided that more participants and tools should be used for the main study.

CHAPTER FIVE: BIDIRECTIONAL CROSSLINGUISTIC INFLUENCE IN THE ACQUISITION OF ENGLISH ARTICLES BY ARABIC-ENGLISH BILINGUAL ADULTS AND CHILDREN USING A NARRATIVE-ELICITATION TASK

5.1. Introduction

This study aimed to investigate L2 English article use by Arabic−English bilingual adults and school-age children (7−12). The study examined the accuracy and errors of both groups regarding several factors, including L1 influence, age and L2AOA, L1/L2 proficiencies and LORUK. Additionally, the study examined the use of L1 Arabic articles and whether the L2 use of English articles influenced participants' use of L1 Arabic. Similarly, for the Arabic articles, accuracy and errors were examined in terms of the L2AOA, L1/L2 proficiencies and LORUK. The study included two control groups – the ENS and the MAS groups− to compare the performance of the experimental groups in each L2 English and L1 Arabic, respectively. The study aims to answer these research questions:

1. What patterns of English article use do bilingual Arabic−English-speaking adults and children with intermediate to advanced L2 proficiency exhibit during the acquisition of the L2 English language?
2. How do the individual factors of age, L2AOA, L1 (in children) and L2 proficiencies, LOR in an English-speaking country (i.e. the UK) and linguistic factors of the L1 article system impact the acquisition patterns of L2−English articles in adults and children?
3. Does L2 affect L1 use of Arabic articles in Arabic−English bilingual adults and children?
4. How do age, L2AOA, L1 (in children), L2 proficiencies and LOR in an English-speaking country (i.e. the UK) impact the use of L1 Arabic articles in adults and children?

5.2. Methodology

5.2.1. Participants

The study recruited four groups: 40 Arabic−English bilingual adults (BA), 13 Arabic−English bilingual children (BC; age 7.84–12.45), 39 adult Arabic monolingual speakers (MAS) controls and 30 adult English native speakers (ENS) controls. Before the experiment, demographic information about the participants was obtained. This was done via a sociolinguistic background questionnaire (Anderson at al., 2017; see Appendix 1), a *Test for Reception of Grammar* (TROG) which measures grammatical knowledge in L2 English and an Arabic sentence comprehension task (ASCT) (Shaalan, 2010) to measure the comprehension of L1 Arabic grammar in the children's group. The questionnaire was adapted to fit the aims of the current study and was given to the two bilingual groups to determine their level of engagement in using each language. This questionnaire was given to both bilingual groups and to MAS group to determine their level of knowledge and usage of English. Although the MAS group is meant to be only speakers and users of Arabic, English is taught in school and used in certain domains and contexts in Saudi Arabia. A description of the questionnaire is provided in Section 4.2 in Chapter Four.

Regarding the TROG test, to determine the participants' level of L2 English proficiency, the bilingual groups performed a revised version of Bishop's (1983, 2003) TROG 2. Speech therapists initially used the TROG to identify speech impairments among monolingual children. Later, the test was used among bilingual children to examine their level of understanding of grammar (e.g. Crutchley et al, 1997). Eventually, an improved version (TROG-2) was designed to be used not only for children but also bilingual adults. For comparison purposes, the test was also performed by the ENS group in this study.

Many children started acquiring L2 English very young, and considering the possibility that their proficiency in L1 Arabic might not be sufficient, it was important to obtain

information about their proficiency level in Arabic. Correspondingly, The ASCT was administered to the BC group. Due to the lack of standardised tests examining the comprehension of colloquial Gulf Arabic, Shaalan (2010) designed this test based on Al Akeel's (1998) test to assess the sentence comprehension of Gulf Arabic-speaking children (age 6−9). The test examines syntactic, morphological and morph-syntactic structures (Appendix 5). Therefore, it is the only reliable source with which we must measure children's proficiency in colloquial Gulf Arabic. It combines two sections, consisting of 22 and 18 items, respectively, forming a total of 40 items. The test instructs the children to choose one of four pictures that display the target structure. One of these pictures forms the correct answer, while the rest of the pictures are distracting items that are drawn to be semantically related to the target item. For example, for Item 14, 'The girl is not painting', the distracting items illustrate a girl performing disparate actions, which include painting and other activities (e.g. writing, playing).

a. The bilingual adult group

Table 5.1 summarises the information from the questionnaire for the BA group. The BA group (age 25−42, *M* = 31.7) are considered late learners of English. They acquired Arabic as a first language in their home countries and started learning English in school between the ages of 6–12 and 12, the age of 6−12 (*M* = 11.03), with little exposure to English from the environment until their arrival in the UK. Most participants had started learning English in public intermediate school at 11−13 years old. However, eight participants had started a bit earlier, between six and 10 years of age. In Saudi Arabia, English is taught in school four hours a week, with a greater focus on learning grammar rules and reading than on speaking and writing skills. As English is only used within some educational and professional environments, opportunities to practise spoken English are very limited. When this study was conducted, the subjects were postgraduate students in the UK and had spent 0.5 to 9.1 (*M* =

3.32) years in the UK. TROG-2 results varied between 55 and 109 (*M* = 84.825) suggesting varying levels (between intermediate to advance) of proficiency in L2 English.

Table 5.1
Demographic Information of the Bilingual Adult Group

BA participants	Age	L2AOA	LORUK	LORBC	TROG-2 standard score
Range	25−42	6−13	0.5−9.1	18−40	55−109
Mean	31.72	10.9	3.32	28.03	84.83
SD	5.32	1.997	2.25	5.04	17.32

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK, LORBC = length of residency in birth country, TROG = test for the reception of grammar.

b. Monolingual Arabic speakers

The Arabic control group included 39 adult female participants (age 29-49, *M* = 39.05). For official and cultural reasons, it was difficult to obtain data from male participants. Therefore, the data for this group included only female participants. The data for this group were collected in Qatif, Saudi Arabia. The participants in this group worked as administrators in the education office of Qatif. These individuals were classified as monolingual based on their answers to the questionnaire in which their level of engagement in using English and Arabic was determined; English was either of a minimum use or not used at all. Initially, the questionnaire was given to 41 subjects. However, two were excluded, as one was an English language graduate. The other had previously studied in the US for her master's degree.

c. English native speakers

The ENS group included 30 adult participants (29 from England and one from America). Being an adult native speaker of English was the only requirement for the selection of

participants in this group. All were from the UK, except one, who was American. The participants were either university students or had a university degree at the time of the experiment. They performed the TROG test to compare their findings regarding the bilingual groups. The group included 19 females and 11 males; most participants in this group were students and academic staff at the University of Reading. The TROG-2 scores of this group ranged from 85 to 109 (*M* = 98.97; see Table 5.2), which suggests generally advanced levels of proficiency.

Table 5.2
TROG-2 Standard Scores for the English Native Speakers' Group

ENS participants	*TROG-2 standard scores*
Range	*85−109*
Mean	*98.97*
SD	*6.53*

Note. TROG = test for the reception of grammar

d. The bilingual children's group

Table 5.3 provides demographic information about the BC group, which included Arabic−English bilingual children aged 7.84−12.45 (*M* = 10.04). This group varied in their L2AOA between zero and eight (*M* = 4.15). This group of bilinguals acquired Arabic as a first language in their home countries before arriving in the UK. Eight of these children had started learning English early at home or in kindergarten (age 0−4), while six started after entering school (age 6−8). LORUKs for this group ranged between 0.5−4 years (*M* = 2.23). ASCT results revealed a score between 77.5−95 (*M* = 87.88), which generally indicates a high level of proficiency in L1 colloquial Gulf Arabic. The TROG-2 score, however, ranged between 55−90 (*M* = 69.8), which indicates varying levels of proficiency in L2 English between intermediate to advance.

Table 5.3
Demographic Information of the Bilingual Children's Group

Children participants	Age	L2AOA	LORUK	LORBC	Arabic comprehension	TROG standard score
Range	7.84−12.45	0−8	0.5−4	4−10	77.5−95	55−90
Mean	10.04	4.15	2.23	7.45	87.88	69.77
Standard deviation	1.351	2.48	1.47	2.04	5.76	10.39

Note. L2AOA = second language age of acquisition, LRUK = length of residency in UK, LORBC = length of residency in birth country, TROG = test for the reception of grammar

5.2.2. Ethics

Like the pilot study (Section 4.2.2), an information sheet and a consent form were given to each participant (or to the parents in the case of the children). The information sheet included a description of the tasks that the participants were required to perform for this study and the SRT study (Chapter 6). The information sheet included four versions targeting participants of the groups: the BA, the BC, the ENS and the MAS (appendix 6).

In the information sheet of the BA group, the participants were told that they would perform several tasks in two sessions a week apart: one session in which English was used and another in which Arabic was used. For the English session, they were asked to fill out a questionnaire and perform a simple English proficiency task besides a story-telling task and an SRT in English. For the Arabic session, they were asked to perform an Arabic version of a storytelling task and an SRT. In the information sheet for the children, similarly, the children were asked to perform the same tasks in two sessions (Arabic and English), apart from the Arabic SRT. Additionally, in the Arabic session, the children were asked to perform an Arabic proficiency task.

The control groups were asked to perform the tasks on their information sheets in one session only, a session in English for the ENS group and a session in Arabic for the MAS

group. For the ENS group, they were asked for the English versions of the story-telling task and the SRT besides the proficiency task. For the MAS group, the Arabic versions of the story-telling task and the SRT were requested. In addition, they were asked to answer the questionnaire (in Arabic).

For all four versions of the information sheet, an explanation of how the data would be maintained is provided in Section 4.2.2. Concerning the consent form, the subjects (or parents, in the case of children) were informed that, by signing these forms, they agree to participate in the study. They were also informed of their right to withdraw from the study at any point.

5.2.3. Materials

Article-use data in English and Arabic were collected via a narrative-elicitation task. The narrative-elicitation task was adopted from the Edmonton Narrative Norms Instrument (www.rehabresearch.ualberta.ca/enni). The task comes in the form of two sets of stories (A and B) and a training story (T) (appendix 3). The same sets of stories described in the pilot study (Section 4.3) were used in this study. For this study, two stories from each set were selected (A2, A3, B2 and B3) besides the training story. These stories were initially in pictorial form and were presented in A4 size. However, following COVID-19 situation, they were presented online in a PDF document in a shared screen. As depicted in Table 5.4, the training story (T) presented six pictures showing two characters (a boy and a shopkeeper) in a supermarket. The rest of the four stories are experimental. Each of the second stories (A2) and the fourth story (B2) consists of eight pictures, while the third story (A3) and the fifth story (B3) have 13 pictures. Both the second story (A2) and the third story (A3) involve the same main characters (an elephant and a giraffe). The fourth story (B2) and the fifth story (B3) include the same main character (a rabbit and a dog). Each of the four stories involves diverse sets of events in which new characters and objects are introduced for all the types of

articles and semantic contexts. The fourth story and the fifth story are slightly longer and contain more characters and events than the second and third stories, which allows more noun production in the data. The task of the participants was to narrate the story depicted in the pictures.

Table 5.4

Main Characters of the Pictorial Stories in the Elicited Narrative Task

The stories		The characters
The training story	T	A boy and a shopkeeper
Stories in Set A	A1	An elephant and a giraffe
	A2	
	A3	
Stories in Set B	B1	A rabbit and a dog
	B2	
	B3	

5.2.4. Procedure

Each person individually performed this task in the four groups. Bilingual groups performed the task twice, once in English and the other in Arabic, one week apart. Before the task, the examiner gave each participant instructions using the language intended for that session. The instructions were repeated for each story. The instructions stated that the participants would begin describing the story in the language of that session. The pictures were visible only to the participants during the entire experiment to ensure that no shared knowledge was developed for newly introduced items. Participants were notified of this often and told to describe everything they saw. Following COVID-19, the data collection was set online and was continued only with the adult participants considering that it was too

challenging for children to focus in the online situation. In the online setting, the images were presented in a shared screen by using Zoom software which the participants viewed through their own computers/laptops. The same instructions of the face-to-face situation were used in the online situation except that the participants were told to pretend that the examiner is not able to view the images and narrate the stories accordingly.

In both situation, each participant was introduced to the five stories in one session (using the target language of that session), which lasted between six and 15 minutes. When the participants did not provide enough details, they were told to describe more and be more specific using questions such as 'Can you tell me more about what is happening?'. For each subject, the narrations were audio-recorded using an audio recorder application on a mobile phone device. Thereafter, the narration of the four main stories for each participant was transcribed and coded using the CLAN and CHILDES tools (MacWhinney, 2000).

5.3. Data Analysis

The same method of analysing the narrative pilot study data (Section 4.3) was followed in analysing the main data (both Arabic and English narrative data). The analysis of the narrative concerned mainly article use in all common nouns used to refer to the characters and describe the events of the story. For the Arabic and English, the data were analysed for the correct and incorrect uses of articles (*a/an*, *the* and *zero* in English, as well as *al-* and *zero* in Arabic) across the four semantic contexts: generic, [definite, specific], [indefinite, specific] and [indefinite, nonspecific]. In addition, unlike the pilot study, for the English data in the current study, the use of countability and numbers with common nouns was also analysed. English article usage was considered correctly used by the participants if they could: 1) detect whether there is shared knowledge with the speaker, 2) make a specific/nonspecific distinction and 3) understand noun countability/number. For the Arabic data, only the first

two aspects were considered. The third was not because Arabic articles do not mark number noun countability. Indefiniteness in Arabic for both singular and plural and uncountable nouns is always marked by *zero* articles.

In this study, the instructions of the main study were changed to ensure that indefinite contexts were treated as indefinite, which included alternating the order of the stories that had the same main characters and notifying the participant to deal with each story as a separate story, ignoring any similarity with the other stories presented. This was based on the results of the pilot study (Section 4.6), in which the participants mistook indefinite nouns for definite. However, the same process of analysis of the pilot study was used when the participants appeared to ignore these instructions and dealt with subsequent stories as continuations. In the narrative data for both versions, contexts were identified and coded before conducting any quantitative analysis based on semantic contexts. The coding was based on analysing contexts with discourse analysis, discerning specific and nonspecific contexts and determining whether shared knowledge existed between the speaker and the listener.

In determining incorrect uses, errors in the English narrative data included the omission of articles (see Example 5.1), substitution (see Example 5.2) and pluralisation errors (see Example 5.3) in English data. Pluralisation errors were determined from the context and exhibited either by omitting the final *-s* from the noun or when an *-s* is added to a singular noun.

Example 5.1

Omission of a/an

BA6: Ok, there is ***swimming pool*** and ***elephant*** and, I think, ***giraffe***. They may...they want to swim.

Example 5.2

Substituting* the *for a/an in the first-mentioned noun

BA19: And ***the other elephant***, I think, elephant guy, try to help her.

Example 5.3

-s plural is added to a singular noun.

BA33: And the donkey has ***small toys*** like the helicopter, and he wants to make them fly.

Since Arabic articles do not encode countability, it was not considered here. However, since Arabic exhibits distinctions from English in the NP structure, which includes two or more word combinations (see Section 2.2.2.), some considerations were taken in the analysis based on the type of Arabic NP appearing in the data: i) noun adjective phrases and ii) ‘iDaafa phrases (i.e. annexation).

In a noun adjective phrase, the adjective(s) agree with the noun in gender, number and definiteness (AlHawary, 2011; Owen, 2013). Accordingly, in the case of definite adjective noun phrases, the adjective is treated like the noun, and *al-* is attached to each noun and adjective. In ‘iDaafa phrases in which the noun phrase includes two or more nouns, conversely, indefiniteness/definiteness is determined by the last noun (i.e. the main noun) in the phrase. In definite ‘iDaafa phrases, only the last noun in the phrase is marked by *al-*, while all preceding nouns are marked by *zero*. However, for indefinite ‘iDaafa phrases, all nouns, including the last noun, are marked by *zero*. Thus, the errors will be: In definite noun adjective phrases, not adding *al-* to adjectives was treated as an omission error. Conversely, in definite ‘iDaafa phrases, adding *al-* to the noun preceding the main noun was considered an overuse of *al-*.

Table 5.5 identifies newly mentioned nouns that are likely to be indefinite for each story. Further details on how new nouns were identified are provided in Appendix 4.

Table 5.5

Expected Indefinite Nouns Likely to Appear in Narrative Data

The story	Newly introduced items/characters
Story A2	(a) giraffe (an) elephant (a) swimming pool/pool (a) sign (a) lifeguard/guard (b) plaster/bandage
Story A3	(a) giraffe (an) elephant (a) swimming pool/pool (a/an) toy airplane/airplane (a) lifeguard/guard (a) second lifeguard/lady elephant (a) net/fishing net
B2	(a) rabbit (a) dog (a) picnic (a) mat/picnic blanket (a) carrot (zero) sandwiches (zero) cheese (zero) pickles (a) cake (a) doctor
B3	(a) rabbit (a) dog (a) carriage/car (a) balloon (a) man/balloon seller (zero) balloons (a) balloon (zero) money (a) rabbit/person (a) balloon

5.4. Data Coding

5.4.1. English Narrative Coding

The data included various patterns of English article use and errors. For each of these patterns, a particular code was used in CLAN. Table 5.6. presents correct and incorrect uses within each semantic context that existed in the data. The use of *generics* was very limited in the data and exhibited only two patterns, which included correct uses of *the* and *zero,* as presented in items (1) and (2), respectively. For the [definite, specific] contexts, where *the* is used, the data included correct uses of *the* in item (3) and two error patterns, *the* omission in (4) and *a/an* overuse as in (5). For the [indefinite, specific] context, where *a/an* and *zero* were used, eight patterns were exhibited in the data. For this context, the data included correct uses of *a/an* and *zero* as in (6) and (7), respectively. In addition, the data included errors of *a/an* omission (8), *a/an* overuse (9), *the* overuse substituting *a/an* (10), *the* overuse substituting *zero* (11) and pluralisation errors, as in (12) and (13), respectively. Similar patterns were also presented in the [indefinite, nonspecific] context. For this context, the data included correct uses of *a/an* and *zero,* as in (14) and (15), respectively. The data also included errors of *a/an* omission (16), *a/an* overuse (17) and pluralisation errors, as in (18). However, for the [indefinite, nonspecific] context *the* overuse, substituting *a/an* or *zero* did not occur in the data.

Table 5.6
Patterns of English Article Use and Errors in English Narratives

Context	Patterns		Example	Code
Generic	Correct use of *the*	1	B22: The one balloon is five...is for one. Is five pounds.	T1D
	Correct use of *zero*	2	BA1: So, another lifeguard who was a woman and women are superheroes seemingly.	T10
[definite, specific]	Correct use of *the*	3	BC5: There is an elephant and a giraffe. BC5: The elephant wanted to jump in, and then the giraffe was standing still (second-mentioned nouns).	T2D
	The omission	4	BA20: Now the doctor tries to see which is the problem has in number two. BA20: I think now doctor tried, I think, to treat the number two, and it is going to go hospital or something like that.	E20
	An overuse	5	BA20: I see an elephant with donkey, I think, yeah.	E2A

			*BA20: I think a donkey tries to do something wrong, and an elephant is shocked or something like this.	
[indefinite, specific]	Correct use of *a/an*	6	BA4: The lifeguard put a bandage on her knee.	T3A
	Correct use of *zero*	7	BA1: Ok, there were two rabbits walking alone down the forest who has...who had baskets (a first-mentioned noun).	T30
	A/an omission	8	BA6: Ok, there is swimming pool and elephant and, I think, giraffe. They may...they want to swim.	E30
	A/an overuse (in the *zero* context)	9	A rabbit father came and maybe give him a money to take a balloon.	E3A
	The overuse in the *a/an* context	10	BA19: And the other elephant, I think, elephant guy, try to help her (a first-mentioned noun).	E3D-A
	The overuse in the *zero* context	11	BC2: Once upon a time, there was a...two bunnies going on a walk. *BC2: And one bunny was really, really greedy, and he ate all the food (a first-mentioned noun).	E3D-0
	Pluralisation errors (adding *-s*)	12	BA18: Elephants with giraffe with, I don't know, with cow?…with cow with cow. They like swimming.	CE30
	Pluralisation errors (omitting *-s*)	13	BA2: So, there is two rabbits with their baskets, lunch basket or something…with picnic basket.	CE30
[indefinite, nonspecific]	Correct use of *a/an*	14	BA1: Uh, she might looked. ...She might have looked impressed by the plane, so she grabbed that plane toy... it's... I believe it was a toy.	T4A
	Correct use of *zero*	15	BA28: They are walking...or wait. It's a dog...ok, they are walking in the garden, I think. I think they are not rats. The female is a dog, and the male is a rabbit, sorry.	T40
	A/an omission	16	BA15: I don't know why he went; I think she went. She looks like she's a girl.	E40
	A/an overuse (in the *zero* context)	17	BA23: I think it's not floor, sorry, maybe it's a water or something, maybe.	E4A
	Pluralisation errors	18	BA28: Oh, there is another rabbit came with a coat. Yeah, I think he's the father of the female rabbit, and the small rabbit goes to his father, maybe for asking for moneys...money, sorry.	CE40

5.4.2. Arabic Narrative Coding

In the Arabic narrative data, disparate patterns of Arabic article use and errors were revealed in the four semantic contexts. Table 5.7 presents an example of each pattern. Like the English narrative, the use of generics in Arabic narratives was limited. The data exhibited one pattern in the use of generics for Arabic articles represented in the correct uses of *al-* as in (1). For the [definite, specific] context, the data exhibited a pattern of correct uses of *al-* with both nouns and adjectives, as in items (2) and (6), respectively. Errors in this context, however, were only exhibited with nouns and included *al-* overuse as in (4) and *al-* omission (5). In the [indefinite, specific] context, where *zero* is used, the data presented correct uses of *zero* with both nouns and adjectives, as in (7) and (9) and the error of *al-* overuse as in (8)

and (10). In the [indefinite, specific] context, the data presented correct uses of *zero* with both nouns and adjectives, as in (11) and (12).

Table 5.7

Patterns of Arabic Article Use and Errors in Arabic Narratives

Context	Type of word	Pattern	Item	Example	Code
Generic	Nouns	Correct use of *al-*	1	MA21: طبعا هو قال لهم شايفين كيف هو خطأ, قام يوجههم أن الواحد مايلعب جنب المسبح **Translation**: Of course, he told "you see, that's wrong", and he instructed them that **a person** should not play near the pool.	T1AL
[definite, specific]	Nouns	Correct use of *al-*	2	MA7: شخصيات كرتونية, فيل وزرافة رايحين المسبح **Translation:** Cartoon characters, an elephant and a giraffe going to **the pool** MA7: الفيل عرض أنهو بيسبح, بينط في البركة **Translation: The elephant** suggested that he swims, he jumps into the pool	T2AL
		Correct use of *zero*	3	MA5: ماقدروا يمسكوها, وعصب صاحب البالونة **Translation:** They couldn't catch it and the balloon's **owner** got angry.	T20
		Overuse of *al-*	4	BA12: وبعدين الفيل الحارس يأشر لها على اللوحة التعليمات, إن المفروض ممنوع تركظين **Translation:** and then the elephant guard showed her **the instruction sign** and that she shouldn't jump	E2AL
		Omission of *al-*	5	MA28: جابت الحصان أدوات الإسعافية إلا تسعف الفيل **Translation:** The horse brought **first aid tools** to help the elephant. BA23: حاولت في إنتشال اللعبة من المسبح, فيلة, عشان ترجعها لصديق الفيل **Translation:** She tried to get the toy out of the pool, **elephant**, to give it back to the elephant's friend	
	Adjectives	Correct use of *al-*	6	BA5: جا فيل ثاني للمساعدة **Translation:** Another elephant arrived to help *BA5: قعد فحص رجل الفيل الأول إللي طاح **Translation:** he then examined **the first elephant'** foot, the one who fell	TA2AL

[indefinite, specific]	Nouns	Correct use of *zero*	7	MA13: كان في فيل ويمكن زرافة في مسبح وكانوا متحمسين جداً إلى السباحة مع إن كان في إشارة, لا إشارة عدم الجري **Translation: T**here was **an elephant**, and possibly **a giraffe**, in a pool, and they were very excited to swim and there was a sing, ..no a sing of "no running"	T30
		Overuse of *al-*	8	MA21: الفيل والزرافة متحمسين كانوا وحبوا يطبوا في المسبح إلى قدامهم (first-mentioned nouns) **Translation: The elephant** and **the giraffe** were excited and they wanted to jump into the pool in front of them	E3AL
	Adjectives	Correct use of *zero*	9	BA5: جا فيل ثاني للمساعدة **Translation: A second elephant** arrived to help	TA30
		Overuse of *al-*	10	MA22: جا الفيل الثاني.. مادري مين.. ابوه ولا أحد, لمساعدته مع الحمار (first-mentioned noun) **Translation: The second elephant (a second elephant)** came.. I don't know who.. his father or someone else.. to help him with the donkey	EA3AL
[indefinite, nonspecific]	Nouns	Correct use of *zero*	11	MA10: هذي شكلها نزهة.. في بنت؟.. أي بنت وولد جاي إليها, إلتقوا في الطريق يعني, رحبوا ببعض **Translation:** This looks like **a picnic**.. there is a girl and a boy coming to her. They met on the way. They welcomed each other.	T40
	Adjectives	Correct use of *zero*	12	MA7: إستحرق فيها المدرب قال ليها لا تركضي مرة ثانية في المسبح **Translation:** The coach shouted at her and said "don't run **a second time** in the pool"	TA40

5.5. Quantitative Analysis

Once correct uses and errors were selected and coded, calculations were done to determine the number of items per semantic context and per obligatory context as well as the number of errors within these contexts for each participant in each group using CLAN tools. The data were then transferred to Excel for further analysis.

Several analyses were performed using Excel:

1) Average mean percentages of the correct use of articles in each semantic and obligatory context were obtained concerning the overall number of items in each context.

2) Thereafter, the average mean of the English and Arabic article accuracy scores were included per semantic context for each of the English and Arabic data. As the number of articles was very limited for the generic context, it was excluded from the analysis.

3) Accuracy scores were obtained for each article used in the English and Arabic data based on the obligatory contexts for these articles. Accordingly, for English narrative data, accuracy scores were calculated for the use of *the*, the use of *a/an* and the use of *zero*. For the Arabic data, however, accuracy scores were determined for the use of *al-* and the use of *zero*.

4) An overall accuracy score was also obtained for the overall use of the Arabic article system and the English article system. To attain this, a calculation of the sum of all items/articles in all semantic contexts was done, followed by a calculation of all correct uses in all semantic contexts. The average mean percentages of the correct use of articles to the overall number of articles in all contexts was computed to obtain accuracy scores in the form of percentages.

$$\textbf{Proportion of correct article use} = \frac{\text{a sum of all correct uses in all semantic contexts}}{\text{sum of all the items/articles in all the semantic context}} * 100$$

5) With regard to errors, as presented in tables 5.6 and 5.7, they were categorised for each of the Arabic and the English narrative data. For the Arabic narrative data, error categories were classified under two categories: *al-* omission and *al-* overuse. For the English narrative data, conversely, the errors were classified under seven categories: *the* overuse in the *a/an* context, *the* overuse in the *zero* context, *the* omission, *a/an* omission, *a/an* overuse in the *the* context, *a/an* overuse in the *zero* context and pluralisation errors. For each error category, the number of errors was calculated and compared to the overall number of errors for those data to obtain error proportions in the form of percentages.

5.5.1. Statistical Analysis

SPSS software was used to conduct the statistical analyses. First, the normality of distribution and homogeneity of variance for the data were checked to determine the type of

tests (parametric or nonparametric) to use for analysing the data. The normality of the distribution and the homogeneity of the variance were examined for: i) accuracy scores, for each of the overall scores and accuracy scores per semantic context and per article form (i.e. obligatory context), and ii) error-type proportions. For all three aspects, a Shapiro−Wilk normality test and Levene's tests were conducted.

Descriptive statistics of the mean and standard deviation were then performed to obtain a clearer idea of the performance of the groups.

Given that the data for each Arabic and English narrative were not normally distributed for any aspects (see Shapiro−Wilk test results in tables 5.8 and 5.9), nonparametric tests were used. Two types of nonparametric tests were conducted for a between-group and a within-group analysis: On the one hand, English responses within the groups ENS, BA and BC were compared. For this, a between-group Kruskal−Wallis H test, with pairwise *post-hoc* tests, was performed to examine if there are disparities in the accuracy scores and the amount of each type of error in using English articles. To compare the levels of accuracy in the semantic contexts and in the obligatory contexts, within-subjects Friedman's tests and follow-up Wilcoxon signed-rank tests were conducted. In Arabic, BA, BC and MAS were compared concerning their responses. Similarly, a Kruskal−Wallis H test with pairwise *post-hoc* tests was also performed to examine the difference in the accuracy scores and errors in Arabic article use. To compare levels of accuracy in the semantic contexts, the within-subjects Friedman's test and follow-up Wilcoxon signed-rank tests were conducted. To compare the levels of accuracy in the obligatory contexts, the Wilcoxon signed-ranks test was performed.

Finally, to examine whether the independent variables LORUK, L2AOA, the L2 proficiency score and L1 proficiency affect accuracy measures and the number of errors, within-group Spearman correlations were performed for each of the Arabic and the English narrative data.

Table 5.8

Shapiro–Wilk and Levene's Test Results for English Article Use in the English Narrative

Aspect of the data	Pattern	Shapiro–Wilk			Levene's tests
		Statistic	df	*p* value	*p* value
Overall accuracy		.778	71	$p < .001$	$p < .001$
Accuracy per semantic context	[definite, specific]	.435	71	$p < .001$	$P = .009$
	[indefinite, specific]	.852	71	$p < .001$	$p < .001$
	[indefinite, nonspecific]	.597	71	$p < .001$	$p < .001$
Accuracy per obligatory context	*the* context	.435	71	$p < .001$	$p = .009$
	a/an context	.839	71	$p < .001$	$p < .001$
	zero context	.687	71	$p < .001$	$p < .001$
Errors	Overuse in *a/an* context	.754	71	$p < .001$	$p < .001$
	Overuse in *zero* context	.335	71	$p < .001$	$p < .001$
	a/an omission	.919	71	$p < .001$	$p = .014$
	the omission	.805	71	$p < .001$	$p < .001$
	a/an overuse in the *the* context	.515	71	$p < .001$	$p = .102$
	a/an overuse in the *zero* context	.455	71	$p < .001$	$p < .001$
	pluralisation errors	.409	71	$p < .001$	$p < .001$

Table 5.9
Shapiro−Wilk Test and Levene's Test Results for Arabic Article Use in an Arabic Narrative

		Shapiro−Wilk			Levene's tests
		Statistic	df	*p* value	*p* value
Overall accuracy		.615	76	$p < .001$	$p < .001$
Accuracy per semantic context	[definite, specific]	.202	76	$p < .001$	$p < .001$
	[indefinite, specific]	.705	76	$p < .001$	$p = .024$
	[indefinite, nonspecific]	.194	76	$p < .001$	$p = .150$
Accuracy per obligatory context	*al-* context	.166	76	$p < .001$	$p < .001$
	zero context	.709	76	$p < .001$	$p = .024$
Errors	*al-* omission	.485	76	$p < .001$	$p < .001$
	al- overuse	.485	76	$p < .001$	$p < .001$

5.6. Results

5.6.1. English Narrative

5.6.1.1 Total Article Production per Semantic and Obligatory Context in the English Narrative

Table 5.10 presents the mean average and standard deviation for the number of items produced in each semantic and obligatory context. Based on the results for each of the three groups (BA, ENS and BC), articles/items were mostly produced in the [definite, specific] context, followed by the [indefinite, specific] and then the [indefinite, nonspecific] context, respectively. For obligatory contexts, for each of the three groups, the highest number of articles was produced in the *the* context, followed by the *a/an* and then the *zero* contexts, respectively. Article productions in the [definite, specific] context for each of the three

groups dominated the two indefinite contexts. Similarly, for each of the three groups, the use of *the* was higher than for both indefinite articles (*a/an* and *zero*).

Table 5.10
Mean Average of English Article Production Per Semantic and Obligatory Context in the ENS Group, the BA Group and the BC Group

		ENS		BA		BC	
	Number of items	*M*	*SD.*	*M*	*SD.*	*M*	*SD.*
Semantic contexts	[definite, specific]	(78.43) 71.89%	38.68	(63.20) 70.43%	21.76	(62.31) 74.11%	20.81
	[indefinite, specific]	(27.13) 24.87%	12.04	(22.05) 24.57%	5.611	(19.31) 22.97%	4.87
	[indefinite, nonspecific]	(3.53) 3.23%	3.14	(4.48) 4.99%	4.03	(2.46) 2.92%	1.66
Obligatory context	*the* context	(78.43) 71.89%	38.68	(63.22) 70.40%	21.78	(62.31) 74.11%	20.81
	a/an context	(25.8) 23.64%	8.185	(22.00) 24.50%	6.94	(18.77) 22.32%	5.61
	zero context	(4.9) 22%	7.12	(4.58) 5.10%	3.17	(3.00) 3.57%	1.87

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

5.6.1.2. Order of Accuracy in Using English Articles in Semantic and Obligatory Contexts

For each group, the order of accuracy was determined across semantic and obligatory contexts. To confirm whether this order was comparable, within-subjects Friedman's tests and follow-up Wilcoxon signed-ranks tests were conducted to examine if there were significant disparities between accuracy measures within these contexts for each of the three groups. The results of these tests are in tables 5.11 and 5.12.

For accuracy in using articles in semantic contexts, the ENS group, which is the control group that will serve as a comparison, exhibited the highest accuracy in the [indefinite, nonspecific] context (M = 99.11), followed by the [definite, specific] context (M = 98.73) and then the [indefinite, specific] context (M = 93.62), respectively. As presented in Table 25, Friedman's test results revealed that, for the ENS, there was a significant difference in the levels of accuracy across semantic contexts ($\chi^2(2) = 26.88$, $p < 0.001$). Follow-up Wilcoxon signed-ranks test results showed a significant divergence between the accuracy of

the [definite, specific] and the [indefinite, specific] (Z = -3.80, p < 0.001, r = -0.49), between the [definite, specific] context and the [indefinite, nonspecific] (Z = -2.56, p = 0.011, r = -0.33) and between the [definite, specific] and the [indefinite, nonspecific] context (Z = -3.35, p < 0.001, r = -0.43). The findings confirm that there was a disparity in ENS's use of English articles across these contexts.

Table 5.11

Friedman's Within-Subject and Wilcoxon Signed-Rank Test Results for Accuracy Measures Across Semantic Contexts for the ENS Group, the BA Group and the BC Group

Group	Friedman's test results	Wilcoxon signed-rank test results		
		[definite, specific]-[indefinite, specific]	[definite, specific]-[indefinite, nonspecific]	[indefinite, specific]-[indefinite, nonspecific]
ENS	$\chi^2(2)$ = 26.88 p < 0.001	Z = -3.8 p < 0.001	Z = -2.56 p = 0.011	Z = –3.35 p < 0.001
BA	$\chi^2(2)$ = 19.63 p < 0.001	Z = -5.26 p < 0.001	Z = -2.39 p = 0.019	Z = -1.18 p = 0.24
BC	$\chi^2(2)$ = 12.20 p = 0.002	Z = -2.98 p = 0.003	Z = -0.17 p = 0.866	Z = -1.16 p = 0.248

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

The BA group, however, presented the highest accuracy in the [definite, specific] context (M = 94.43), followed by the [indefinite, nonspecific] context (M = 72.99) and then the [indefinite, specific] context (M = 66.92), respectively. Friedman's test results revealed that, for the BA, there were marked variations in accuracy levels across semantic contexts ($\chi^2(2)$ = 19.63, p < 0.001). Follow-up Wilcoxon test results revealed a significant difference in accuracy between the [definite, specific] and the [indefinite, specific] context (Z = -5.26, p < 0.001, r = -0.59) and between the [definite, specific] and the [indefinite, nonspecific] context (Z = -2.39, p = 0.019, r = -0.27). Notably, the distinction between accuracy measures across contexts was small. Generally, the findings indicate that the BA is more accurate in encoding definite meaning than in encoding indefinite meaning; the accuracy in [indefinite,

specific] and the [indefinite, nonspecific] contexts are similar due to a lack of statistical significance.

Like the BA, the BC group had the highest accuracy in the [definite, specific] context (*M* = 98.99), followed by the [indefinite, nonspecific] context (*M* = 87.50) and then the [indefinite, specific] context (84.88%). Friedman's test results revealed that, for the BC, there was a significant difference in the levels of accuracy across the semantic contexts ($\chi^2(2) = 12.20$, $p = 0.002$). This was particularly evident for accuracy between the [definite, specific] and the [indefinite, specific] ($Z = -2.98$, $p = 0.003$, $r = -0.58$). The significance of these findings is small. The findings, however, generally suggest that the BC group is more accurate in encoding definite meaning than in encoding indefiniteness.

Based on obligatory contexts, the ENS, the control group, presented the highest accuracy in using *zero* (*M* = 98.89), followed by *the* (*M* = 98.73) and *a/an* (*M* = 93.20), respectively. Friedman's test results (presented in Table 26) revealed a significant distinction between the accuracy measures of the ENS group across obligatory contexts ($\chi^2(2) = 22.98$, $p < .001$). Follow-up Wilcoxon test results showed that *the* accuracy was markedly higher than *a/an* ($Z = -3.82$, $p < .001$, $r = -0.49$). The accuracy of *zero* was markedly higher than *a/an* ($Z = -3.35$, $p < .001$, $r = -0.43$). The findings suggest that the ENS is more accurate in using *zero* than in using *the* and *a/an*.

Table 5.12

Friedman's Within-Subject and Wilcoxon Signed-Rank Test Results for Accuracy Measures across Obligatory Contexts for the ENS Group, the BA Group and the BC Group

Group	Friedman's test results	Wilcoxon signed-rank test results		
		the- a/an	*the- zero*	*a/an- zero*
ENS	$\chi^2(2) = 22.98$, $p < .001$	Z = -3.82 $p < .001$	Z = –1.76 $P = 0.78$	Z = -3.35 $p < .001$
BA	$\chi^2(2) = 22.36$ $p < 0.001$	Z = -5.18 $p < .001$	Z = -3.85 $p < .001$	Z = 0–37 $p = 0.712$
BC	$\chi^2(2) = 7.74$ $p = 0.021$	Z = -2.82, $p = .005$	Z = –0.94 $p = 0.345$	Z = –1.07 $p = 0.286$

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

For the BA group, the highest accuracy was exhibited when using *the* (M = 94.44) followed by *zero* (M = 66.96) and *a/an* (M = 66.57), respectively. Friedman's test results revealed that there was a significant variation between the accuracy measures of the BA group across obligatory contexts ($\chi^2(2) = 22.36$, $p < 0.001$). Follow-up Wilcoxon test results revealed that *the* accuracy is markedly higher than *a/an* (Z = -5.18, $p < .001$, r = -0.58), and *the* accuracy is significantly higher than *zero* (Z = -3.85, $p < .001$, r = -0.43). The significance of these findings is small. The findings suggest that the BA is more accurate at using *the* than at using *a/an* and *zero*.

Likewise, for the BC groups, the highest accuracy was also exhibited in using *the* (M = 98.99), followed by *zero* (M = 92.20) and *a/an* (M = 84.89), respectively. Friedman's test results demonstrated a notable distinction between the accuracy measures of the BC group

across obligatory contexts ($\chi^2(2) = 7.74$, $p = 0.021$). Follow-up Wilcoxon test results illustrated that *the* accuracy is significantly higher than *a/an* (Z = -2.82, $p = .005$, r = -0.55). Based on the results, the BC is more accurate at using *the* than *a/an*.

The findings suggest that both the BA and BC showed a different order of accuracy than the ENS control. The findings suggest that the BA is more accurate at encoding a definite meaning and the use of the definite article *the* than at encoding indefinite meaning and the use of both indefinite articles *a/an* and *zero*. Like the BA, the results indicate that the children in the BC group are more accurate at encoding definite meaning than indefinite meaning and the better use of *the* than *a/an*. However, there is no statistical variation in the use of each *the* and *a/an* and in using *zero*.

5.6.1.3. Accuracy in L2 English Article Use in the Narrative Task: Analysis of Language Groups

Descriptive statistics were obtained for the overall accuracy score, accuracy scores per semantic context and accuracy scores for each English article. The results, which include the means and standard deviation for each of the accuracy scores, are presented in Table 5.13. To examine group disparities, between-group Kruskal−Wallis tests with post-hoc pairwise comparisons were conducted in these aspects (overall accuracy score, accuracy scores per semantic context and accuracy scores in an obligatory context).

For overall accuracy in using English articles, the highest accuracy was obtained by the ENS group ($M = 97.52$), followed by the BC group ($M = 95.84$) and then the BA group ($M = 86.33$), respectively. The results of the between-group Kruskal−Wallis tests revealed the three groups were significantly different in this aspect ($\chi^2(2) = 34.75$, $p < 0.001$). Post-hoc pairwise comparisons showed that the BA group demonstrated notably less accuracy ($M = 86.33$) than the ENS controls (M = 97.52, $p < 0.001$, $r = 0.69$) and the BC and BA groups (*p*

= 0.003, r = –0.40). However, no significant distinctions were found between the BC and ENS groups (p = .164, r = 0.21).

Table 5.13

Kruskal−Wallis H and Post-Hoc Pairwise Comparison Results in the Accuracy of Using English Articles in the English Narrative Task for the ENS, BA and BC Groups

		ENS		BA		BC		Kruskal−Wallis H results	Post-hoc pairwise comparison		
Accuracy scores /Mean number of correct uses		*M*	*SD*	*M*	*SD*	*M*	*SD*		BA-ENS	BC-ENS	BA-BC
General accuracy scores		97.52 (106.37)	2.017	86.33 (78.08)	11.05	95.84 (80.62)	2.90	($\chi2(2) = 34.75$, $p < 0.001$)	$p < 0.001$	$p = .164$	$p = .003$
Accuracy per semantic context	[definite, specific]	98.73 (77.3)	1.44	94.43 (59.55)	9.79	98.99 (61.62)	1.01	($\chi2(2) = 14.47$, $p < 0.001$)	$p < 0.001$	$p = .752$	$p = .005$
	[indefinite, specific]	93.62 (25.53)	6.96	66.92 (15.18)	24.11	84.88 (16.69)	14.74	($\chi2(2) = 30.58$, $p < 0.001$)	$p < 0.001$	$p = .068$	$p = .023$
	[indefinite, nonspecific]	99.11 (3.5)	4.72	72.99 (3.28)	34.60	87.50 (2.31)	31.08	($\chi2(2) = 16.002$, $p < 0.001$)	$p < 0.001$	$p = .330$	$p = .052$
Accuracy per article	Accuracy of using *the*	98.73 (77.3)	1.44	94.44 (59.58)	9.79	98.99 (61.62)	1.01	($\chi2(2) = 14.47$, $p < 0.001$)	$p < 0.001$	$p = .752$	$p = .005$
	Accuracy of using *a/an*	93.20 (24.23)	7.93	66.57 (15.38)	26.07	84.89 (16.38)	17.97	($\chi2(2) = 26.54$, $p < 0.001$)	$p < 0.001$	$p = .178$	$p = .015$
	Accuracy of using *zero*	98.89 (4.83)	4.07	66.96 (3.13)	34.63	92.20 (2.62)	14.50	($\chi2(2) = 25.31$, $p < 0.001$)	$p < 0.001$	$p = .302$	$p = .009$

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

a. In semantic contexts

Across the semantic context, in the [definite, specific] context, Kruskal−Wallis test results revealed significant variations between the three groups. The follow-up tests showed the accuracy of the ENS (M = 98.73) in the [definite, specific] context was notably higher than the BA (M = 94.43, $p < 0.001$, r = 0.40). Likewise, the BC group's accuracy (M = 98.99) was markedly higher than the BA group (M = 94.43) in this aspect (p =.005, r = -0.39). No significant distinction between the BC (M = 98.99) and the ENS (M = 98.73) were depicted in this pattern (p = .752, r = -0.04).

The three groups also significantly varied in the accuracy of article use in the [indefinite, specific] context ($\chi 2(2) = 30.58$, $p < 0.001$). Post-hoc pairwise comparisons depicted that the accuracy of the ENS group (M = 93.62) in the [indefinite, specific] context was markedly higher than the BA group (M = 66.92) ($p < 0.001$, r = 0.66) and that the BC group's accuracy (M = 84.88) was noticeably higher than the BA (M = 66.92, p = .023, r = -0.31). The accuracy for the BC (M = 84.88) and ENS (M = 93.62) groups, however, was not significantly different in this context (p = 0.068, r = 0.28).

Similarly, important disparities were also exhibited between the three groups in the accuracy of using articles in the [indefinite, nonspecific] ($\chi 2(2) = 16.00$, $p < 0.001$) in which post-hoc pairwise comparisons illustrated the ENS group's accuracy (M = 99.11) in this context was markedly more elevated than the BA group (M = 72.99, $p < 0.001$, r = 0.47). However, no significant difference was observed in this context between the BC (M = 87.50) and ENS (M = 99.11) groups (p = .330, r = 0.15) or between the BA (M = 72.99) and BC (M = 87.50) groups (p = .052, r = -0.27).

b. In obligatory contexts

Regarding the accuracy of each article, marked distinctions in groups' accuracy measures were also exhibited. The results showed a significant difference between the three groups in terms of the accuracy of using *the* ($\chi 2(2) = 14.47$, $p < 0.001$). Partial differences were revealed by post-hoc pairwise comparisons in which the ENS group's accuracy ($M = 98.73$) was higher than the accuracy of the BA ($M = 94.44$, $p < 0.001$, $r = 0.40$). However, no significant distinctions were found in respect to *the* accuracy between the BC (M = 98.99) and the ENS (M = 98.73) groups ($p = .752$, $r = -0.05$) or the BC group ($M = 98.99$) and the BA group ($M = 94.44$, $p = .005$, $r = -0.39$).

Notable variations between the groups were also found regarding *a/an* accuracy. In this aspect, as well, post-hoc pairwise comparisons showed that the ENS ($M = 93.20$) was significantly higher than the BA ($M = 66.57$; $p < 0.001$, $r = 0.61$), and the BC ($M = 84.89$) was also significantly higher than the BA ($M = 66.57$; $p = .015$, $r = -0.34$). As for the BC ($M = 84.89$) and ENS groups ($M = 93.20$), no important divergences were discerned ($p = .178$, $r = 0.21$).

Concerning the accuracy of *zero*, significant divergences were also shown between the three groups ($\chi 2(2) = 25.31$, $p < 0.001$). Based on the post-hoc pairwise comparisons, the ENS ($M = 98.89$) was importantly higher than the BA ($M = 66.96$; $p < 0.00$, $r = 0.59$), and the BC ($M = 92.20$) was also markedly more elevated than the BA ($M = 66.96$; $p = .009$, $r = -0.36$). No departure was found between the ENS ($M = 98.89$) and the BC groups ($M = 92.20$; $p = .302$, $r = 0.16$).

In summary, the accuracy measures of the BA in all aspects showed notably lower accuracy than the ENS group. In contrast, the findings revealed that BC accuracy measures in all aspects were not markedly different from those of the ENS. The BC group was significantly higher in all accuracy aspects than the BA group. The findings suggest that the

children in the BC group were more target-like than the BA group in their use of L2 English articles.

5.6.1.4. Role of Background Variables in the Accuracy of Using L2 English Articles

a. ***Role of background variables in the accuracy of using L2 English articles: Bilingual adults' results***

Spearman correlation tests were conducted to determine whether the variables LORUK, L2AOA and L2 proficiency reflected in the TROG-2 scores influenced article use by the BA group. Table 5.14 presents the results of these tests. The results demonstrated a significantly negative correlation between LORUK and the accuracy of English article use in the [indefinite, specific] context (r = -.343, p = .030) suggesting a decrease in accuracy in this context with a longer residence in the UK.

Regarding L2AOA, the results showed a markedly negative effect of L2AOA on the overall accuracy of English article use (r = -.408, p = .009). For accuracy per semantic context, there was a notably negative correlation between L2AOA and the accuracy of using English articles in the [indefinite, specific] context (r = -.450, p = .004) and a markedly negative correlation between L2AOA and the accuracy of English article use in the [indefinite, nonspecific] context (r = -.328, p = .045). In obligatory contexts, there was a noticeably negative correlation between L2AOA and the accuracy of *a/an* use (r = -.479, p = .002). The findings indicate that the older the participants when they start acquiring L2 English, the less accurate they are in using English articles. This is particularly reflected in the use of *a/an* and articles in indefinite contexts decreasing with delays in L2AOA.

Table 5.14

Spearman's Correlation Test Results for the Bilingual Adult Group on the Relationship between Accuracy Measures and Background Variables of LORUK, L2AOA and L2 Proficiency

Accuracy scores			LORUK	L2AOA	L2 proficiency (TROG-2 score)
General accuracy scores		*r*	-.305	-.408	.692
		p-value	.056	.009	< 0.001
Accuracy per semantic context	[definite, specific] scores	*r*	-.165	-.137	.391
		p-value	.308	.399	.013
	[indefinite, specific] scores	*r*	-.343*	-.450	.686
		p-value	.030	.004	< 0.001
	[indefinite, nonspecific] scores	*r*	-.208	-.328	.438
		p-value	.210	.045	.006
Accuracy per article	Accuracy of using *the*	*r*	-.165	-.137	.391
		p-value	.308	.399	.013
	Accuracy of using *a/an*	*r*	-.309	-.479	.644
		p-value	.052	.002	< 0.001
	Accuracy of using *zero*	*r*	-.089	-.256	.503
		p-value	.588	.116	.001

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK, TROG = test for the reception of grammar

L2 proficiency had a prominent impact on all accuracy categories. The results showed an important positive correlation between L2 proficiency scores and the overall accuracy of English article use (r = .692, p < 0.001). Within semantic contexts, L2 proficiency scores showed a significant correlation with accuracy scores in all semantic contexts: [definite, specific] (r = .391, p = 0.013), [indefinite, specific] (r = 0.686, p < 0.001) and [indefinite, nonspecific] (r = .438, p < 0.001). The results also revealed a significant positive correlation between L2 proficiency and the accuracy of using *the* (r = .391, p = 0.013), a significant positive correlation between L2 proficiency and the accuracy of using *a/an* (r = 0.644, p <

0.001) and a significant positive correlation between L2 proficiency and the accuracy of *zero* ($r = 0.503$, $p = 0.001$). The results indicate that the accuracy of using L2 English articles, in all aspects, improves with an increase in L2 proficiency.

In summary, L2 proficiency seems to play the most significant role in the BA group's performance. With higher L2 proficiency, the BAs are more accurate at using L2 English articles in all aspects. Concerning L2AOA, the higher the L2AOA, the less accurate the BAs are in using L2 English articles overall in indefinite contexts and in the use of *a/an* based on obligatory contexts. Regarding LORUK, the longer the LORUK, the less accurate the BA group is in using L2 English articles in the [indefinite, specific] context.

b. ***Role of background variables on the accuracy of using L2 English articles: Bilingual children's results***

Spearman correlation tests were performed to examine the relationship between the accuracy measures for the BC groups and the independent variables: LORUK, L2AOA, L2 proficiency (reflected in the TROG-2 scores) and L1 Arabic proficiency (reflected by the ASCT scores). The correlation test results are presented in Table 5.15.

Regarding L2AOA, the results revealed a significantly positive correlation between L2AOA and accuracy in the [definite, specific] context ($r = .559$, $p = .047$). The results also illustrated a significant positive correlation between L2AOA and the accuracy of using *the* ($r = .559$, $p = .047$). Based on the results, the increase in L2AOA resulted in an increase in the accuracy scores of using the *the* article and in the [definite, specific] context.

Table 5.15

Spearman's Correlation Test Results for the Bilingual Children's Group on the Relationship between Accuracy Measures and Background Variables of LORUK, L2AOA and L1/L2 Proficiency

Accuracy scores			LORUK	L2AOA	TROG-2 score	L1 Proficiency (ASCT)
General accuracy scores		*r*	-.312	-.155	.011	-.141
		p-value	.299	.612	.971	.645
Accuracy per semantic context	[definite, specific] scores	*r*	.182	.559	-.375	-.560
		p-value	.552	.047	.207	.046
	[indefinite, specific] scores	*r*	-.379	-.344	.132	-.035
		p-value	.202	.250	.667	.910
	[indefinite, nonspecific] scores	*r*	-.405	-.052	-.073	-.352
		p-value	.192	.872	.821	.262
Accuracy per article	Accuracy of using *the*	*r*	.182	.559	-.375	-.560
		p-value	.552	.047	.207	.046
	Accuracy of using *a/an*	*r*	-.272	-.480	.234	-.006
		p-value	.368	.097	.441	.986
	Accuracy of using *zero*	*r*	-.140	.344	-.306	-.180
		p-value	.664	.274	.333	.575

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK, TROG = test for the reception of grammar, ASCT= Arabic sentence comprehension test

Regarding L1 proficiency, the results revealed a markedly negative correlation between L1 proficiency and the accuracy in the [definite, specific] context (r = -.560, p = .046) and a significantly negative correlation between L1 proficiency and the accuracy of using *the* (r = -.560, p = .046). The findings suggest that, with augmented L1 proficiency, the accuracy in using and encoding definite meaning decreases.

In general, neither LORUK nor L2 proficiency seems to influence children's performance. Regarding L2AOA, the higher the L2AOA, the more precise children are in their use of *the* in the [definite, specific] context. Conversely, with ameliorated L1 proficiency, the more accurate the BC in the use of *the* in the [definite, specific] context.

5.6.1.5. Analysis of the Types of Errors in L2 English Article Use in the English Narrative

Errors in the use of English articles were categorised under seven categories: *the* overuse in the *a/an* context, *the* overuse in the *zero* context, *the* omission, *a/an* omission, *a/an* overuse in the *the* context, *a/an* overuse in the *zero* context and pluralisation errors. A calculation of the number of each error type by each group was obtained and compared to the overall number of errors produced by the group to determine the percentage of each error category. Subsequently, descriptive statistics of the mean and the standard deviation were obtained for all error categories in all groups.

Based on the results of the descriptive statistics (Table 5.16), patterns and proportions of the error types were compared across the three groups.

A Kruskal−Wallis between-group analysis was conducted to examine the difference in error patterns between the three groups: BA, BC and ENS. Based on the results, the groups varied markedly in producing *a/an* omission errors ($\chi 2(2) = 9.51$, $p = 0.009$). Post-hoc pairwise comparisons revealed that the BA group (46.41%) was significantly higher than the ENS group (26.23%) in omitting *a/an* ($p = .002$, $r = -0.36$). However, no significant variances in omitting *a/an* were exhibited between the BC (32.92%) and the ENS (26.23%; $p = .420$, $r = -0.12$) or between the BA (46.41%) and the BC (32.92%) groups ($p = .144$, $r = 0.20$).

The groups also importantly differed in producing *a/an* overuse in the *zero* context ($\chi 2(2) = 14.67$, $p < 0.001$). Post-hoc pairwise comparisons revealed a significant distinction in producing *a/an* overuse in the *zero* context between the BA (10.90%) and ENS groups (0.77%; $p < 0.001$, $r = -0.43$), as well as between the BA (10.90%) and the BC (4.17%) groups ($p = .019$, $r = 0.32$). However, there was no significant variance in producing *a/an* overuse in the *zero* context between the BC (4.17%) and ENS (0.77%) groups ($p = .697$, $r = -0.06$).

Table 5.16.
Kruskal−Wallis H and Post-Hoc Pairwise Comparison Results in Error Production in Using English Articles in the English Narrative Task for the ENS, BA and BC Groups

Error type	ENS		BA		BC		Kruskal−Wallis	Post-hoc results		
	M	*SD*	*M*	*SD*	*M*	*SD*		BA-ENS	BC-ENS	BA-BC
the overuse in the *a/an* context	34.14 (1.07)	39.53	12.13 (1.23)	14.11	31.39 (1.38)	34.04	(χ2(2) = 2.472[a,b], p = .291)	-	-	-
the overuse in the *zero* context	0.96 (0.03)	4.90	1.87 (0.23)	4.50	6.94 (0.31)	16.60	(χ2(2) = 2.627[a,b], p = .269)	-	-	-
a/an omission	26.23 (0.53)	37.18	46.41 (5.4)	23.80	32.92 (1.00)	31.74	(χ2(2) = 9.51, p = 0.009)	p = .002	p = .420	p = .144
the omission	32.77 (0.97)	37.53	19.89 (2.35)	20.76	11.25 (0.38)	16.77	(χ2(2) = 2.929[a,b], p = .231)	-	-	-
a/an overuse in the *the* context	5.128 (0.17)	14.73	6.44 (1.3)	14.46	13.33 (0.31)	28.95	(χ2(2) = 2.295[a,b], p = .317)	-	-	-
a/an overuse in the *zero* context	0.77 (0.03)	3.92	10.90 (0.85)	19.91	4.17 (0.08)	14.43	(χ2(2) = 14.67, p < 0.001)	p < 0.001	p = .697	p = .019
Pluralisation errors	.00 (0)	.00	2.36 (0.38)	4.84	.00 (0)	.00	(χ2(2) = 10.69, p = 0.005)	p = .003	p = 1.000	p = .024

Note. ENS: English native Speakers, BA: bilingual adults, BC: bilingual children

Similarly, the three groups demonstrated a significant disparity in the production of pluralisation errors (χ2(2) = 10.691[a], p = 0.005). Post-hoc pairwise comparisons revealed a significant divergence in producing pluralisation errors between the BA (2.36%) and ENS groups (0%; p = .003, r = -0.35), as well as between the BA (2.36%) and BC (0%) groups (p = .024, r =

0.31). However, there was no significant variation in the production of pluralisation errors between the BC (0%) and the ENS groups (0%; $p = 1$, $r = 0$).

In summary, the three groups were notably distinct in producing three types of errors: *a/an* omission, *a/an* overuse in the *zero* context and in pluralisation errors. For *a/an* omission, both the BA and the BC produced a similar portion of this error. However, for both *a/an* overuse in the *zero* context and in pluralisation errors, the BA was noticeably higher than in both the BC and the ENS groups. For the rest of the error patterns, the groups exhibited no marked disparities in producing the other four types of errors: *the* overuse in the *a/an* context ($\chi2(2) = 2.472^{a,b}$, $p = .291$), *the* overuse in the *zero* context ($\chi2(2) = 2.627^{a,b}$, $p = .269$), *the* omission ($\chi2(2) = 2.929^{a,b}$, $p = .231$) and *a/an* overuse in the *the* context ($\chi2(2) = 2.295^{a,b}$, $P = .317$).

5.6.1.6. Role of Background Variables in Error Production in Using L2 English Articles

a. Role of background variables on error production in using L2 English articles: Bilingual adults' results

Table 5.17 presents results for Spearman's correlations for the BA group's error-type proportions and independent variables: LORUK, L2AOA and L2 proficiency (i.e. TROG-2 score). The results showed a significantly negative correlation between L2 proficiency and *the* overuse in the *zero* context ($r = -.334$, $p = .035$), which suggests that with an increase in L2 proficiency, the BA produce fewer *the* overuse errors in the *zero* context.

Table 5.17

Spearman's Correlation Test Results for Error Production by Bilingual Adults on the Relationship between Errors and Background Variables (LORUK, L2AOAO, L2 Proficiency)

Error type		LORUK	L2AOA	L2 proficiency (TROG-2 score)
the overuse in the *a/an* context	*r*	-.082	.154	-.111
	p-value	.616	.343	.497
the overuse in the *zero* context	*r*	.219	.048	-.334
	p-value	.175	.770	.035
a/an omission	*r*	.068	.241	-.015
	p-value	.677	.134	.927
the omission	*r*	.104	-.056	-.106
	p-value	.522	.730	.513
a/an overuse in the *the* context	*r*	-.134	-.053	-.072
	p-value	.410	.747	.659

a/an overuse in the *zero* context	*r*	-.067	-.058	-.194
	p-value	.682	.722	.231
Pluralisation errors	*r*	.289	.291	-.110
	p-value	.071	.069	.500

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK, TROG = test for the reception of grammar

b. Role of background variables on error production in using L2 English articles:

Bilingual children's results

Table 5.18 presents the results for the Spearman's correlation for the BC group's error-type proportions and the independent variables: LORUK, L2AOA and L2 proficiency (i.e. the TROG-2 score). The results revealed that, with regard to L2AOA, there was a significant positive correlation between L2AOA and *a/an* omission errors (r = .638, p = .026), which indicates that, with a delay in L2AOA, children are likely to produce *a/an* omission errors.

Table 5.18

Spearman's Correlation Test Results for Error Production by Bilingual Adults on the Relationship between Errors and Background Variables (LORUK, L2AOAO, L2 Proficiency)

Error type		LORUK	L2AOA	TROG-2 score	ASCT score
The overuse in the *a/an* context	*r*	.396	.262	-.199	-.195
	p-value	.202	.411	.534	.545
the overuse in the *zero* context	*r*	-.038	-.276	.376	.340
	p-value	.906	.385	.228	.280
a/an omission	*r*	-.229	.638	-.213	.027
	p-value	.474	.026	.506	.933
the omission	*r*	-.047	-.364	.514	.016
	p-value	.884	.245	.087	.961
a/an overuse in the *the* context	*r*	-.317	-.558	.277	.405
	p-value	.315	.059	.383	.192
a/an overuse in the *zero* context	*r*	.487	-.272	.088	-.486
	p-value	.108	.393	.786	.110
Pluralisation errors	*r*	N/A	N/A	N/A	N/A
	p-value	N/A	N/A	N/A	N/A

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK, TROG = test for the reception of grammar, ASCT= Arabic sentence comprehension test

5.6.2. Arabic Narrative Results

5.6.2.1. Total Production of Arabic Articles per Semantic and Obligatory Context

Table 5.19 presents the results for the descriptive statistics of the mean and the standard variation for the number of items/articles in each semantic and obligatory context produced by the BA, BC and MAS groups. Based on the results, each of the three groups produced the highest number of articles in the [definite, specific] context, followed by the [indefinite, specific] context and the [indefinite, nonspecific] context. In obligatory contexts., however, each of the three groups produced a higher number of articles/items in the *al-* context than in the *zero* context.

Table 5.19

Mean Average of Arabic Article Production Per Semantic and Obligatory Context in the MAS Group, the BA Group and the BC Group

		MAS		BA		BC	
	Number of items	*M*	*SD.*	*M*	*SD.*	*M*	*SD.*
Semantic contexts							
	[definite, specific]	67.40% (72.36)	24.35	55.26% (94.00)	39.49	69.72% (62.69)	19.48
	[indefinite, specific]	27.32% (29.33)	9.74	19.46% (33.10)	11.39	27.15% (24.77)	8.89
	[indefinite, nonspecific]	5.28% (5.67)	3.25	3.19% (5.43)	2.87	4.13% (3.77)	2.09
Obligatory context	*Al-* context	64.63% (69.44)	22.87	67.40% (89.35)	36.96	67.48% (61.77)	19.02
	Zero context	35.37% (38.00)	11.00	32.59% (43.20)	14.38	32.52% (29.77)	9.18

Note. MAS: Monolingual Arabic speakers, BA: bilingual adults, BC: bilingual children

5.6.2.2. Order of Accuracy in Arabic Article Use in Semantic and Obligatory Contexts

Accuracy measures were obtained by calculating the percentages of correct responses to the overall responses for each obligatory and semantic context. In this section, to determine if the ease/difficulty of using L1 Arabic articles varied across the contexts for each group, the order of accuracy was determined across semantic and obligatory contexts. To confirm whether this order was comparable, within-subjects Friedman's tests and follow-up Wilcoxon signed-ranks tests were conducted to examine if there were any significant differences between accuracy measures within the semantic contexts. Wilcoxon signed-ranks tests were conducted to examine whether there were any significant disparities between accuracy

measures in the obligatory contexts of *al-* and *zero*. The results of these tests are presented in tables 5.20 and 5.21.

Regarding semantic contexts, the MAS exhibited their highest accuracy in using articles in the [definite, specific] context (M = 99.74), followed by the [indefinite, nonspecific] context (M = 99.12) and the [indefinite, specific] context (M = 88.15). Friedman's within-subjects results depicted an important variance in the levels of accuracy across the semantic contexts ($\chi^2(2) = 52.00$, $p < 0.001$). Follow-up Wilcoxon test results displayed a crucial divergence between the accuracy in the [definite, specific] and the [indefinite, specific] context ($Z = -5.01$, $p < 0.001$, $r = -0.57$) and a significant difference between the accuracy measures in the [indefinite, nonspecific] context and the [indefinite, specific] context (Z = -4.34, $p < .001$, $r = -0.49$). Based on the results, the MAS group was more accurate at using Arabic articles in the [definite, specific] context than in the [indefinite, specific] context. Similarly, the MAS group showed better performance in the [indefinite, nonspecific] context than in the [indefinite, specific] context.

Table 5.20
Friedman's Within-Subject and Wilcoxon Signed-Rank Test Results for Accuracy Measures in Using Arabic Articles across Semantic Contexts for the MAS Group, the BA Group and the BC Group

Group	Friedman's test results	Wilcoxon signed-rank test results		
		[definite, specific]-[indefinite, specific]	[definite, specific]-[indefinite, nonspecific]	[indefinite, specific]-[indefinite, nonspecific]
MAS	$\chi^2(2) = 52.00$ $p < 0.001$	$Z = -5.01$ $p < 0.001$	Z = 0-.42 $p = 0.674$	$Z = –4.34$ $p < 0.001$
BA	$\chi^2(2) = 45.02$ $p < 0.001$	Z = -4.82 $p < .001$	Z = -1.60 $p = 0.110$	Z = –4.33 $p < .001$
BC	$\chi^2(2) = 15.32$ $p < 0.001$	Z = -2.13 $p = .033$	Z = -1.60 $p = 0.109$	Z = –2.94 $p = .003$

Note. MAS: Monolingual Arabic speakers, BA: bilingual adults, BC: bilingual children

Like the MAS, the BA groups had the highest accuracy score in the [definite, specific] context (M = 99.57), followed by the [indefinite, nonspecific] context (M = 99.58) and the [indefinite, specific] context (M = 94.59), respectively. Likewise, for the BA, Friedman's within-subjects results portrayed a significant difference in the levels of accuracy between the semantic contexts ($\chi^2(2) = 45.02$, $p < 0.001$). Follow-up Wilcoxon test results showed an important distinction between the accuracy in the [definite, specific] and the [indefinite, specific] context (Z = -4.82, $p < .001$, r = -0.54) and a significant difference between the accuracy measures in the [indefinite, nonspecific] context and the [indefinite, specific] context (Z = -4.33, $p < .001$, r = -0.48). The findings suggest more accuracy in L1 Arabic article use by the BA in the [definite, specific] context and the [indefinite, nonspecific] context than in the [indefinite, specific] context.

Unlike the two groups, the highest accuracy for the BC group was achieved in the [indefinite, nonspecific] context (M = 100), followed by the [definite, specific] context (M = 96.49) and the [indefinite, specific] context (M = 87.60). Friedman's within-subjects results of the BC revealed a notably disparity in the levels of accuracy across the semantic contexts ($\chi^2(2) = 15.32$, $p < 0.001$). Follow-up Wilcoxon test results showed a significant difference between the accuracy in [definite, specific] and the [indefinite, specific] context (Z = -2.13, p = .033, r = -0.42) and a notable variation between accuracy measures in the [indefinite, nonspecific] context and the [indefinite, specific] context (Z = -2.94, $p = .003$, r = -0.58). Based on the results, the BC depicted the better use of L1 Arabic articles in the [indefinite, nonspecific] context and the [definite, specific] context than in the [indefinite, specific] context.

As for the accuracy of pre-obligatory contexts, based on Wilcoxon test results, for the MAS, the accuracy of *al-* use (M = 99.80) was importantly higher than in *zero* (90.84%; Z = -5.01, p < .001, r = -0.57). For the BA, the accuracy of *al-* use (M = 99.75) was also significantly higher than *zero* (95.71%; Z = -4.90, p < .001, r = -0.55). Similarly, the BC was significantly better at using *al-* (M = 96.87) than *zero* (89.18%; Z = -2.34, p = .019, r = -0.46). The findings indicate the better use of *al-* and expressing definiteness compared to the use of *zero*.

Table 5.21
Within-Subjects Wilcoxon Signed-Rank Test Results on the Accuracy of Arabic Articles' Obligatory Contexts for Each Group (MAS, BA and BC)

Group	Wilcoxon signed-rank test results
MAS	Z = -5.01, p < .001
BA	Z = -4.90, p < .001
BC	Z = -2.34, p = .019

Note. MAS: Monolingual Arabic speakers, BA: bilingual adults, BC: bilingual children

In summary, all three groups (MAS, BA and BC) were markedly more accurate in using L1 Arabic articles in the [definite, specific] context and the [indefinite, nonspecific] context than in the [indefinite, specific] context. The three were also similar; they were all more accurate at using *al-* than in using *zero*.

5.6.2.3. Accuracy in L1 Arabic Article Use in the Narrative-Elicitation Task: Analysis of Language Groups

Descriptive statistics of the mean and the standard variation were obtained for the accuracy measures of the three groups: BA, BC and MAS. Between-group Kruskal−Wallis tests with post-hoc tests were conducted to examine group differences in accuracy measures; the result is presented in Table 5.22.

In comparing the overall accuracy, the highest accuracy was achieved by the MAS group (M = 97.05), followed by the BA group (M = 98.45) and the BC group (M = 94.80). The results showed that the three groups were importantly different in the overall accuracy of Arabic article use ($\chi2(2) = 12.784^{a}$, p = .002). Post-hoc pairwise comparisons revealed that, for this pattern, the BA group's (M = 98.45) accuracy was notably higher than the MAS group (M = 97.05; p = .008, r = -0.30); similarly, the overall accuracy of the BA group (M = 98.45) was significantly higher than the BC group (M = 94.80; p = .002, r = 0.43). However, the overall accuracy of Arabic article use between the BC (M = 94.80) and MAS groups (M =97.05) was not significantly different (p = 0.200, r = 0.18). The effect sizes for the difference between MAS and BA were small.

Table 5.22

Kruskal−Wallis H and Post-Hoc Pairwise Comparison Results in the Accuracy of Arabic Article Use in the Arabic Narrative Task for the MAS, BA and BC Groups

		MAS		BA		BC		Kruskal−Wallis H results	Post-hoc pairwise comparison		
Accuracy scores/Mean number of correct uses		*M*	*SD*	*M*	*SD*	*M*	*SD*		BA-MAS	BC-MAS	BA-BC
General accuracy scores		97.05 (104.10)	2.67	98.45 (130.65)	1.49	94.80 (87.46)	6.74	($\chi2(2) = 12.78$, $p = .002$)	$p = 0.008$	$p = 0.200$	$p = .002$
Accuracy per semantic context	[definite, specific]	99.74 (72.15)	.73	99.57 (93.62)	1.11	96.49 (61.23)	10.70	($\chi2(2) = .85$, $p = .655$)	-	-	-
	[indefinite, specific]	88.15 (26.26)	13.57	94.59 (31.6)	6.64	87.60 (22.15)	15.23	($\chi2(2) = 10.68$, $p = .005$)	$p = 0.008$	$p = .391$	$p = .006$
	[indefinite, nonspecific]	99.12 (5.62)	3.77	99.58 (5.4)	2.64	100.00 (3.77)	.00	($\chi2(2) = .93$, $p = .629$)	-	-	-

Accuracy per article	Accuracy of using *al-*	99.80 (69.31)	.70	99.75 (89.15)	.549	96.87 (60.62)	10.14	(χ2(2) = 1.24, p = .539)	-	-	-
	Accuracy of using *zero*	90.84 (34.79)	10.55	95.71 (41.5)	4.64	89.18 (26.85)	10.53	(χ2(2) = 12.80, p = .002)	p = .011	p = .144	p = .001

Note. MAS: Monolingual Arabic speakers, BA: bilingual adults, BC: bilingual children

Regarding the accuracy per semantic context, the results showed a significant difference between the three groups in the accuracy of Arabic article use in the [indefinite, specific] context (χ2(2) = 10.678[a], p = .005). Post-hoc pairwise comparisons revealed that the BA group (M = 94.59) were importantly higher in their accuracy in the [indefinite, specific] context than the MAS group (88.15%; p = .008, r = -0.30); similarly, in the accuracy of the [indefinite, specific] context, the BA group (M = 94.59) were notably higher than the BC group (87.60%; p = .006, r = 0.37). However, for this aspect, the accuracy measures between the BC (M = 87.60) and MAS groups (M = 88.15) were not significantly different (p = .391, r = 0.12). Based on the findings, there is no difference between the BC and MAS groups in the use of L1 Arabic articles in the [indefinite, specific] context.

Regarding the accuracy of each article, the results showed significant disparities between the three groups in the accuracy of using *zero* (χ2(2) = 12.794[a], p = .002). Post-hoc pairwise comparisons revealed that the BA group (M = 95.71) was notably higher in their accuracy of using *zero* than the MAS group (M = 90.84; p = .011, r = -0.28). Similarly, the BA group (M = 95.71) had markedly higher accuracy in using *zero* than the BC group (M = 89.18; p = .001, r = 0.45). However, the *zero* accuracy of Arabic article use between the BC (M = 89.18) and the MAS group (M = 90.84) was not markedly different (p = .144, r = 0.20); the effect size of the significance between the BA and MAS and between the MAS and the BC groups was small.

In summary, the groups (MAS, BA and BC) varied in their overall accuracy of L1 Arabic article use in the [indefinite, specific] context. In the two respects, BA was importantly more accurate than both the MAS controls and BC group. Aside from these two aspects, the three groups were similarly accurate in their use of L1 Arabic articles.

5.6.2.4. Role of Background Variables in the Accuracy of L1 Arabic Article Use

a. Role of background variables on accuracy in using L1 Arabic articles: Bilingual adults' results

Table 5.23 presents the results of Spearman's correlation tests, which were performed to examine the relationship between the accuracy measures of Arabic article use by the BA group and the independent variables: LORUK, L2AOA and L2 proficiency (indicated by TROG-2 scores).

For the accuracy per semantic context, there was a markedly negative correlation between L2AOA and the accuracy in the [definite, specific] context (r = -.405, p = .010). The results also revealed a significantly negative correlation between L2AOA and the accuracy of using *al-* (r = -.400, p = .011). Accordingly, the findings suggest that, with an earlier L2AOA, a better performance is likely to occur in expressing definiteness and using the definite article *al-*.

Table 5.23
Spearman's Correlation Test Results for Both Bilingual Adults on the Relationship between Accuracy Measures in Using L1 Arabic Articles and the Background Variables of LORUK, L2AOA and L2 Proficiency

Accuracy scores			LORUK	L2AOA	L2 proficiency (TROG-2 score)
General accuracy scores		*r*	.055	-.140	.424
		p-value	.735	.388	.006
Accuracy per semantic context	[definite, specific] scores	*r*	-.188	-.405	.142
		p-value	.246	.010	.382
	[indefinite, specific] scores	*r*	.105	-.014	.388
		p-value	.520	.932	.013

	[indefinite, nonspecific] scores	*r*	-.271	-.260	.070
		p-value	.091	.105	.669
Accuracy per article	Accuracy of using *al-*	*r*	-.138	-.400	.080
		p-value	.395	.011	.624
	Accuracy of using *zero*	*r*	.072	-.025	.415
		p-value	.659	.878	.008

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK, TROG = test for the reception of grammar

The results also portrayed a significantly positive correlation between L2 proficiency scores and the overall accuracy of Arabic article use (r = .424, p = .006). In addition, there was a noticeably positive correlation between L2 proficiency scores and the accuracy of Arabic article use in the [indefinite, specific] context (r = 0.388, p = .013). In obligatory contexts, the results also showed a significant positive correlation between L2 proficiency scores and the accuracy of using *zero* (r = .415, p = .008). The findings suggest that, with higher proficiency in L2 English, the BA group are likely to perform better in their use of L1 Arabic articles. With an increase in L2 proficiency, they most likely exhibit a better use of *zero* in the [indefinite, specific] context.

In summary, the findings with respect to L2AOA suggest that the earlier the BA when acquiring L2 English, the less accurate they are in using *al-* in the [definite, specific] context. Concerning L2 proficiency, the higher the L2 proficiency, the more accurate the BA at using L1 Arabic articles overall, in the [indefinite, nonspecific] context and in using *zero*.

b. Role of background variables on accuracy in L1 Arabic article use: Bilingual children's results

Table 5.24 presents the results of Spearman's correlation tests, which were conducted to examine the impact of the independent variables LORUK, L2AOA and L2 proficiency

(indicated by TROG-2 scores) and L1 proficiency (suggested by ASCT scores) on the accuracy measures of Arabic article use by the BC group.

The results revealed a significantly positive correlation between LORUK and the overall accuracy score of Arabic article use (r = .583, p = .036). Regarding the accuracy per semantic context, the results also showed a significantly positive correlation between LORUK and accuracy in the [definite, specific] (r = .706, p = .007). This is also reflected in the obligatory context, in which the findings demonstrated a significantly positive correlation between LORUK and the accuracy of using *al-* (r = .634, p = .020). The findings suggest that with longer residences in the UK, the better the children are in using L1 Arabic articles. Specifically, with longer residence, the BC group would likely show better performance in expressing definiteness and the use of the definite article *al-*.

Table 5.24
Spearman's Correlation Test Results for Both Bilingual Children on the Relationship between Accuracy Measures in Using L1 Arabic Articles and the Background Variables of LORUK, L2AOA and L1/L2 Proficiency

Accuracy scores			LORUK	L2AOA	TROG-2 score	Arabic grammar test
General accuracy scores		*r*	.583	.051	.183	.055
		p-value	.036	.869	.549	.857
Accuracy per semantic context	[definite, specific] scores	*r*	.706	.269	-.128	-.366
		p-value	.007	.373	.678	.219
	[indefinite, specific] scores	*r*	.218	-.166	.170	-.064
		p-value	.474	.588	.579	.836
	[indefinite, nonspecific] scores	*r*	-	-	-	-
		p-value	-	-	-	-
Accuracy per article	Accuracy of using *al-*	*r*	.634	.409	-.093	-.176
		p-value	.020	.165	.763	.564
		r	.460	-.028	.098	-.120

	Accuracy of using *zero*	*p*-value	.114	.927	.751	.696

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK, TROG = test for the reception of grammar

5.6.2.5. Analysis of the Types of Errors in L1 Arabic Article Use in the Arabic Narrative

Errors in the use of Arabic articles fall under two categories: *al-* overuse and *al-* omission. The number of each error type was calculated and compared to the overall number of errors to obtain percentages. Then, descriptive statistics of the mean and the standard deviation were obtained for the error categories in all groups.

Based on the results of the descriptive statistics (Table 5.25), patterns and proportions of error types were compared across the three groups. The overuse of *al-* was the most common error for each of the three groups, with percentages of (96.53%) for the MAS group, (87.24%) for the BA group and (88.83%) for the BC group. The Kruskal−Wallis between-group test results revealed no significant disparities between the groups in producing either *al-* omission ($\chi2(2) = 2.200^{a,b}$, $p = .333$) or *al-* overuse ($\chi2(2) = 2.200^{a,b}$, $p = .333$).

Table 5.25

Kruskal−Wallis H and Post-Hoc Pairwise Comparison Results in Error Production in Using Arabic Articles in the Arabic Narrative Task for the MAS, BA and BC Groups

Error type	MAS		BA		BC		Kruskal−Wallis	Post-hoc results		
	M	SD	M	SD	M	SD		BA-MAS	BC-MAS	BA-BC
al- omission	3.47 (0.13)	10.80751	12.76 (0.2)	24.77	11.17 (1.15)	27.38	($\chi2(2) = 2.200^{a,b}$, $p = .333$)	-	-	-
al- overuse	96.53 (3.21)	10.80751	87.24 (1.7)	24.77	88.83 (2.92)	27.38	($\chi2(2) = 2.200^{a,b}$, $p = .333$)	-	-	-

Note. MAS: Monolingual Arabic speakers, BA: bilingual adults, BC: bilingual children

5.6.2.6. Role of Background Variables on Error Production in Using L1 Arabic articles

a. Role of background variables on error production in using L1 Arabic articles: Bilingual adults' results

Table 5.26 presents the Spearman's correlation results for the BA group's error-type proportions and the independent variables: LORUK, L2AOA and L2 proficiency. The results showed a significantly positive correlation between L2AOA and *al*- omission (r = .460, p = .008) and a significantly negative correlation between L2AOA and *al*- overuse (r = -.460, p = .008). The findings indicate that, with a delay in L2AOA, more *al*- omission errors are likely to occur; however, with a delay in L2AOA, less *al*- overuse is likely to be produced.

Table 5.26

Spearman's Correlation Test Results for Error Production in L1 Arabic Article Use by Bilingual Adults on the Relationship between Errors and Background Variables (LORUK, L2AOAO, L2 Proficiency)

Error type		LORUK	L2AOA	L2 proficiency (TROG-2 Score)
al- omission	*r*	.219	.460	.032
	p-value	.228	.008	.861
al- overuse	*r*	-.219	-.460	-.032
	p-value	.228	.008	.861

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK, TROG = test for the reception of grammar

b. Role of background variables on error production in using L1 Arabic articles: Bilingual children's results

Table 5.27 presents the results for Spearman's correlations for the BC group's error-type proportions and the independent variables: LORUK, L2AOA, L2 proficiency (TROG-2 score) and L1 proficiency (ASC task score). The findings regarding LORUK revealed that there was a significant negative correlation between LORUK and *al*- omission (r = -.634, p = .020) and a significant positive correlation between LORUK and *al*- overuse (r = .634, p = .020). The findings suggest that, with longer residence in the UK, BCs are likely to produce more *al*- omission errors; however, they are less likely to overuse *al*-.

Table 5.27
Spearman's Correlation Test Results for Error Production in L1 Arabic Article Use by Bilingual Children on the Relationship Between Errors and Background Variables (LORUK, L2AOAO, L1/L2 Proficiency)

Error type		LORUK	L2AOA	L2 proficiency TROG-2 score	L1 proficiency ASCT Score
al- omission	*r*	-.634	-.409	.093	.176
	p-value	.020	.165	.763	.564
al- overuse	*r*	.634	.409	-.093	-.176
	p-value	.020	.165	.763	.564

Note. L2AOA = second language age of acquisition, LORUK = length of residency in the UK, TROG = test for the reception of grammar, ASCT= Arabic sentence comprehension test

5.7. Discussion

The study aimed at examining L2 English articles used by L1 Arabic L2 English bilingual adults and children (age 7−12). The study considered several factors that might possibly affect the patterns exhibited by the two groups. These include the individual factors of age, L2AOA, L1/L2 proficiency and LOR in an English-speaking country (i.e. the UK), as well as the influence of the L1 article system. Furthermore, the study investigated whether L1 Arabic article use is likely to be impacted by the acquisition of L2 English articles in the two groups (BA and BC). For this purpose, the narrative task was conducted twice: in English and in Arabic. The study explored whether any aspects of CLI, negative or positive, were likely to occur in both L1 Arabic and L2 English use of articles. To achieve this aim, overall accuracy scores and accuracy per semantic context and per obligatory context scores were calculated. Moreover, errors in using articles and countability were explored, categorised and calculated. The performances of the two groups in English and Arabic were also compared to the ENS and the MAS controls. Between-group statistical analyses were conducted to determine

whether there were any variations between the groups. In addition, to examine the impact of individual factors on the performance of the bilingual groups, several correlation tests were conducted. This section presents a discussion of the findings based on the research questions in sections 5.7.1, 5.7.2, 5.7.3 and 5.7.4, respectively. This is followed by a discussion of the general implications of these findings (Section 5.7.5).

5.7.1. What Patterns of English Article Use do Bilingual Arabic−English-Speaking Adults and Children Exhibit during the Acquisition of the English Language? (RQ1)

To examine how the BA and the BC groups performed with regard to L2 English article use, accuracy scores were measured based on: i) semantic context and ii) obligatory contexts. The examination of article use indicates how the participant understands the semantic meanings of definiteness and specificity reflected in the use of articles in these contexts. In obligatory contexts, this suggests how each article (*the*, *a/an* and *zero*) is used as a form. To measure the overall use of the L2 English article system, a general accuracy score was also calculated. Moreover, the errors the participants produced were considered in their L2 use of English articles. Across the contexts, errors were calculated and categorised under seven categories: *the* overuse in the *a/an* context, *the* overuse in the *zero* context, *the* omission, *a/an* omission, *a/an* overuse in the *the* context, *a/an* overuse in the *zero* context and pluralisation errors. Between-group analyses were conducted to explore any differences between the two bilingual groups and the ENS controls. Predictions about the performance of the groups were made in relation to the order of accuracy (Hypothesis 1a) and errors (Hypothesis ab).

With respect to the order of accuracy, the findings showed that the BA group were more accurate at using *the* in the [definite, specific] context than using both *a/an* and *zero* in the indefinite contexts. However, there was no difference in accuracy between the two indefinite articles (*a/an* and *zero*) or in the accuracy between the [indefinite, specific] and

[indefinite, nonspecific] contexts. The BC group were more accurate at using *the* than in using *a/an* and in using L2 English articles in the [definite, specific] context than in the [indefinite, specific] context. Despite the small effect size of these results, the findings of the BA group fully confirm the predictions in Hypothesis (1a); however, the BC group's findings only partially confirm these predictions.

Between-group analysis showed that the BC group was generally more like the ENS group in their L2 English article use in all aspects. The findings suggest that the BC group showed more accuracy in performance in all aspects compared to the BA group. However, these divergences had a small effect size. The BA group were generally less accurate in their use of L2 English articles in all aspects of accuracy than the ENS group, which could suggest more struggle in the use of L2 English articles by adult bilinguals.

The findings of both the BA and BC groups are consistent with most of the studies in which L2 learners demonstrate more accuracy in expressing definiteness and using *the* than using *a/an* (Chaudron & Parker, 1990; Haiyan & Lianrui, 2010; Huebner, 1983; Master, 1987; Parrish, 1987; Sarko, 2008, 2009, among others). This supports Ekiert's (2007) explanation of relationship form–meaning complexity. In the current study, considering the limited use of generics in the narrative data (Tarone & Parrish, 1988; Zodrenko & Paradis, 2008, 2012), *the* only encodes definite meaning. Accordingly, *the* in the current data is less complex than *a/an* and *zero* in indefinite contexts where encoding number is additionally required.

Besides complexity, the fact that the BA were also more accurate in using *the* than in *zero* aligns with findings regarding L1 influence, in which the [+art] L1 shows more accuracy in *the* than in *zero* (Huebner, 1983; Parrish, 1987; Sarko, 2008, 2009) as opposed to the [-art] L1 in which more accuracy is exhibited in using *zero* than in *the* (Diez−Bedmar & Papp, 2008; Huebner, 1983; Parrish, 1987). This order of accuracy can indicate the L1 influence in

the adult use of L2 English articles. To confirm whether this L1 influence really exists, more discussion on the L1 influence is provided in Section 5.7.2.

The results of the errors give suggestions on some of the problematic aspects each group exhibits in the use of L2 English articles. Errors by the BA group mostly included *a/an* omission (46.41%) followed by *the* omission (19.89%), *the* overuse in the *a/an* context (12.13%), adding *a/an* in the *zero* context (10.90%), overusing *a/an* in the *the* context (6.44%), *pluralisation* errors (2.36%) and, last, adding *the* in *zero* contexts (1.87%). For the BC group, conversely, the most common error was *a/an* omission (32.92%), followed by *the* overuse in the *a/an* context (31.39%) and *a/an* overuse in the *the* context (13.33%), *the* omission (11.25%), *the* overuse in the *zero* context (6.94%) and *a/an* overuse in the *zero* context (4.17%). Neither the ENS nor the BC groups produced any *pluralisation* errors. Between-group analysis showed that the three groups were different in respect to three errors: *a/an* omission, pluralisation errors and *a/an* overuse in the *zero* context. Indeed, the BA group produced more errors than the BC group in *pluralisation* errors and *a/an* overuse in the *zero* context error categories. Nonetheless, there was no difference between the two bilingual groups concerning *a/an* omission.

Based on the findings of errors, *a/an* omission dominates over other types of errors in both groups, BA and BC, which confirms Hypothesis 1b. This aspect also indicates the L1 influence in which, due to the lack of indefinite articles in Arabic, Arabic is likely to exhibit this error in L2 English articles. These findings align with previous research on adult L1 Arabic speakers (e.g. Zughoul, 2002; Bataineh, 2005; El−Sayed, 1983) in which omitting *a/an* was also explained regarding the L1 Arabic influence. Furthermore, the findings confirm Hypothesis 1b as well. Both groups exhibited *the* overuse errors, particularly more in the *a/an* context. In overusing *the* in the *a/an* context, the BC group produced this error in an approximately similar amount to *a/an* omission. Interestingly, the BA group showed a greater

tendency to omit *the* than to produce *the* overuse errors. However, in both omitting *the* and overusing *the*, the two groups were similar to the ENS controls, which could suggest that these patterns were not problematic. Concerning the overuse of *the*, considering that exhibiting this error was often associated with the intermediate stage of acquiring L2 English articles (*the-flooding* phenomenon; Haiyan & Lianrui, 2010; Huebner, 1983; Liu & Gleason, 2002; Master, 1997), it could be that both the BA and the BC groups are overcoming this stage. Regarding pluralisation errors and *a/an* overuse in the *zero* context errors produced by the BA group, this suggests adults struggle to understand noun countability.

5.7.2. How do the Individual Factors of age, L2AoA, L1 (in children) and L2 Proficiencies, LOR in an English-Speaking Country (i.e. the UK) and Linguistic Factors of the L1 Article System Impact the Acquisition Patterns of L2−English Articles in Adults and Children? (RQ2)

Age and L2 age of onset of acquisition

The impact of age was mainly considered by examining how the BA and the BC groups perform in their use of English articles and whether disparities would likely occur between them in using L2 English articles. As presented in the previous section (RQ1), both bilingual groups, BC and BA, demonstrated higher accuracy of L2 English article use in the definite context and *the* than in using indefinite articles in indefinite contexts. Between-group analyses, however, proved BC groups were more target-like in their performance, except for producing *a/an* omission, which was prominent in children. Children were more accurate than the adults in the BA group in aspects of accuracy. The two groups exhibited a difference (with a medium effect). The BA group produced more pluralisation and *a/an* overuse errors; however, they produced a similar amount of *a/an* omission.

Furthermore, correlation tests revealed interesting findings with regard to L2AOA. Correlation tests showed that, for the BA group's increase in L2AOA, less accuracy was

observed in the overall use of L2 English articles in both indefinite contexts and in the use of *a/an* obligatory contexts. The findings regarding BC showed that the younger the child when acquiring English, the less likely that he/she was to produce *a/an* omissions.

The findings suggest that the age of the onset of acquisition seems to influence the development of L2 English articles in L2 learners. Early learners are likelier to develop better accuracy in the use of English articles than late learners, which partially confirms Hypothesis 2a. The findings regarding the production of *a/an* omission by both groups further confirm Hypothesis 2a. Considering that *a/an* omission is often a pattern of L1 influence among L1 Arabic speakers (Zughoul, 2002; Bataineh, 2005; El−Sayed, 1983), it can be concluded that both adults and children (age 7−12) seem to exhibit instances of L1 influence; however, based on correlation results, L1 influence seems to decrease with earlier ages of acquisition. Respecting pluralisation errors and *a/an* overuse in *zero*, between-group results indicate that early L2 acquirers develop a better understanding of noun countability compared to adults.

Respecting previous findings, L1 Arabic adults in the study performed similar to most L1 Arabic adults in previous research (Zughoul, 2002; Bataineh, 2005; El−Sayed, 1983). In comparing the children in this study to younger L1 Arabic children in Zodrenko and Paradis (2012), the children in this study showed more L1 influence patterns than children in Zodrenko and Paradis (2012). This case has been found in Morales−Reyes and Gómez Soler (2016), in which L1 Spanish children revealed more patterns of L1 influence compared to their younger counterparts in Zodrenko and Paradis (2012). The findings of the study corroborate previous research regarding age and L2 acquisition in which the earlier the age of acquisition, the better the individual is in mastering L2 forms and less L1 negative influence is exhibited (Ionin et al., 2009; Morales−Reyes & Gómez Soler, 2016).

L2 and L1 proficiencies

Correlation test results of the BA showed that, with greater L2 proficiency in the BA group, subjects are likely to perform more accurately in using L2 English articles overall and in all aspects regarding use in semantic and obligatory contexts. Regarding errors, additionally, the findings revealed that the BA group are less likely to produce *the* overuse in *zero* with better L2 proficiency. Furthermore, regarding L1 proficiency, interestingly, the findings of correlation tests performed regarding the BC group's results depicted that, with heightened L1 proficiency, children were likely to be less accurate in using *the* in the [definite, specific] context. The findings indicate L2 proficiency plays an important role in the L2 acquisition of L2 English articles by the BA group. Therefore, we partially confirmed the predictions in Hypothesis 2b.

The findings regarding L2 proficiency in the BA results are consistent with previous research in L2 English article acquisition, where an increase of accuracy and change of patterns in L2 English article use are found (e.g. Chaudron & Parker, 1990; Liu & Gleason, 2002). The relationship between overusing *the* in the *a/an* context and adults' proficiency reflects explanations respecting what is called '*the* flooding' (Huebner, 1983; Liu & Gleason, 2002; Master, 1997) where *the* is overgeneralised across the process of acquiring L2 English articles and decreases as L2 learners progress from intermediate to advance levels of L2 proficiency.

In general, the findings align with Kim et al.'s (2020) explanation that, with better L2 proficiency, L2 English learners exhibit more awareness of form−meaning distinctions. The fact that this is more specific to indefiniteness was explained by Jarvis and Pavlenko (2008), in which L1 negative influence decreases with more proficiency in the L2.

Concerning L1 proficiency, the BC group's decreased accuracy in using *the* in the [definite, specific] context contradicts Hypothesis 1b. The use of *the* in the [definite, specific] context presents an overlapping aspect to the use of articles in L1 Arabic. Contrary to Jarvis and Pavlenko (2008), the decrease in children's accuracy in this context indicates less L1 influence with more L1 proficiency. Although this pattern is unusual, it can be explained by the small sample of the BC group.

L1 to L2 influence

L1 to L2 influence can be explained by the order of accuracy and errors in using L2 English articles by the BA and the BC groups. Both adults and children appear qualitatively similar in their performance, but they diverge in their level of accuracy and the degree to which they exhibit L1 influence in their L2 use of English articles. In this section, the L1 to L2 influence is explained regarding Jarvis and Pavlenko's (2008) criteria with three types of evidence: i) intragroup homogeneity, ii) intergroup heterogeneity and iii) L2−L1 performance congruity.

Concerning the first evidence, respecting Selinker (1983), Jarvis and Pavlenko (2008) explained that exhibiting a different performance in the target language compared to native speakers of the language (i.e. English in this case) indicates *intragroup homogeneity*. The findings of this work displayed the BA group performed differently from the ENS control; they were less accurate in their use of L2 English articles and mainly produced more *a/an* omission errors than the ENS controls. The BC group, however, unlike the adults, was more similar to the ENS controls. The only difference is that the BC group, just like the BA group, produced more *a/an* omission errors than the ENS controls. The findings suggest that the BA group, based on Jarvis and Pavlenko's (2008) rationale, seems to meet the *intragroup homogeneity* requirements. However, the BC group's performance was more native-like. Consequently, it does not generally satisfy this aspect.

Concerning the order of accuracy, both groups showed higher accuracy in using *the* than in *a/an*. In the BA, the accuracy was also higher than *zero*. In the semantic contexts, the BA demonstrated more accuracy in the [definite, specific] context than in both the [indefinite, specific] and the [indefinite, nonspecific] contexts. For the children, conversely, the accuracy in the [definite, specific] context was higher than in the [indefinite, specific] context only. While this difference between the patterns of the BA and the BC groups could be due to the small number of participants in the BC group, the patterns of both groups indicate L1 influence. This is further supported by errors in which *a/an* omission is viewed as an indicator of L1 influence.

The order of accuracy and errors revealed that the groups' performance matched the differences and similarities between Arabic and English. Considering that L1 Arabic has a definite article and lacks indefinite articles (i.e. indefiniteness is marked by *zero*) explains why the two groups showed better use in *the* and the [definite, specific], compared to using *a/an* and *zero* in indefinite contexts. In the [definite, specific] context, due to the familiarity of using the definite article *al-* in Arabic, the use of *the* in English appears to be easier. In indefinite contexts, the lack of indefinite articles in Arabic is reflected in how the participants omitted *a/an* in the use of English articles. Furthermore, considering that, in using noun countability, distinction is not a requirement in Arabic article use, this reflects how the adults particularly struggle in this aspect, producing *pluralisation* and *a/an* overuse errors in the *zero* context. Reflecting how the BA and BC groups' performance matches their L1 use of Arabic articles, the findings for each group, therefore, confirm L2−L1 performance congruity (i.e. evidence iii).

The L1 influence can be confirmed by examining how bilinguals perform compared to other L1 groups to exclude the possibility that the existing patterns are universal and apply to all L2 users (Jarvis & Pavlenko, 2008). Even though the higher accuracy in definite

contexts opposed to indefinite contexts could be attributed to the L1 influence, the fact that this pattern also occurs among [-art] L1 groups − for example, Japanese L1 in Chaudron and Parker (1990) and Chinese L1 in Robertson (2000) − might cast doubts on this possibility. Regarding acquiring English articles, however, one main distinction concerned how [-art] L1 performs, unlike [+ art] L1. The [-art] L1 often exhibits more article omission errors in which *zero* is overgeneralised (e.g. Diez-Bedmar & Papp, 2008; Robertson, 2000). Considering that Arabic only lacks indefinite articles, it was predicted (in Hypothesis 1b) that omitting *a/an* is likely to predominate, which was confirmed by both results of the BA and the BC groups. In this pattern, L1 Arabic contradicts [+art] L1 groups, for example the French L1 in Sarko (2008, 2009) and the Spanish L1 in Diez−Bedmar and Papp (2008). Contrary to omitting *a/an*, both bilingual groups showed less tendency to omit *the*, exhibiting no difference to the native speakers' performance and, in that, contradicting most [-art] L1 groups. These alignments and the difference the two bilingual groups show with both [+art] and [-art] L1 groups suggest patterns specific to L1 Arabic speakers in the acquisition of L2 English articles. Based on this comparison, the patterns of L2 English articles of the two groups (the BA and the BC) seem to fulfil the requirements for intergroup heterogeneity.

The general patterns of both groups, BA and BC, confirm that their L2 English article use has been impacted by the influence of L1 Arabic. However, the two groups varied in the extent of this influence. The BA group shows a more prominent L1 impact in both accuracy and error patterns. The BC group, however, generally performed more native-like. The L1 influence was mainly restricted to omitting *a/an.* This finding contradicts Jarvis and Pavlenko's (2008) statement that *forward CLI* tends to show no difference between early and older learners in the acquisition of morphology and lexis. However, children exhibit less L1 influence than adults in L2 English articles (Ionin et al., 2009; Morales−Reyes & Gómez

Soler, 2016; Zodreno & Paradis, 2012). It seems that Jarvis and Pavlenko's (2008) generalisation does not apply to L2 English articles.

Length of residence in the UK

Correlation test results of the BA group showed that, with longer residence in the UK, the less accurate the adults are in their use of L2 English articles in the [indefinite, specific] context. The findings, accordingly, reject Hypothesis (2c), which predicted that longer exposure would likely result in more accuracy in using L2 English articles by adults and children.

Generally, LOR is viewed as one of the main predictors of L2 development (Jarvis & Pavlenko, 2008). The findings generally contradict previous research, in which it was found that, in sufficient LOR, many L2 learners were found to show target-like L2 use (DeKeyser, 2000; Guion et al., 2000). While this seems unusual, it could be explained by the fact that LOR, as a factor, is quite broad; many other factors are subsumed by this one variable. MacKay and Flege (2004) found that predicting how LOR impacts performance is connected to the amount of engagement in both L1 and L2. In living in an English-speaking environment, individuals vary in their level of L2 language engagement. While the participants in the BA group used English academically as students, there were different additional domains in which participants could engage in either English or Arabic use.

5.7.3. Does L2 Affect L1 Use of Arabic Articles in Arabic−English Bilingual Adults and Children? (RQ3)

In the use of L1 Arabic articles, accuracy scores were measured based on i) semantic context and ii) obligatory context. The examination of article use based on semantic contexts reflects how the participants understood the semantic meanings of definiteness and specificity in L1 Arabic articles. In obligatory contexts, the results provide suggestions on how each article (*al-* and *zero*) is used as a form across all the meanings it expresses. Errors in using L1

Arabic articles were also calculated and categorised under two categories: *al-* omission and *al-* overuse. To measure the use of the L1 Arabic article system overall, an overall accuracy score was calculated. The order of accuracy levels were statistically measured across both semantic and obligatory contexts, and the performance of the groups was compared.

The results showed that the three groups performed similarly, exhibiting the same order of accuracy within both semantic and obligatory contexts. Each of the three groups showed a similar accuracy level in the [definite, specific] and the [indefinite, nonspecific] contexts. The accuracy in both contexts (i.e. the [definite, specific] and the [indefinite, nonspecific]) was higher than in the [indefinite, specific] context. In the obligatory context, all three groups showed more accuracy in using *al-* compared to *zero*. Notably, the variations between levels of accuracy across both semantic and obligatory contexts were small.

Between-group analysis revealed the three groups were generally different in the overall accuracy, the accuracy within the [indefinite, specific] context and the use of *zero* in the obligatory context. In all these aspects, the BA group was generally more accurate than both the MAS group (with a small effect size) and the BC group (with a medium effect size). However, the MAS and BC had similar accuracy levels.

The difference between the MAS controls and each of the BC and the BA groups (considering the small effect size) is likely to suggest a lack of L2 to L1 influence. Based on Jarvis and Pavlenko (2008), differences between bilinguals and monolinguals in the target language (i.e. L1 here) indicate that the performance of bilinguals surpasses what is typical in the source language and suggests crosslinguistic influences. Based on the level of similarities across the three groups, the performance of both the BA and the BC reflects the typical performance of monolingual Arabic speakers.

Despite this similarity in performance with monolinguals, interestingly, the two bilingual groups showed different accuracy levels in the above-mentioned aspects; therefore,

it is worth further examining other aspects. Considering that L1 Arabic is the target language, L1−L2 performance congruity is examined regarding how each group performed in their use of L2 English articles. In L1 Arabic and L2 English, both groups (BA and BC) showed more accuracy in the [definite, specific] context and using the definite articles *al-* and *the* than in other semantic contexts and the use of indefinite articles. Correspondingly, their performance in using L1 Arabic articles mirrors their use in L2 English articles. Accordingly, based on Jarvis and Pavlenko (2008), the performance of the BA and the BC groups confirms aspects of L1−L2 performance congruity as evidence suggesting L2 to L1 influence.

Unfortunately, due to limitations of time and resources, it was not possible to include comparative groups of different source languages (i.e. different L2s in this case) whose performance can be compared to the experimental groups in this study (i.e. the BA and BC groups). Furthermore, considering few studies investigate the L2 to L1 influence in this area and on L1 Arabic groups, it was not possible to examine intergroup heterogeneity.

Based on the findings, thus, crosslinguistic congruity was the only aspect indicating L2 to L1 influence in the use of L1 Arabic articles in the BA and BC groups. Considering that the existing evidence is not sufficient to fully exclude the L2 effects, Hypothesis 3 is partially confirmed. The variation between adults and children suggests that, if L2 to L1 influence is confirmed, it varies across the two age groups.

5.7.4. How do Age, L2AoA, L1 (in Children), L2 Proficiencies and LOR in an English-Speaking Country (i.e. the UK) Impact the Use of L1 Arabic Articles in Adults and Children? (RQ4)

Age and L2 age of acquisition

The results showed that the BA group were generally more accurate in their use of L1 Arabic articles than the BC. They were more accurate in the use of *zero* in the [indefinite, specific] context.

Interestingly, the correlation tests results of the BA showed that, with an increase in L2AOA, less accuracy is likely to appear in the use of *al-* in the [definite, specific] context. With regard to errors, the findings showed that while *al-* omission by the BA showed an increase with an increase in L2AOA, *al-* overuse decreased with an increase in L2AOA.

The difference between the two groups suggests a variation between adult and child Arabic−English bilinguals in the use of L1 Arabic articles. The findings indicate that late L2 English learners are likely to exhibit better general use of L1 Arabic articles and *zero* than early acquirers. There are two explanations for these findings. First, it is likely that the L1 Arabic article system is generally more developed in adults who are older than in children of this age. Second, adults' performance has been positively influenced by the L2 acquisition of English articles.

The correlation results of the BA group in the decrease in accuracy in the [definite, specific] context indicate a negative L2 to L1 effect with higher L2AoA. However, the BA group, although it included few early learners of English, presented very little variability in L2AoA. Therefore, the findings in the relationship between age and greater accuracy might merely be random. Accordingly, the findings reject Hypothesis 4a in which L2 effects were expected to be more apparent in the children's performance.

L2 English proficiency and L1 Arabic proficiency

Correlation tests performed by the BA group illustrated that, with greater L2 proficiency, the BA group demonstrates more accuracy in their overall use of L1 Arabic articles and in using *zero* in the [indefinite, specific] contexts and *zero* in obligatory contexts. With respect to L1 and L2 proficiency, correlation tests performed on the BC group's results did not exhibit any relationship between L1 proficiency nor L2 proficiency and the use of L1 Arabic articles by the BC group. Considering that the use of *zero* in the indefinite context is presented in the use of articles in both Arabic and English, the findings of the BA group

partially confirm Hypothesis 4b, which predicted that, with an increase in L2 proficiency, it is more likely to exhibit the L2 effects on the L1.

In explaining the findings of the BA group, it has been stated that the increase of accuracy in L2 results in more awareness about the use of certain patterns in L2 and, accordingly, often leads to better accuracy (Butler, 2002). It seems that L2 proficiency in bilinguals not only impacts their L2 use, but also any congruent patterns in the L1. Regarding the expression of indefiniteness, it seems that understanding the difference in how indefiniteness is expressed in English compared to Arabic makes participants more concerned about the use of the overlapping patterns (i.e. *zero*) within these contexts. This results in the better use of these mirroring patterns in Arabic.

Length of residence in the UK

The result revealed that, regarding children's LOR, with longer time in the UK, there is a greater overall accuracy of using L1 Arabic articles, the accuracy in the [definite, specific] context and the accuracy of *al-*. Accordingly, Hypothesis 4c is partially confirmed. Likely, the longer duration of residence in the UK has likely resulted in more exposure to and use of L2 English. Since the L2 use of English has developed while children were still using L1 Arabic, this likely resulted in the enhancement of similar patterns in the use of articles across the two languages. This explains how, in L1 Arabic, the definite article *al-* and the accuracy in the [definite, specific] context, where the pattern mirrors that of L2 English, correlated with longer residence along with the exposure to and use of L2 English. The increased accuracy in these two aspects logically resulted in the overall increase of the accuracy of L1 Arabic articles. The findings are consistent with Kecskes & Papp (2000), who found that longer L2 exposure (through L2 instruction in Kenskes and Papp's 2000 study) resulted in a positive L2 to L1 influence.

5.7.5. General Implications

Use of L2 English articles

The findings of the narrative suggest that the process of the L2 acquisition of L2 English articles presents some complexity in which both the complexity of L2 English articles and the former knowledge of L1 Arabic articles play a role in the process. The findings showed that the process can exhibit disparities regarding the L2AOA in which early learners perform differently from older learners. In addition, the accuracy of L2 English articles demonstrates an association with the extent to which the L2 is developed, which is mainly illustrated in the role of L2 proficiency.

The findings illustrated the ease of bilingual groups in using *the* compared to *a/an* and *zero*, portraying a relationship to both the level of complexity of English article use across the semantic contexts as well as how L1 Arabic articles are used. Regarding complexity, the use of *the* in the [definite, specific] context is generally found to be easier for L2 English learners than the uses of *a/an* and *zero*, with the present less form−meaning complexity compared to *a/an* and *zero* (Ekiert, 2007, Ekiert & Han, 2016). Concerning the L1 influence, based on the relationship between thought and language in L2 acquisition, L2 English articles were classified under thinking for speaking categories. Articles are language-specific categories likely to affect the conceptual system in learners' minds (Murakami & Alexopoulou, 2016). The meaning of definiteness marked by a definite article is already implemented in the minds of L1 Arabic speakers (illustrated in the use of *al-* in definite contexts). Therefore, form−meaning mapping regarding expressions of definiteness by the form *the* seems to be an easier task, as it is already part of routinely activated connections in the minds of L1 Arabic speakers. The indefinite articles, conversely, present crosslinguistic divergences between L1

Arabic and L2 English. L1 Arabic lacks an equivalent form to *a/an* in English and L1 Arabic articles, unlike English articles, which do not mark number. Therefore, the use of L2 English articles in indefinite contexts presents more form−meaning mapping complexity than the [definite, specific] context. Moreover, findings regarding *a/an* omission support the *structural overlap theory*, in which *zero*, the overlapping form in the indefinite context in the two languages, was overgeneralised. Therefore, *a/an* omission can be associated with L1 Arabic influence.

This interaction between L2 complexity and L1 influence in the performance of the bilinguals in this study demonstrates the integration between the L1 system and the L2 system in bilinguals' minds. The findings, hence, are explained by Cook and Cook (2003) regarding multicompetence, in which both L1 use and L2 use can influence other. Respecting the literature, Cook and Cook (2003) explain that this interaction can vary depending on the stages of L2 development. This is observed in the relationship respecting how the use of L2 English articles' accuracy and L1 influence's aspects change with an increase in L2 proficiency in this study.

Use of L1 Arabic articles

The findings of the Arabic narrative bring further evidence to Cook and Cook's (2003) concept of multicompetence and the integration between L1 and L2 in the minds of bilinguals. Moreover, based on the relationship between thought and language as well as how L1 article use affects the use of L2 English articles illustrated in the forward L1 to L2 influence, it can be assumed that L2 English article use also holds sway over the minds of bilinguals. Consequently, the use of L1 Arabic articles might likewise exhibit L2 effects. Although the findings do not provide full evidence of the L2 effects on the L1 based on Jarvis and Pavlenko's (2008) criteria, the findings indicate some instances of L2 influence in the L1 Arabic use of articles. These instances of L2 to L1 influence are exhibited in the disparity

between adults and children and how the accuracy changes regarding the individual factors of L2 proficiency and L2 exposure.

L2 to L1 effects, according to Cook and Cook (2003), are presented in the integration continuum in which the CLI varies depending on the stages of L2 development and the language's area as well as the L1−L2 crosslinguistic similarities and differences in the use of L1 Arabic and L2 English articles. Concerning L2 stages, the current data illustrate that an increase in accuracy was observed with an increase in both L2 proficiency and LOR in the UK. This pattern is consistent with Kecskes and Papp (2003), who state that, for L2 effects to be apparent, L2 learners need to reach a particular threshold in L2 which is only achieved with sufficient L2 proficiency level and enough L2 exposure.

The fact that the L2 to L1 effects did not surface in the distinctions between the bilingual and monolingual groups reflects Kecskes and Papp's (2003) claim that L2 to L1 effects are often harder to detect, especially on a structural level. The findings regarding L2 proficiency and exposure suggest that L2 to L1 effects appeared in underlying meanings, which is presented in the semantic and pragmatic function, in which L1 Arabic articles' accuracy increases due to L2 acquisition. This conclusion supports Ringbom's (2007) claim that, by acquiring an L2, learners gain more metalinguistic awareness. Mihaljević Djigunovic (2010) stated this ameliorated metalinguistic awareness contributes to making L2 learners more aware of their L1 use, as observed in the current findings.

Regarding the aspects above, the findings of the current study illuminated the impact of the L2AOA effects on the L2 to L1 effects. Contrary to Jarvis and Pavlenko (2008), the findings suggest that L2 to L1 influence is more prominent in adults (i.e. late learners) than children (i.e. early learners). One explanation is that age's effects are often confounded by the input (Muñoz, 2010). Adults in the BA have been exposed to both explicit and implicit L2 input in both classrooms and natural language settings. Children, however, were only

exposed to an L2 in natural settings. According to Muñoz (2010, p.46), '[T]he explicit instruction provided by the classroom favours explicit language learning, at which older learners are superior because of their greater cognitive maturity'. Likely, adults' explicit exposure to an L2 affects how it is integrated into their multicompetence system, where along with natural exposure has resulted in more activation of the L2 underlying concepts in the minds of the adult bilinguals than in children's. Therefore, this has resulted in more L2 effects on the L1 in adults as opposed to children.

CHAPTER SIX: EXAMINNG ARTICLE USE IN ARABIC−ENGLISH BILINGUAL ADULTS AND CHILDREN USING A SENTENCE-REPETITION TASK

6.1. Introduction

This chapter introduces the second study, which examines the use of L2 English and Arabic articles among Arabic−English speakers, adults (BA) and children (BC) ((age 7−12), using an SRT. The study investigates whether the independent variables of L1 influence, L2AOA, L1/L2 proficiencies and LORUK influence the use of L2 English articles by the group. Additionally, it examines whether the adjectival pre-modification of the nouns is likely to result in more omission errors in the L2 use of English articles. Moreover, the study investigates whether bilingual adults' use of L1 Arabic articles is impacted by the L2 use of English articles. Similarly, the use of L1 Arabic is examined regarding many variables: L2AOA, L2 proficiency and LORUK. Hence, the study includes two versions of an SRT: English[2] and Arabic. Furthermore, the performance of the groups in each version, the English and the Arabic, is compared to two control groups, monolingual Arabic speakers (MAS) and English native speakers (ENS), respectively. This study addresses the following research questions:

1. What patterns of English article use do bilingual Arabic−English-speaking adults and children of intermediate to advanced L2 proficiency exhibit during their acquisition of the English language?
2. How do individual factors of age, L2AOA, L1 (in children) and L2 proficiencies, LOR in an English-speaking country (i.e. the UK) and the linguistic factors of the L1 article system and the NP structure impact the acquisition patterns of L2−English articles in adults and children?

[2] The English version of the task designed here has been simultaneously used in another project (an MA dissertation) with an L1 Mandarin group (Huang, 2020). The aim was to include this study in a shared future publication and therefore the findings of are not reported here.

3. Does L2 affect L1 use of Arabic articles in Arabic−English bilingual adults?
4. How do age, L2AOA, L2 proficiency, and LOR in an English-speaking country (i.e. the UK) impact the use of L1 Arabic articles in adults?

6.2. Methodology

6.2.1. Participants

The study was conducted using the same groups of participants in Chapter 5: the BA, BC, MAS and ENS groups. A description and demographic information about the four groups are provided in Section 5.2.1. Considering that data collection for both the current study and the study in Chapter 5 occurred simultaneously, the same ethics forms for the narrative study were obtained here. Explanations about ethics are provided in Section 5.2.2.

6.2.2. The Rationale for Designing the Task

By using an SRT to examine article use, more control can be gained to determine the patterns and contexts in which articles are used. As the use of narratives is lacking in providing all four semantic contexts, using an SRT, all target contexts can be provided. In addition, both the structure and number of items can be determined in designing the task. In comparing SRTs with narratives, the amount of data in the narrative can vary greatly among subjects. In this regard, in SRTs, this variability can be restricted, as all participants will be presented with the same number of sentences to repeat.

SRTs have been known for their sensitivity in assessing language abilities (Marinis & Armon−Lotem, 2015). However, the usefulness of the task has been questioned based mainly on the premise the provided repetition is merely a rote imitation of sounds rather than a real indicator of language abilities (McDade et al., 1982). Based on this criticism, Erlam (2006) suggested certain considerations to ensure the constructiveness of the task, some which are addressed here:

1. Sentence length and complexity

The length of the sentence or the stimulus is important aspect to consider when designing an SRT. In this task, the length of the sentence can be controlled by counting the number of syllables (Vinther, 2002). The stimulus should be neither too long nor too short. Sentences that are too long can be too hard for the participant to imitate/remember (Hamayan et al., 1977). However, the sentences should be of an appropriate length to exceed subjects' short-term memory capacity. Sometimes, the stimulus is repeated correctly because it is short enough to be retained by the immediate memory, resulting in repetition with no comprehension, or what is known as 'parroting' or 'rote imitation' (Lee, 1970; Munnich et al., 1994). When the stimulus is long enough, this often allows the short memory to go into a deeper function of processing the stimulus before the repetition (Vinther, 2002). According to Eisenstein et al. (1982), the repetition provided and errors produced therefore reflects the participant's competence. Based on this criterion, in the current study's design, Chrabaszcz and Jiang's (2014) research on non-generic uses of *the* is followed where the target sentences have an average length of 13 syllables.

2. Delayed imitation

The chance of rote imitation or parroting increases when the repetition is immediately presented after hearing the stimulus (McDade et al., 1982). Delayed imitation has been achieved using different activities between hearing the stimulus and providing the repetition. These activities varied between inserting pictures, posing questions or both between the two steps.. In this study, this can be achieved through the insertion of the five-second pause between the stimulus and the repetition.

6.2.3. Design of the Sentence-Repetition Task

Two versions of the SRT were created: one version in Standard Arabic and another version in English. In each version, the task examined two features: first, the use/function of articles in the four semantic contexts: [definite, nonspecific] (i.e. generic), [definite, specific], [indefinite, specific] and [indefinite, nonspecific]. Based on the literature, one of the main hypotheses about why learners face difficulties in using English articles is associated with the function of the articles and the extent to which that function is similar or different to the system of their L1 (Ekiert, 2007; Alenizi, 2013; Elwerfalli, 2013). The second feature assessed if the presence of an adjective preceding the noun impacts the use and error patterns exhibited by the learners. It is assumed that omission errors occur more when the noun is preceded by an adjective (article + adjective + noun) than in the case with no adjective nouns (article + noun; Goad & White, 2004; Trenkic, 2002).

Following Chrabaszcz and Jiang (2014), for each target item in the task, two sentences were presented to the participant: a context sentence and a target sentence. The context sentence was written and used mainly to introduce the context for the target sentence; repetition was only required for the target sentence. The example 6.1 from Chrabaszcz and Jiang (2014, p. 364) illustrates how items in this study will be presented. Repetition is only required for the target sentence.

Example 6.1

On the cultural use of *the*

Context sentence: The U.S. Congress consists of the Senate and the House of Representatives.

Target sentence: Congress meets in the Capitol in Washington, D.C.

6.2.3.1. English Version of the English Sentence-Repetition Task

The English version of the sentence-repetition task elicits the use of the articles *a/an*, *the* and *zero* (Table 6.1). The task examined the use of English articles within the four main

English semantic contexts: generic, [definite, specific], [indefinite, specific] and [indefinite, nonspecific]. Within each context, eight items, with one context sentence and one target sentence for each item, were presented, except for the *generic* context in which 12 items were used. Eight items per context would ensure reliable statistical analysis. In the generic context, conversely, 12 items were included to ensure an equal number of items for each of the three English articles across the four contexts; therefore, the task has 12 items eliciting the use of *the*, 12 items eliciting the use of *a/an* and 12 items eliciting the use of *zero* across the semantic contexts. For each case across all contexts, half of the target nouns were bare nouns, while the other half were pre-modified by an adjective (see Table 6.1).

As mentioned before, each item contained a context and a target sentence, as in Example 1 (Table 6.1). The target sentences were designed according to certain criteria. First, the length of these sentences was an average of 13−15 syllables for each target sentence (Chrabaszcz & Jiang's (2014). Additionally, the content related to simple events in which children could understand these sentences. Following is the distribution of articles according to each context:

In the generic context:

- Four sentences present the use of generic *the*,
- Four sentences represent the use of generic *a/an* and
- Four sentences to represent the use of generic *zero*.

Therefore, in Table 6.1, Item 1 tested the use of *zero* in the generic context with an adjective (Adj + *zero* + noun). The context sentence is introductory and mainly added for consistency in the generic, as some of the items within the task (i.e. in the [definite, specific] context) require a sentence before the target sentence to convey the intended meaning. The target sentence is the sentence added to be repeated by the participant to elicit the use of the target article. The last column shows the number of syllables in each target sentence.

The context [definite, specific] represents the non-generic uses of textual, structural, situational and cultural uses (explained in Section 2.2.1). For each non-generic type of *the*, two target sentences are presented, one with the presence of an adjective and one without. In each of the [indefinite, specific] and [indefinite, nonspecific], which represent the use of the indefinite articles *zero* and *a/an*, four sentences presented the use of *a/an.* The other four represented the use of *zero*. The test included 18 filler items (Table 6.2) to prevent the participants from becoming aware of the test aspects. In addition, five training items were used to introduce participants to the task (Table 6.3).

Table 6.1

Sentences in the English Sentence-Repetition Task

	The context	Context sentence	Target sentence	Number of syllables
	Generic: *zero, a/an, the*			
1	Adj + *zero* + NP	Tom watches a lot of scary films.	He says scary films are fun and interesting.	12
2	Adj + *zero* + NP	Seafood is really common in Wales.	For instance, fried prawns are really popular there.	13
3	*zero* + NP	It is often a good idea to have flowers at home.	I think flowers are colourful and bring joy to the place.	14
4	*zero* + NP	It is easier to ride a bike when you are young.	I think children are often good at riding bikes.	12
5	Adj + *a/an* + NP	There are certain things you should not forget when you go out in summer.	I think a small water-bottle is very important.	14
6	Adj + *a/an* + NP	Some types of flowers have a special meaning.	For example, a red rose can give the meaning of love.	14
7	*a/an* + NP	Layla thinks Ahamd should get a pet, maybe a dog!	I think a dog is a very friendly animal.	14
8	*a/an* + NP	Tom was not sure what to buy for a gift.	I think a book is always a good choice for a gift.	13

9	Adj + *the* + NP	There many types of animals in East Asia.	For instance, the black tiger lives in the jungles of India.	14
10	Adj + *the* + NP	Male lions are really lazy!	It is the female lion that often hunts for food.	13
11	*the* + NP	Jack hates living in rural areas.	He thinks the city is a better place to live in.	13
12	*the* + NP	There are some animals that cannot be taken as pets.	For example, the bear can be very dangerous.	13
	Definite, Specific: *the*			
13	Cultural use	There are many interesting places in London.	It would be a good idea to visit the big tower if you go there.	15
14	Cultural use	It would be nice to go camping.	We can look at the moon and have a barbecue.	14
15	Situational use	While eating dinner, the wife said to the husband:	'Can you pass me the small spoon, please?'	11
16	Situational use	The team were playing football for two hours.	Then, the coach asked them to pick up the balls before leaving.	14
17	Textual use	The mother gave her daughter a bicycle for her birthday.	The girl uses the bicycle to go to school every day.	13
18	Textual use	Last week, a new student moved to our neighbourhood.	I saw the new student going to Starbucks the other day.	14
19	Structural use	There are a lot of toys in the box.	I like the blond doll next to the car on the right.	12
20	Structural use	There are two children at the party.	These children are playing next to the tall man in black.	12
	[indefinite, specific]: *a/an*, *zero*			
21	Adj + *a/an* + NP	Alex loves raising animals.	Yesterday, he brought a black cat to the apartment.	13
22	Adj + *a/an* + NP	Amin came home with a smile on his face.	Then, he gave his wife a beautiful ring for her birthday.	14
23	*a/an* + NP	The teacher came to class today.	He gave a lesson about life in Australia.	12
24	*a/an* + NP	Mona is sitting in the library.	She is reading a book about castles and dragons.	12

25	Adj + *zero* + NP	The family sat down at the restaurant for dinner.	The waiter served roast potatoes to the family.	14
26	Adj + *zero* + NP	Nada is wearing a long skirt.	The long skirt has gold buttons around the waist.	11
27	*zero* + NP	Kate and her friends went for a picnic.	In the picnic, they ate biscuits and sat on the grass.	13
28	*zero* + NP	The teacher gave an art class for the children.	In the class, the children drew pictures of their parents.	13
	[indefinite, nonspecific]: *a/an*, zero			
29	Adj + *zero*+ NP	Studying can be hard.	You need to take difficult exams during the year.	13
30	Adj + *zero* + NP	It is nice to go to the park.	We can buy beautiful balloons and eat ice cream.	12
31	*zero* + NP	In my family, we all like to do different things.	My sister loves baking cakes for us on the weekends.	13
32	*zero* + NP	My father works in a company.	This company builds houses for many families.	12
33	Adj + *a/an* + NP	There are many ways to do good things.	One way is to give a homeless man some food.	12
34	*a/an* + NP	There are many ways to tell someone you love them.	You can write a letter to your mum and say you love her.	14
35	*a/an* + NP	Kate found a new job.	Now, she is a teacher in our school, and she loves it.	13
36	Adj + *a/an* + NP	My friend has a dream.	She wants to be an important doctor when she grows up.	14

Table 6.2

Filler Sentences for the English Sentence-Repetition Task

	Context sentences	Target sentences	Number of syllables
1	Where were you?	I have been studying in my room for the last three hours.	13
2	I have not seen Ali for a while	He has been staying with his aunt and her son since last week.	14
3	Where had Sam spent his summer vacation?	He had stayed in New York for the entire summer.	12

4	Mona does not have a job.	She has been looking for a job since her graduation.	13
5	How long have you been waiting?	I have been waiting for a couple of hours now.	12
6	How much practice does a person need to get the driving licence?	You need to practice for a minimum of 30 hours.	14
7	I have not seen Charlie for a while.	She has been really busy since her sister's wedding.	14
8	Adam is an old teacher.	He has been working in this school for a long time.	12
9	It is finally summer vacation!	I can play videogames and watch films all day long!	12
10	My friend talks a lot!	She has been literally talking for the last four hours!	14
11	I met Naidia in the gym last year.	Since then, we have been meeting every now and then.	13
12	Building a house can take a long time.	It can sometimes take over two years to finish.	13
13	Alice looks tired.	She has been cleaning the garden since this afternoon.	13
14	Sam and Mike are working in the house.	They have been painting the walls for the last two days.	12
15	Beth and Bob are a beautiful couple.	They have been married since they were college students.	12
16	Ayman is finally finishing his studies.	He has been studying medicine for the last seven years.	12
17	John is really busy.	He has been working in the office since he came.	12
18	How long is the first training?	The first training usually takes around a year and three months.	14

Table 6.3

Training Sentences for the English Sentence-Repetition Task

	Context sentences	Target sentences	Number of syllables
1	Eman is very good at singing.	Last week, she sang **a song** for her brother's birthday.	12
2	Ahmad bought a new phone last month.	He has been using **the new phone** to talk to his family.	13
3	Kate is going through a hard time.	It would be nice if you give her **a hug** to cheer her up.	14
4	Layla has an exam tomorrow.	She has been working really hard for the last two weeks.	13

5	How long have you been in Liverpool?	I have been living in Liverpool since my childhood.	14

6.2.3.2. Arabic Version of the Sentence-Repetition Task

The Arabic version of the task examined the use of the Arabic articles: *al-* and *zero* (Table 6.4). This version was presented in Standard Arabic. The reason for choosing Standard Arabic and not spoken colloquial Arabic is that there are different versions of colloquial Arabic in Saudi Arabia. Choosing one variety of colloquial Saudi Arabic is problematic as not all children/participants might necessarily understand that variety as Saudis in the UK come from different parts of the country. Accordingly, it was decided that Standard Arabic would be used instead. During the pilot study, children in regular UK schools were examined in which it appeared that their knowledge of Standard Arabic was insufficient. Accordingly, the task was used only with the bilingual adults participants. Like the English version, the use of the Arabic articles was examined within the four semantic contexts: generic, [definite, specific], [indefinite, specific] and [indefinite, nonspecific]. Within each context, eight items were presented with one context sentence and one target sentence for each item. For each article use across all the contexts, half of the target nouns were bare nouns, while the other half were followed by an adjective.

All the target sentences were chosen with an average of 13−18 syllables for each target sentence. In the generic use in Arabic, unlike in English, the noun is always preceded by *al-*. Moreover, the use of the generic with plural nouns is always marked by *al-* unlike English, in which marking generic plural nouns with *the* is considered ungrammatical (Abumlhah, 2016). Accordingly, to balance the data, half of the items in this context presented the use of plural nouns, while for the other half, singular nouns were used. The context [definite, specific] represented the non-generic uses of *al-*: textual, structural, situational and cultural. For each type of non-generic use of *al-*, two target sentences were presented: one with an adjective and one without. In the [indefinite, specific] and [indefinite,

nonspecific] contexts, which represent the use of the indefinite article *zero*, to strike a balance and mirror the use of articles in English, four sentences included singular nouns, and the other four had plural nouns. The test also comprised 16 filler items (Table 6.5) to prevent the participants from becoming aware of the test's aspects. In addition, to familiarise the participants with the task, five training items were added (Table 6.6).

Table 6.4

Sentences in the Arabic Sentence-Repetition Task

		Context sentence	Target sentence	Number of syllables
	Generic			
1	Bare plural NP	تتميز بعض الحيوانات بالذكاء Some animals have special intelligence.	تعتبر الفيلة من أكثر الحيوانات ذكاءً **Elephants** are one of the most intelligent animals.	14
2	Bare plural NP	بعض الحيوانات تعيش طويلاً Some animals live a long life.	تعيش الدلافين فترة طويلة من الزمن **Dolphins** live for a long duration of time.	13
3	Adj + plural NP	تعيش بعض الحيوانات في اماكن باردة Some animals live in cold areas.	تعيش الدببة القطبية في شمال الكرة الأرضية **Polar bears** live at the North Pole.	14
4	Adj + plural NP	بعض الحيوانات تأكل اللحوم Some animals are meat eaters.	تتغذى النمور السوداء على لحوم بعض الحيوانات **Black tigers** feed on the flesh of other animals.	17
5	Bare NP	بعض الحيوانات تتغذى على النبات Some animals are plant eaters.	يأكل الحصان الأعشاب وبعض أنواع الفواكه **The horse** eats grass and some types of fruit.	16
6	Bare NP	تنام بعض الحيوانات كثيراً Some animals sleep a lot.	يحب الأسد النوم لساعات طويلة خلال اليوم **The lion** likes to sleep for long hours during the day.	15
7	Adj + NP	بعض الحيوانات تحب المشي Some animals like to walk.	يستطيع الحمار الوحشي السير لمسافات بعيدة **The zebra** can walk long distances.	17
8	Adj + NP	تعد أمريكا موطنا لبعض الطيور	يعيش الديك الرومي في أمريكا الشمالية **The turkey** lives in North America.	13

		The US is a home for some (types of) birds.		
	Definite, specific: al-			
9	Bare NP	حضر طالب جديد إلى فصلنا الأسبوع الماضي A new student arrived in our class last week.	أصبح الطالب صديقاً للجميع في فترة قصيرة **The new student** became everyone's friend in a short time.	16
10	Adj + NP	اشترت ليلى فستاناً جديداً من أجل الحفلة Layla bought a new dress for the party.	احتوى الفستان الجديد على شرائط ذهبية **The new dress** contains gold ribbons.	14
11	Adj + NP	بينما جلست العائلة حول المائدة, قالت الأم لابنتها: While the family sat down for dinner, the mother told her daughter:	"خذي السلة الصغيرة إلى المطبخ وأحضري الشاي" 'Take **the small basket** to the kitchen, and bring the tea'.	16
12	Bare NP	بينما كانت منى تدرس في المكتبة مع أخيها, قالت منى: While she was studying in the library with her brother, Mona said:	"أعطيني القلم الذي بجانبك لو سمحت" 'Can you give me **the pen** beside you, please?'	15
13	Adj + NP	يوجد حيوانات عديدة داخل المزرعة There are many animals inside the farm.	يعجبني الحصان الصغير الذي بجانب السور I like **the small pony** besides the fence.	14
14	Bare NP	يحب أيمن صرف المال Ayman likes to spend money.	كانت الحقائب التي اشتراها الأسبوع الماضي غالية جداً **The bags** he bought last week are really expensive.	18
15	Adj NP	يحرص سالم على زيارة العائلة دائماً Salim is always committed to visiting family.	خلال العيد المبارك يزور سالم والديه واخوته During **the blessed Eid**, Salim visits his parents and his siblings.	17
16	Bare NP	يقوم المسلمون بأداء عدة واجبات Muslims have many commitments.	مثلاً, على المسلمين إعطاء الصدقة للمحتاجين For instances, Muslims must pay **the sadaqah** (charity money) for the poor.	17
	Indefinite, specific: zero			

17	Bare NP	ذهب رامي إلى صالة السينما Rami went to the cinema.	في السينما, شاهد رامي فيلماً عن حياة القرود In the cinema, Rami watched **a film** about the life of apes.	15
18	Adj + NP	ذهبت منى إلى السوق بالأمس Mona went shopping yesterday.	هناك, اشترت منى حقيبة خضراء وبعض الملابس There, Mona bought **a green bag** and some clothes.	17
19	Bare NP	فتحت إيمان السلة Eman opened the basket.	أخرجت إيمان دباً صغيراً من السلة Eman took **a small bear** out of the basket.	13
20	Adj + NP	أنس كاتبٌ مبدع Anas is a creative writer.	العام الماضي, كتب أنس قصيدة عن حب الوطن Last year, he wrote **a poem** about loving home.	15
21	Bare Plural NP	أحلام لاتزال بالمرسم Ahlam is still in the studio.	إنها تلون بطاقات من أجل حصة الرسم غداً She is colouring **cards** for the art class tomorrow.	16
22	Bare Plural NP	عاد رائد إلى المنزل وهو يحمل كيساً Raed came back home carrying a bag.	أخرج رائد علباً من الكيس وبعض الأطعمة Raed took **cans** out of the bag.	15
23	Adj + Plural NP	علق أبي لوحةً في الصالة My father hung a painting in the living room.	بداخل اللوحة, توجد بيوت ملونة حولها حدائق Inside the painting, there are colourful houses surrounded by gardens.	17
24	Adj + Plural NP	سافر مهند إلى المكسيك الأسبوع الماضي Muhannad travelled to Mexico last week.	من هناك, أحضر مهند قبعات جميلة وبعض الأطعمة There, he bought **beautiful hats** and some types of food.	18
	Indefinite, nonspecific: zero			
25	Bare NP	منى لا تستطيع دفع أجار الشقة Mona cannot pay the rent.	منى طالبة بالجامعة وليس لديها وظيفة She is **a student** at a university and does not have a job.	17
26	Adj + NP	أحمد يدرس الطب Ahamd is studying medicine.	إنه يعمل جاهداً ليصبح طبيباً ماهراً يوماً ما. He is working hard to become **a doctor** one day.	18

27	Adj + NP	سناء لا ترد على المكالمات Sana does not respond to calls.	بإمكانك إرسال رسالة نصية إلى هاتفها You can send her **a written text** to her phone.	16
28	Bare NP	سالم إنسان ناجح Salim is a successful person.	سالم موظف في شركة كبيرة لبيع الأثاث Salim is **an employee** in a big company which sells furniture.	15
29	Adj + Plural NP	أحمد يعمل كاتباً في جريدة Ahamad is a writer for a newspaper.	يقوم أحمد بكتابة مقالات قصيرة للجريدة Ahamad writes **short articles** for the newspaper.	16
30	Adj + Plural NP	من الجميل أن تكون فناناً It is nice to be an artist.	بإمكانك رسم لوحات جميلة وبيعها للآخرين You can paint **beautiful paintings** and sell them to others.	18
31	Bare Plural NP	تحلم خلود بأن تعمل بمخبز Khulood dreams about working in a bakery.	ترغب خلود بصنع حلويات بنكهات عديدة Khulood wants to make **sweets** of different flavours.	18
32	Bare Plural NP	تحب نورة مساعدة الآخرين Noura likes helping others.	تقوم نورة بتوزيع هدايا للعوائل الفقيرة كل عام Noura distributes **gifts** to poor families every year.	17

Table 6.5

Filler Sentences for the Arabic Sentence-Repetition Task

	Context sentences	Target sentences
1	متى تبدأ الدراسة؟ When does school start?	سوف تبدأ الدراسة في الأسبوع القادم School starts next week.
2	كم عشت هنا؟ How long have you lived here?	لقد عشت في مدينة الرياض لمدة عشرين عاماً I lived in Riyadh city for 20 years.
3	إيمان تدرس جيداً من أجل إمتحانها Eman is studying well for her exam.	لديها إمتحان علوم يوم الإثنين القادم She has a science exam next Monday.
4	أحمد يتحدث اللغة الإنجليزية جيداً Ahamd speaks English very well.	عاش أحمد عشر سنواتٍ من عمره في أمريكا Ahamd has spent 10 years of his life in the US.
5	أشترت أماني أدوات للرسم Amani bought painting tools.	ستشارك أماني في مسابقة الرسم الشهر القادم Amani is participating in a painting contest next month.
6	حصل أيمن على ميدالية ذهبية Ayman has gotten a gold medal.	لقد حصل عليها في مباراة السلة العام الماضي He got it in a basketball game last year.

7	أمل وسالم متزوجان منذ فترة طويلة Amal and Salim have been married for a long time.	سيحتفل الإثنان بذكرى زواجها العاشر غداً The two are celebrating their tenth anniversary tomorrow.
8	متى بدأت الكتابة When did you start writing?	لقد بدأت الكتابة عندما كنت في الصف الخامس I started writing when I was in the fifth grade.
9	كم يوماً إستغرقت في رسم اللوحة How long did it take you to paint the painting?	إستغرق رسم هذه اللوحة خمسة أشهر Painting this painting has taken five month.
10	مها تشعر بالتعب Maha is feeling tired.	قامت مها بتنظيف المنزل طوال اليوم Maha has been cleaning for the entire day.
11	يجب أن أنام مبكراً I have to sleep early.	علي أن أذهب إلى العمل غداً صباحاً I have to go work tomorrow.
12	سامي مصور محترف Sami is a professional photographer.	عمل سامي مصوراً في الجريدة لمدة أربع سنوات Sami worked as a photographer for a newspaper for four years.
13	سعيد مصابٌ بالزكام Saeed has a cold.	غاب سعيد عن المدرسة مدة يومين Saeed has been absent from school for two days.
14	خالي مدرسٌ رائع My uncle is a great teacher.	عمل خالي في التدريس مدة عشرين عاماً My uncle has worked in teaching for 20 years.
15	تأخذ زهراء دروساً في القيادة Zahra is taking driving lessons.	زهراء لديها إمتحانُ في القيادة الشهر القادم Zahra has a driving test next month.
16	تشعر رنا بملل شديد Rana is feeling bored.	لم تخرج رنا من المنزل لأسبوعين كاملين Rana has not gone out of the house for two complete weeks.

Table 6.6

Training Sentences for the Arabic Sentence-Repetition Task

	Context sentences	Target sentences
1	ذهبت إيمان إلى المحل Eman went to the shop.	من هناك إشترت إيمان دفتراً وبعض الأطعمة From there, Eman bought a notebook and some food.
2	الفيلة حيوانات كبيرة الحجم Elephants are huge animals.	تُعد الفيلة أكبر الحيوانات على الكرة الأرضية Elephants are considered the largest animals on earth.
3	أحضر أحمد قطاً إلى المنزل Ahmad brought a cat to the house.	يحب القط اللعب طوال اليوم وأكل السمك The cat likes to play the entire day and eat fish.
4	أين تنوي قضاء الإجازة؟ Where do you want to spend the vacation?	أفكر بقضاء إسبوعين في فرنسا وأسبوعاً آخر في لندن I'm thinking about spending two weeks in France and one week in London.
5	منى رياضية محترفة Mona is a professional athlete.	تعمل منى مدربة رياضية منذ تخرجها من الجامعة Mona works as a trainer since she graduated from university.

6.2.3.3. Presenting Task Items

The two tasks were presented on PowerPoint slides accompanied by pictures reflecting the meaning of the sentence. For each item, in the slide of the context sentence, the context sentence was written and presented with a picture (see Figure 6.1) for some time (5−7 seconds) before the target sentence. Following Chrabaszcz and Jiang's (2014) study, the target sentence was presented immediately on a following slide in the form of pre-recorded audio and attached to PowerPoint slides with a picture reflecting the meaning of the sentence as well (see Figure 6.2). Between the stimulus (i.e. listening to the target sentence) and the repetition, a timer of five seconds was inserted for delaying the response, which allowed individuals to focus on the meaning and avoid parrot repetition (see Figure 6.3). When the timer ended, a beeping sound was heard accompanied by the word 'Go' on the screen, and the participant then repeated the target sentence (See Figure 6.4)

Figure 6.1

A Sample Slide Presented a Context Sentence.

Figure 6.2

Presenting the Target Sentence in Audio Form

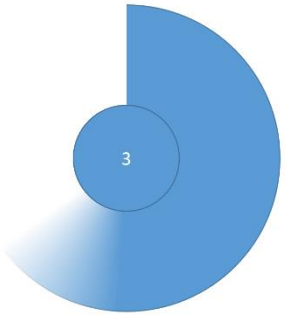
[redacted]

[redacted]

Figure 6.3

The Timer Provides a Pause Between the Stimulus and the Repetition.

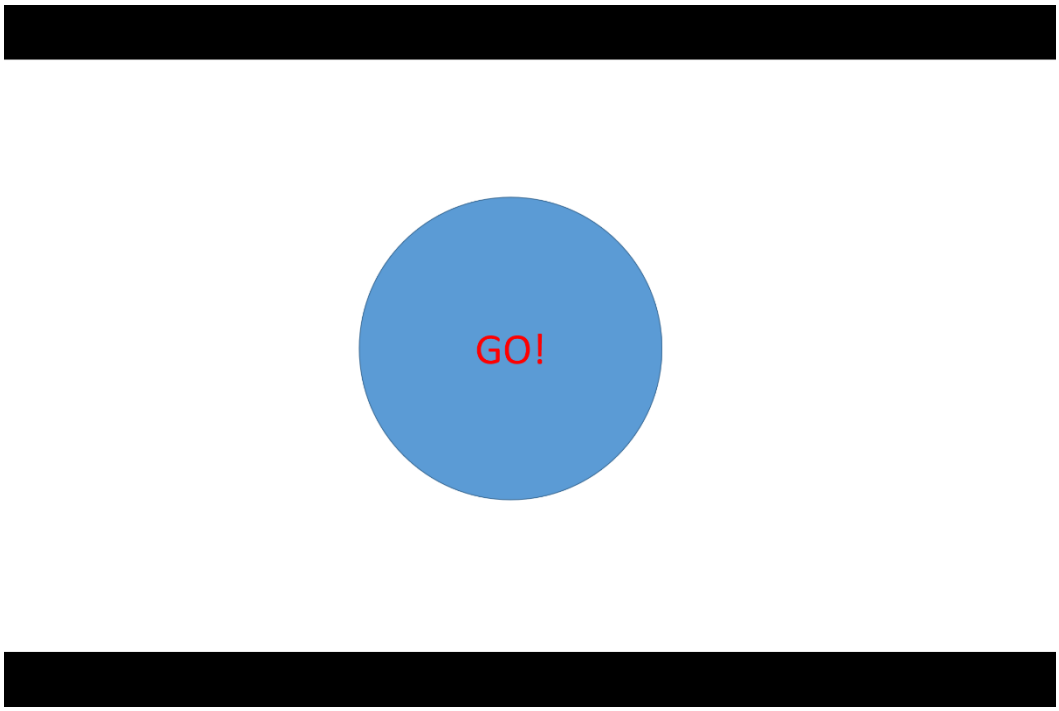
[redacted]



[redacted]

Figure 6.4

The Time at Which the Participant Should Provide Repetition after Hearing the Peep



For each of the two tasks, the training items were presented in a separate PowerPoint document for the main items and filler items. For each version of the task, the remaining items (i.e. the main items and filler items) were included in one PowerPoint document where the order of the items was randomised. For each version of the task, four randomised versions were used.

For each version of the task, the task was presented in five parts/stages. After each part, the participants were presented with a picture with the phrase *congratulation* and a clapping sound for encouragement. For encouragement as well, a star also appeared at the end of each part, and subjects collected five stars when they were done. All the responses of the participants were audio recorded to be scored later.

6.2.4. Procedure

The two versions of the task were performed in two sessions, one week apart between each session. Instructions were given in the target language of the task. Initially, the task was

presented on a laptop (*acer, screen size 14*) on which individuals performed the task with the examiner face to face. For the children, the tasks were conducted in the presence of the mother. Following the COVID-19 protocols and social distancing requirements, the data were continued online for the adults in which the materials were presented on a shared screen. Subjects viewed the task on their computer/laptop using Zoom software. As it was difficult for children to stay focused online, the data collection for the BC group stopped before that.

Before starting the experimental session of the task, the participants were presented with five training examples to familiarise them with the task. The participants were asked first to read the context sentence (or listen to the examiner reading it), which is written underneath the presented picture (see Figure 6.1). Subsequently, they would listen to the target sentence in the following slide, followed by the beep and the word *go*, after which they provided their repetition. If the participants were successful with the training, they were told to follow the same scenario with the main task; otherwise, they were given clarification during the training until they fully understood how it was done. During this process, for each participant, the experiment was recorded using a mobile device. Each target sentence was heard once, unless the sound had the distraction of background noise or was not heard due to connection issues in the online situation. Each session of the tasks lasted between 20 to 30 minutes offline. However, in the online situation, due to connection issues, the duration was sometimes longer, up to 40 minutes.

6.2.5. Piloting the Task

It was important to ensure that the task was successful in examining the implicit knowledge of the participants and was of an appropriate level for the subjects, particularly regarding vocabulary. The words in the task needed to be comprehended especially by the children. It was also important to ensure that the administration of the task was not too challenging for participants. To control all these factors, the task was piloted to test the

constructiveness of the task and ensure that it was well-designed. Piloting was first done on two groups of participants. For the English task, nine were included: five adults and four children. Among the children, three were bilingual, and one was a monolingual English speakers. Among the adult participants, four were bilinguals. Two were students in the UK, and two were visiting the UK. The fifth participant, a visitor as well, was mainly monolingual in Arabic but had some knowledge of English. For the Arabic version, eight participants tried the task: four bilingual adults and four bilingual children.

a. Results of the English sentence-repetition pilot

The delayed response and the length of the sentence seemed sufficient in preventing participants from providing rote repetition (i.e. parroting), an outcome often criticised in SRTs. Accordingly, this allowed the participants to keep the meaning and reproduce the sentence, reflecting their own level of grammar. Consequently, the produced sentences seemed to reflect their own implicit knowledge. Further evidence of participants' use of implicit knowledge is that, on many occasions, subjects provided another correct use of articles, although they replaced the target article. For example, some participants often used the article *a* instead of *the* in a generic context in which both articles can express generic meaning (e.g. 'A bear can be very dangerous' instead of 'The bear can be very dangerous'). Another example can be exhibited in indefinite contexts in which an indefinite singular noun phrase might replace the plural noun phrase, yet the participant in that case also added *a,* which made the use of the article correct in that case.

b. Results of the Arabic sentence-repetition pilot

The BA group performed with high accuracy and rarely made errors. Among all the adult data, each of the errors, *al-* overuse and *al-* omission, occurred once. In addition, once, a participant missed the noun phrase, using a verb instead of the noun (i.e. 'He works in a company…' instead of 'He is an employee in a company').

The Arabic task was difficult for the bilingual children. Only one of four could finish the task; all the other three could not finish the training part, even though they spoke colloquial Arabic well. The one who finished the task started school back in her home country, in which studies take place in Arabic. She had been in the UK only eight months. Moreover, even though she finished the task, she missed the noun phrase many times and admitted that it was harder than the English task. Accordingly, although the other children spoke Arabic very well, they only used spoken colloquial Arabic and the task was in Standard Arabic.

c. Adjustments

After piloting, minor changes were made to the English version of the task. These adjustments included five items (Appendix 7) varying between changing some words to changing the target sentence or both the context and the target sentence. A phrase such as 'for instance' was replaced by words that were more familiar to the young participants ('for example'). There were cases in which the participants dropped the noun phrase, presumably due to the type of verb preceding the noun phrase. For example, when the noun phrase is in an object position, but the verb can stand alone without the presence of the object, as in 'In the picnic, they ate biscuits and sat on the grass', the verb was replaced by 'had', for which having an object is necessary.

Regarding the Arabic version, although no adjustments were made, the use of the task was restricted only to the BA group and the MAS group. The task was in Standard Arabic, which was difficult for the BC group in this study. Nonetheless, it is often taught in school in Saudi Arabia. Considering the children attended school in the UK, an education in Standard Arabic was not available for most children. Therefore, the Arabic version of the experiment was conducted only with bilingual adults.

6.3. Analysis of the English Sentence-Repetition Task

6.3.4. Scoring the English Sentence-Repetition Task

The responses of the participants were recorded using a mobile device and then transcribed and scored. The scoring of the task followed a 0−1 scheme. The scoring of the target item was based on the criteria of whether there was any replacement of the target article or any change in the countability of the noun within the target noun phrase. The scoring also revolved around the pragmatic value of the target noun phrase and if it had been changed due to alterations surrounding the target noun phrase in the target sentence. For example, if certain changes in repeating a sentence switched the meaning from generic to definite specific, it was scored as 0. Within the noun phrase, omitting adjectives or adding them was not considered an error. In addition, replacing the noun with another noun of the same type in terms of countability did not influence the score. Based on the above, a score of 0 was given only in the following cases; otherwise, it was scored as correct (i.e. as in 1):

1. When the target article is omitted (i.e. substituted by *zero*; see Example 6.2) or replaced with another article (Example 6.3) even if the replacing article carries the semantic and pragmatic function of the replaced article.

   Example 6.2

   Original sentence: Then, the coach asked them to pick up the balls before leaving.

   Repetition: “Then the coach asked them to pick up balls before leaving.” (*the* omission)

   Example 6.3

   Original sentence: I think a dog is a very friendly animal.

   Repetition: “I think the dog is a very friendly animal.” (substitution)

2. When the countability of a noun within a target noun phrase is changed, that is when a plural noun is changed to singular (Example 6.4) and vice versa (Example 6.5).

   Example 6.4

   Original sentence: The long skirt has gold buttons around the waist.

   Repetition: "The long skirt has a gold button around the waist." (plural changed to singular).

   Example 6.5

   Original sentence: For example, the black tiger lives in the jungles of India.

   Repetition: "For example, the black tigers live in the jungle of India." (singular noun is changed to plural)

3. When the type of the noun and the target noun phrase are changed (i.e. when a countable noun is made uncountable and vice versa; see Example 6.6).

   Example 6.6

   Original sentence: In the picnic, they had biscuits and sat on the grass.

   Repetition: "In the picnic, they have food and sits on the grass." (an uncountable noun substituting for a countable noun)

4. When another determiner or a pronoun is used instead of the target article (e.g. *some, her* etc.), even when the semantic and the pragmatic value remained (see Example 6.7).

   Example 6.7

   Original sentence: In the picnic, they had biscuits and sat on the grass.

   Repetition: "In the picnic, they had some biscuits and sat on the grass." (*some* instead of *zero*)

5. When the entire noun phrase is omitted from the sentence (see Example 6.8).

Example 6.8

Original sentence: In the class, the children drew pictures of their parents.

Repetition: "In the class, children drew their parents."

6. When the noun is omitted even when the adjective within the target noun phrase is kept, as in Example 6.9.

Example 6.9

Original sentence: One way is to give a homeless man some food.

Repetition: "One way is to give a homeless some food." (the noun is omitted)

7. When the repetition failed or was not provided.
8. When the target noun phrase remains the same, but other changes within the sentence outside the target noun phrase change the intended meaning, as in Example 6.10.

Example 6.10

Original sentence: It is the female lion that often hunts for food.

Repetition: "This is the female lion that likes to hunt for food." (The meaning is changed from generic to definite specific.)

9. When the repetition is provided too early before the alarm

6.3.5. Categorisation of English Sentence-Repetition Accuracy Scores

Correct responses were calculated for each participant, and each was given an overall score out of 36, excluding all errors. The scoring was then categorised to determine accuracy based on the following:

1) Accuracy per semantic context: Overall accuracy of using articles in each semantic context (generic, [definite, specific], [indefinite, specific], [indefinite, nonspecific]);

2) Accuracy per obligatory context: Overall accuracy of each individual article based on the obligatory context (i.e. across all semantic contexts in which the article is used);

3) Accuracy of using articles within each semantic context: Accuracy of each individual article or category within a specific semantic context. For example, for the English article system in the generic context, accuracy is calculated for generic *the,* generic *a/an* and generic *zero*.

To determine the accuracy of article use for each semantic context, the overall score was divided across the four semantic contexts to determine participants' accuracy in using articles within each of these contexts. In the English SRT, the generic was scored out of 12, while the [definite, specific] context, the [indefinite, specific] context and the [indefinite, specific] context were scored out of eight. To determine the general accuracy score for each individual article based on its obligatory context, the sum of all scores was calculated for each article across the four contexts. Accordingly, the accuracy scores for each of *the, a/an* and *zero* were calculated out of 12. Finally, for the accuracy of articles within a specific semantic context, the scores were divided for each individual article use/category within the context. In the generic, each of *the, a/an* and *zero* were scored out of four; in the [definite, specific] context, each cultural use, textual use, structural use and situational use of *the* was scored out of two. In the [indefinite, specific] context, *a/an* and *zero* were scored out of four. Similarly, in the [indefinite, nonspecific] context, *a/an* and *zero* were scored out of four.
4) Errors in the use of articles and numbers were calculated and categorised under nine categories: *a/an* omission, *the* omission, *the* overuse in the *a/an* context, *the* overuse in the *zero* context, *a/an* overuse in the *the* context, *a/an* overuse in the *zero* context, pluralisation errors, pluralisation and article errors combined and other. The errors were further categorised based on grammaticality into grammatical and ungrammatical errors. Furthermore, to determine the impact of the syntactic structure of nouns (being pre-modified by an adjective versus when they lack an adjective), errors were calculated for each case.

6.3.6. Statistical Analysis

SPSS software was used to conduct the statistical analysis of the data. First, it was important to check the normality of the distribution and homogeneity of variance for the data. A Shapiro−Wilk normality test and Levene's tests were used to check for normal distribution and homogeneity for the ENS controls, the BA group and the BC group. The results (Table 6.7) indicated that the data were not normally distributed, and nonparametric tests were used. Second, descriptive statistics of the mean and standard deviation were employed for the scores (converted to percentages) to obtain a comparable index of the performance of the groups.

Table 6.7

Shapiro−Wilk Test of Normality and Homogeneity of Variance of the Accuracy Scores in the English Sentence-Repetition Task

		Shapiro−Wilk		Levene's test
		Df	*p* value	*p* value
	Overall accuracy	83	$p < 0.001$	$p < 0.001$
Accuracy per semantic context	Generic	83	$p < 0.001$	$p < 0.001$
	[definite, specific]	83	$p < 0.001$	$p < 0.001$
	[indefinite, specific]	83	$p < 0.001$	$p < 0.001$
	[indefinite, nonspecific]	83	$p < 0.001$	$p < 0.001$
Accuracy obligatory context	*The* score	83	$p < 0.001$	$p < 0.001$
	a/an score	83	$p < 0.001$	$p < 0.001$
	Zero score	83	$p < 0.001$	$p < 0.001$
Accuracy of articles in the generic context	Generic *zero*	83	$p < 0.001$	$p < 0.001$
	Generic *a/an*	83	$p < 0.001$	$p < 0.001$
	Generic *the*	83	$p < 0.001$	$p < 0.001$
Accuracy of articles in [indefinite, specific]	[indefinite, specific] *a/an*	83	$p < 0.001$	$p < 0.001$
	[indefinite, specific] *zero*	83	$p < 0.001$	$p < 0.001$
Accuracy of articles in [indefinite, nonspecific]	[indefinite, nonspecific] *a/an*	83	$p < 0.001$	$p < 0.001$
	[indefinite, nonspecific] *zero*	83	$p < 0.001$	$p < 0.001$

Non-generic uses of *the* (i.e. in [definite, specific] context)	Cultural *the*	83	$p < 0.001$	$p < 0.001$
	Situational *the*	83	$p < 0.001$	$p < 0.001$
	Textual *the*	83	$p < 0.001$	$p < 0.001$
	Structural *the*	83	$p < 0.001$	$p = 0.013$

Based on the results of the normality test, two types of nonparametric tests were conducted for between-group and within-group analyses. A between-group Kruskal−Wallis H test, with pairwise *post-hoc* tests, was performed to examine if there were variations between the accuracy scores of the ENS group, the BA group and the BC group. To compare the levels of accuracy within the semantic context and across the obligatory contexts, within-subjects Friedman's and follow-up Wilcoxon signed rank tests were conducted.

Within-group Spearman correlation tests were also performed to examine the influence of the independent variables of LORUK, L2AOA, the TROG-2 score and the ASCT score on accuracy measures for both bilingual groups together and then for each of the BA group and the BC group.

Descriptive statistics were obtained for the errors produced by the BA and the BC groups. To compare between errors in the (article + noun) case and the (article + adjective+ noun) case, Wilcoxon signed rank tests were conducted. Correlation tests were also conducted to compare omission errors in relation to the syntactic structure of the nouns (pre-modified and non-pre-modified).

6.4. Analysis of the Arabic Sentence-Repetition Task

6.4.1. Scoring of the Arabic Sentence-Repetition Task

The Arabic article system is different from the English article system because it is not influenced by noun countability. Indefinite nouns, in both specific and nonspecific contexts, are marked by *zero*, and all generic and definite nouns are marked by *al-* despite their type or countability. Accordingly, the scoring of the task concerned only the article of the target NP

and whether the changes surrounding the NP impacted or changed the semantic and pragmatic meaning of the target NP. It was not considered an error (i.e. not scored as 0) when an adjective was added or omitted within the NP or when the countability of the noun was changed if the target NP still gave the intended pragmatic and semantic meaning. Just like the English SRT, the scoring of the Arabic SRT followed a 0−1 scoring scheme in which a score of 0 was given in the following conditions:

1. When the article is changed, resulting in an omission (Example 6.11) or the overuse of *al-* (Example 6.12).

Example 6.11

Original sentence: مثلاً, على المسلمين إعطاء الصدقة للمحتاجين

Transliteration: Mathalan ala Al−muslimeen ia'ata'a Al−Sadaqa lilmuhtajeen.

Translation: For example, Muslims have to give **(al-)** charity money to the needy.

Repetition: "مثلاً, على المسلمين إعطاء صدقة للمحتاجين"(*al-* omission)

Transliteration: Mathalan ala Al−muslimeen ia'ata'a (*zero*) Sadaqa lilmuhtajeen.

Translation: For example, Muslims have to give (*zero*) charity money to the needy.

Example 6.12

Original sentence: تقوم نورة بتوزيع هدايا للعوائل الفقيرة كل عام

Transliteration: Taqoom Nora bitawzee'a (*zero*) Hadaya lilaw'el Al−Faqeerah Kula a'am.

Translation: Nora distributes (*zero*) presents to poor families every year.

Repetition: "تقوم نورة بتوزيع الهدايا لبعض العوائل الفقيرة كل عام "(*al- overuse*).

Transliteration: Taqoom Nora bitawzee'a (*al-*) Hadaya lilaw'el Al−Faqeerah Kula a'am.

Translation: Nora distributes (*al-/the*) presents to poor families every year.

2. If the changes within the noun phrase impact the pragmatic meaning of the sentence (Example 6.13).

   Example 6.13

   Original sentence: يقوم أحمد بكتابة مقالات قصيرة للجريدة

   Transliteration: Yaqoom Ahamad biKitabat (*zero*) maqalat qaseerah liljareedah.

   Translation: Ahamad writes (*zero*) short articles for the newspaper.

   Repetition: "يقوم أحمد بكتابة مقالة قصيرة للجريدة"(*changed from nonspecific to specific*)

   Transliteration: Yaqoom Ahamad biKitabat (*zero*) maqala qaseerah liljareedah.

   Translation: Ahamad is writing (*a/an*) short article for the newspaper.

3. If other determiners are used, replacing the target article (example 6.14).

   Example 6.14

   Original sentence: تتغذى النمور السوداء على لحوم بعض الحيوانات

   Transliteration: Tataghadah al- numoor al- swda'a ala luhoom ba'adh al- haywanat.

   Translation: (*al-*) Black tigers feed on the meat of other animals.

   Repetition: "تتغذى بعض النمور السوداء على لحوم الحيوانات"(some of *al-*)

   Transliteration: Tataghadah ba'adh al- numoor al- swda'a ala luhoom al- haywanat.

   Translation: (some of *al-*) Black tigers feed on the meat of other animals.

4. If the noun phrase is omitted (example 6.15).

   Example 6.15

   Original sentence: مثلاً, على المسلمين إعطاء الصدقة للمحتاجين

   Transliteration: Mathalan ala Al−muslimeen ia'ata'a Al−Sadaqa lilmuhtajeen.

   Translation: For example, Muslims have to give (*al-*) charity money to the needy.

   Repetition: " مثلاً, على المسلمين إعطاء أو مساعدة للمحتاجين" (the noun is omitted)

   Transliteration: Mathalan ala Al−muslimeen ia'ata'a aw musa'adat al- muhtajeen.

   Translation: For example, Muslims have to give or help the needy.

5. If the repetition failed or was not provided.
6. If the repetition was provided too early before the alarm.

6.4.2. Categorisation of Arabic Sentence-Repetition Accuracy Scores

Correct responses were calculated for each participant, who was given an overall score out of 32. The scoring was then categorised to determine accuracy based on: 1) the use of articles for each semantic context, that is generic, [definite, specific], [indefinite, specific] and [indefinite, nonspecific]; 2) the accuracy of each individual article based on the obligatory context (i.e. across all semantic contexts in which the article was used) and 3) for the article accuracy score within a specific semantic context, a score was given to each of the *al-* non-generic uses within the [definite, specific] context.

Based on this categorisation, the overall score was divided across the four semantic contexts to determine the participants' accuracy in using articles within each of these contexts. The overall score was distributed equally across the four contexts. The accuracy of article use for each of the semantic contexts (the generic, the [definite, specific] context, the [indefinite, specific] context and the [indefinite, specific] context) was scored out of eight. To determine the accuracy score for each individual article based on the obligatory context, a sum of all the scores for each article across the four contexts was calculated. Accordingly, the accuracy scores for *al-* and *zero*, respectively, were calculated out of 16. For each type of *al-* non-generic uses within the [definite, specific] context, a score of two was given.

Like the English SRT, errors in the use of Arabic articles were calculated and categorised into *al-* omission, *al-* overuse and *other*. Errors were also categorised based on grammaticality from grammatical to ungrammatical. Errors were calculated for each case.

6.4.3. Statistical Analysis

Following the same procedures used in the English task, a Shapiro−Wilk normality test and Levene's test (in SPSS) were performed for the BA and the MAS groups. The data were

not normally distributed (see Table 6.8). Nonparametric tests were used. In addition, descriptive statistics were gathered for the accuracy scores converted into percentages.

The nonparametric tests included a between-group and a within-group analysis. For the between-group analysis, a Mann−Whitney U test was performed to compare the BA and the MAS groups concerning their different accuracy scores. To compare the levels of accuracy between the semantic context, within-subjects Friedman's tests and follow-up Wilcoxon signed rank tests were conducted. Across the obligatory contexts, to examine if there was a difference in the level of accuracy between *al-* and *zero,* Wilcoxon signed rank tests were performed.

Table 6.8

Shapiro−Wilk Test of Normality and Homogeneity of Variance of the Accuracy Scores in the Arabic Sentence-Repetition Task

		Shapiro−Wilk		Levene's test
		df	*p* value	*p* value
	Overall score	79	$p < 0.001$	$p = .695$
Accuracy per semantic context	Generic	79	$p < 0.001$	$p = .972$
	[definite, specific]	79	$p < 0.001$	$p = .395$
	[indefinite, specific]	79	$p < 0.001$	$p = .536$
	[indefinite, nonspecific]	79	$p < 0.001$	$p = .304$
Accuracy per obligatory context	*al*	79	$p < 0.001$	$p = .933$
	zero	79	$p < 0.001$	$p = .298$
Non-generic uses of *al-*	Textual *al-*	79	$p < 0.001$	$p = .046$
	Situational *al-*	79	-	-
	Structural *al-*	79	$p < 0.001$	$p = .041$
	Cultural *al-*	79	$p < 0.001$	$p = .332$

For the within-group analysis, a Spearman correlation test was conducted to examine the influence of the independent variables of LORUK, L2AOA and the TROG-2 score on the accuracy scores of the BA group.

6.5. English Sentence-Repetition Results

6.5.1. Order of Accuracy in Using English Articles in Semantic and Obligatory Contexts

For each group, the order of accuracy was determined across semantic contexts and obligatory contexts. To confirm whether this order was comparable, within-subjects Friedman's tests and follow-up Wilcoxon signed rank tests were conducted to examine if there were any significant differences between accuracy measures within these contexts for each of the three groups. The results of these tests are presented in tables 6.9 and 6.10.

Table 6.9

Friedman's Within-Subjects and Wilcoxon Signed-Rank Test Results for Accuracy Measures in L2 English Article Use across Semantic Contexts for the ENS, BA and BC Groups

Group	Friedman's test	Wilcoxon signed-rank test results					
	results	**C1-C2**	**C1-C3**	**C1-C4**	**C2-C3**	**C2-C4**	**C3-C4**
ENS	$\chi^2(2) = 13.69$, $p = 0.003$	$Z = -0.72$, $p = 0.474$	$Z = -2.83$, $p = 0.005$	$Z = -1.73$, $p = 0.83$	$Z = -2.65$, $p = 0.008$	$Z = -2.12$, $p = 0.034$	$Z = -1.00$, $p = 0.317$
BA	$\chi^2(2) = 36.10$, $p < 0.001$	$Z = -3.16$, $p = 0.002$	$Z = -3.25$, $p = 0.001$	$Z = -1.841$, $p = 0.066$	$Z = -4.66$, $p < 0.001$	$Z = -1.64$, $p = 0.102$	$Z = -3.92$, $p < 0.001$
BC	$\chi^2(2) = 2.31$, $p = 0.51$	$Z = -1.06$, $p = 0.290$	$Z = -0.20$, $p = 0.844$	$Z = -0.09$, $p = 0.929$	$Z = -1.50$, $p = 0.135$	$Z = -0.980$, $p = 0.327$	$Z = -0.60$, $p = 0.546$

Note. C1: generic context, C2: [definite, specific] context, C3: [indefinite, specific] context, C4: [indefinite, nonspecific] context, ENS: English native speakers, BA: bilingual adults, BC: bilingual children

For accuracy in using articles in semantic contexts, the ENS group exhibited the highest accuracy in the [indefinite, specific] context ($M = 100$), followed by the [indefinite, nonspecific] context ($M = 99.58$), the generic context ($M = 97.78$) and then the [definite, specific] context ($M = 97.08$). Friedman's test results revealed that, for the ENS, there was a significant disparity in levels of accuracy across the semantic contexts ($\chi^2(2) = 13.69$, $p = 0.003$). Follow-up Wilcoxon signed rank test results showed that the accuracy level in the [indefinite, nonspecific] context was significantly higher than in the generic context ($Z = -2.83$, $p = 0.005$, $r = -0.36$). The level of accuracy in the [indefinite, specific] context was

significantly higher than in the [definite, specific] context (Z = -2.65, p = 0.008, r = -0.34), and the level of accuracy in the [indefinite, nonspecific] context was notably higher than in the [definite, specific] context (Z = -2.12, p = 0.034, r = -0.27).

The BA group, however, showed the highest accuracy of English article use in the [definite, specific] (M = 86.25) context followed by the [indefinite, nonspecific] context (M = 80.94), the generic context (M = 75.83) and the [indefinite, specific] context (M = 65.94), respectively. Friedman's test results revealed that, for the BA, there was a significant difference in levels of accuracy across the semantic contexts ($\chi^2(2)$ = 36.10, $p < 0.001$). Follow-up Wilcoxon signed rank test results showed that the accuracy level for the BA in the [definite, specific] context was significantly higher than in the generic context (Z = -3.16, p = 0.002, r = -0.35). The accuracy level in the generic context was importantly higher than in the [indefinite, specific] context (Z = -3.25, p = 0.001, r = -0.36). The accuracy level in the [definite, specific] context was markedly higher than in the [indefinite, specific] context (Z = -4.66, $p < 0.001$, r = -0.52), and the accuracy level in the [indefinite, nonspecific] context was significantly higher than in the [indefinite, specific] context (Z = -3.92, $p < 0.00$, r = -0.43).

Like the BA group, the BC group demonstrated the highest accuracy of English article use in the [definite, specific] context (M = 86.54), followed by the [indefinite, nonspecific] context (M = 81.73), the generic context (M = 81.41) and the [indefinite, specific] context (M = 77.88), respectively. Friedman's test results, however, revealed that, for the BC, there were no significant disparities between the accuracy scores across the semantic contexts. Accordingly, the findings indicate that the BC performed similarly across the four contexts.

Based on obligatory contexts (Table 6.10), the ENS presented the highest accuracy in using *zero* (M = 99.72), followed by *a/an* (M = 99.17) and *the* (M = 96.67), respectively. Friedman's test results (presented in Table 6.4) revealed a significant difference between the

accuracy measures of the ENS group across obligatory contexts ($\chi^2(2) = 10.31$, $p = 0.006$). Follow-up Wilcoxon test results demonstrated that *a/an* accuracy was markedly higher than *the* (Z = -2.18, $p = 0.029$, r = -0.28), and *zero* accuracy was notably higher than *the* (Z = -2.65, $p = 0.008$, r = -0.34).

Table 6.10

Friedman's Within-Subjects and Wilcoxon Signed-Rank Test Results for Accuracy Measures in L2 English Article Use across Obligatory Contexts for the ENS, BA and BC Groups

Group	Friedman's test results	Wilcoxon signed-rank test results		
		the-a/an	*the-zero*	*a/an-zero*
ENS	$\chi^2(2) = 10.31$, $p = 0.006$	Z = -2.18 $p = 0.029$	Z = -2.65 $p = 0.008$	Z = -1.00 $p = 0.317$
BA	$\chi^2(2) = 32.66$, $p < 0.001$	Z = -1.33 $p = 0.185$	Z = -4.36 $p < 0.001$	Z = -4.80 $p < 0.001$
BC	$\chi^2(2) = 8.45$, $p = 0.015$	Z = -0.17 $p = 0.864$	Z = -1.58 $p = 0.115$	Z = -2.68 $p = 0.007$

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

For the BA group, the highest accuracy was exhibited in using *a/an* ($M = 85.63$) followed by *the* ($M = 82.71$) and *zero* ($M = 62.92$), respectively. Friedman's test results revealed that there was a significant disparity between the accuracy measures of the BA group across obligatory contexts ($\chi^2(2) = 32.66$, $p < 0.001$). Follow-up Wilcoxon test results showed that the accuracy of *the* is importantly higher than *zero* (Z = -4.36, $p < 0.001$, $r = -0.49$) and *a/an* accuracy is significantly higher than *zero* (Z = -4.80, $p < 0.001$, $r = -0.54$). The findings suggest a difference in the use of *the* and *zero* and between *a/an* and *zero* by the BA group.

For the BC group, similarly, the highest accuracy was exhibited in using *a/an* (*M* = 86.54) followed by *the* (*M* = 84.62) and *zero* (*M* = 73.72), respectively. Friedman's test results revealed a significant difference between the accuracy measures of the BC group across obligatory contexts ($\chi^2(2) = 8.45$, $p = 0.015$). Follow-up Wilcoxon test results depicted that *a/an* accuracy is significantly higher than *zero* ($Z = -2.68$, $p = 0.007$, $r = -0.53$). Therefore, the findings suggest a distinction in accuracy between *a/an* and *zero* by the BC group.

In summary, the findings suggest that the ENS control group was more accurate in the use of L2 English articles in indefinite contexts than in the [definite, specific] and generic contexts and more accurate at using both indefinite articles (*a/an* and *zero*) than in using *the*. The findings of the BA group, however, showed that the group was most accurate at L2 English articles in the [definite, specific] context. Moreover, the BA showed similar accuracy in both the generic and the [indefinite, nonspecific] contexts. In all three contexts, the BA group was markedly more accurate at using L2 English articles than in the [indefinite, specific] context. In obligatory contexts, the findings suggest that the BA group were more accurate at using both *a/an* and *the* (and slightly more accurate in using *a/an*) than in using *zero*. Regarding the BC group, the findings showed no significant difference in accuracy concerning semantic contexts. In obligatory contexts, however, the results suggest that the BC group were more accurate at using *a/an* than at using *zero*.

6.5.2. Accuracy of Using L2 English Articles in English Sentence-Repetition: Analysis of the Language Groups

Table 6.11 presents the mean and the standard deviation of accuracy measures along with the between-group Kruskal−Wallis U results for the overall accuracy scores and the accuracy score per semantic context.

The analysis revealed a significant difference between the groups in the overall accuracy of English article use ($\chi2(2) = 45.286$, $p < 0.001$). Post-hoc pairwise comparison tests revealed that the ENS group ($M = 98.52$) were significantly more accurate than the BA group ($M = 77.08$) in their overall use of English articles ($p < 0.001$, $r = 0.77$). Likewise, the ENS group were importantly more accurate than the BC group ($M = 81.84$) in their overall accuracy of L2 English article use ($p < 0.001$, $r = 0.69$). However, for the overall accuracy between the two experimental groups, although the BC group achieved a greater accuracy ($M = 81.84$) than the BA group ($M = 77.08$), the two groups did not vary in a statistically significant fashion ($p = 0.869$, $r = -0.02$).

Table 6.11

Kruskal−Wallis H and Post-Hoc Pairwise Comparison Results in the Accuracy of Using English Articles in the Semantic Context of the English Sentence-Repetition Task for the ENS, BA and BC Groups

		ENS		BA		BC		Kruskal−Wallis H results	Post-hoc pairwise comparison		
Accuracy scores/ Mean score		*M*	*SD*	*M*	*SD*	*M*	*SD*		BA-ENS	BC-ENS	BA-BC
General accuracy scores		98.52 (35.46)	1.89	77.08 (27.75)	16.89	81.84 (29.46)	7.40	($\chi2(2) = 45.29$, $p < 0.001$)	$p < 0.001$	$p < 0.001$	$p = 0.869$
Accuracy per semantic context	Generic scores	97.78 (11.73)	3.75	75.83 (9.1)	19.68	81.41 (9.77)	12.34	($\chi2(2) = 29.88$, $p < 0.001$)	$p < 0.001$	$p < 0.001$	$p = 0.717.$
	[definite, specific] scores	97.08 (7.77)	5.38	86.25 (6.9)	16.70	86.54 (6.92)	9.49	$\chi2(2) = 15.75$, $p < 0.001$	$p < 0.001$	$p < 0.001$	$p = 0.329$
	[indefinite, specific] scores	100 (8)	0	65.94 (5.28)	19.81	77.88 (6.23)	21.14	$\chi2(2) = 47.65$, $p < 0.001$	$p < 0.001$	$p < 0.001$	$p = 0.159$
	[indefinite, nonspecific] scores	99.58 (7.97)	2.282	80.94 (6.48)	24.18	81.73 (6.54)	13.13	$\chi2(2) = 28.30$, $p < 0.001$	$p < 0.001$	$p < 0.001$	$p= 0.137$

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

a. Accuracy in L2 English article use: semantic contexts

Regarding relationship accuracy levels for using English articles in each semantic context, in the generic context, the results showed a significant difference between the groups in the accuracy of article use in the generic context ($\chi2(2) = 29.88$, $p < 0.001$). Post-hoc pairwise comparison tests revealed that, for the generic context, the ENS group ($M = 97.78$) were notably more accurate than the BA group ($M = 75.83$) ($p < 0.001$, $r = 0.63$). Likewise, the ENS group ($M = 97.78$) were significantly more accurate than the BC scores ($M = 81.41$; $p < 0.001$, $r = 0.53$). Nonetheless, although the BC group ($M = 81.41$) were slightly more accurate in their use of articles in the generic than the BA group ($M = 75.83$), the difference between the two groups was not significant ($p = 0.717$, $r = -0.05$).

The results also revealed a significant distinction between the groups in their accuracy score of English article use in the [definite, specific] context ($\chi2(2) = 15.747$, $p < 0.001$). Post-hoc pairwise comparison tests showed that, for accuracy scores in the [definite, specific] context, the ENS group ($M = 97.08$) were significantly more accurate than the BA group ($M = 86.25$; $p < 0.001$, $r = 0.40$), and the ENS group were significantly more accurate than the BC group ($M = 86.54$; $p < 0.001$, $r = 0.51$). However, the difference between the BC group ($M = 86.54$) and the BA group ($M = 86.25$) was not significant ($p = 0.329$, $r = 0.13$).

In the [indefinite, specific] context, the results also yielded a significant difference between the groups in the accuracy of English article use in the [indefinite, specific] context ($\chi2(2) = 47.648$, $p < 0.001$). Post-hoc pairwise comparison tests revealed that, for accuracy in the [indefinite, specific] context, the ENS ($M = 100$) group was importantly more accurate than the BA group ($M = 65.94$; $p < 0.001$, $r = 0.82$); the ENS group were also markedly more

accurate than the BC groups (M = 77.88; $p < 0.001$, r = 0.55). Nonetheless, the difference in scores between the BA and BC groups was not significant (p = 0.159, r = -0.19).

Finally, the results showed that the groups were notably different in the accuracy score for English article use in the [indefinite, nonspecific] context ($\chi 2(2) = 28.301$, $p <$ 0.001). Based on the post-hoc pairwise comparison tests' result, the ENS group (M = 99.58) showed significantly higher accuracy than the BA group (M = 80.94; $p < 0.001$, r = 0.52); the ENS group were also significantly more accurate than the BC group (M = 81.73; $p < 0.001$, r = 0.70). However, the difference in scores between the BA (M = 80.94) and the BC (M = 81.73) groups was not significant (p = 0.137, r = 0.20).

In general, the ENS group were more accurate in the overall use of L2 English articles than each of the BA and the BC groups and in accuracy in each of the four semantic contexts: the generic, the [definite, specific], the [indefinite, specific] and the [indefinite, nonspecific] contexts. However, the findings showed no significant differences between the two bilingual groups (the BA and BC) in any of these aspects. Accordingly, the findings indicate that the BA and the BC groups performed similarly in the use of L2 English articles in this study.

b. Accuracy of L2 English article use in an obligatory context

With regards to the accuracy of L2 English article use in the obligatory contexts of *the*, *a/an* and *zero*, descriptive statistics of the means and standard deviation besides the between-group Kruskal−Wallis U results are presented in Table 6.12. Concerning the accuracy of *the* article use, the groups exhibited a significant difference in the accuracy scores of using the article *the* in obligatory contexts ($\chi 2(2) = 23.165$, $p < 0.001$). Post-hoc pairwise comparison tests revealed that the ENS group (M = 96.67) were importantly more accurate in using *the* than the BA group (M = 82.71; $p < 0.001$, r = 0.54). Similarly, the ENS group were also significantly more accurate using *the* than the BC group (M = 84.62; $p <$

0.001, r = 0.52). Nonetheless, for *the* scores between the BA and the BC groups, the difference was not significant ($p = 0.855$, $r = 0.025$).

The results also displayed a significant difference between the three groups in the accuracy of article *a/an* use in an obligatory context ($\chi2(2) = 34.901$, $p < 0.001$). Post-hoc pairwise comparison tests revealed that, for using *a/an*, the ENS group's score ($M = 99.17$) was significantly more accurate than the BA group's score ($M = 85.63$; $p < 0.001$, $r = 0.59$) and the BC group's score ($M = 86.54$; $P < 0.001$, $r = 0.75$). Conversely, in using *a/an*, although the BC group ($M = 86.54$) showed more accuracy than the BA group ($M = 85.63$), the difference between the two groups was not significant ($p = 0.183$, $r = 0.18$).

In addition, the results showed that there was a notable difference between the groups in the correct use of the article *zero* in obligatory contexts ($\chi2(2) = 47.952$, $p < 0.001$). Post-hoc pairwise comparison tests demonstrated that the ENS group ($M = 99.72$) were importantly more accurate in using *zero* than the BA group ($M = 62.92$; $p < 0.001$, $r = 0.80$). The ENS group ($M = 99.72$) were also notably more accurate than the BC group (M = 73.72; $p < 0.001$, $r = 0.66$). However, there was no significant distinction between the BA ($M = 62.92$) and the BC ($M = 73.72$) groups in using *zero* ($p = 0.567$, $r = -0.08$).

Based on the results across obligatory contexts, the ENS group performed better than both bilingual groups in the use of the three English articles (*the*, *a/an* and *zero*). However, as there was no significant disparity between the BA and BC groups' accuracy scores in the correct use of articles in any of the obligatory contexts, the findings suggest that the two bilingual groups use the three articles at a similar level.

Table 6.12

Kruskal−Wallis H and Post-Hoc Pairwise Comparison Results in the Accuracy of Using English Articles in Obligatory Contexts in the English Sentence-Repetition Task for the ENS, BA and BC Groups

		ENS		BA		BC		Kruskal−Wallis H results	Post-hoc pairwise comparison		
Accuracy scores/ Mean score		M	SD	M	SD	M	SD		BA-ENS	BC-ENS	BA-BC
Accuracy per obligatory context	*the* accuracy	96.67 (11.6)	5.179	82.71 (9.93)	15.94	84.62 (10.15)	11.20	$\chi2(2) = 23.17$, $p < 0.001$	$p < 0.001$	$p < 0.001$	$= 0.855$
	a/an accuracy	99.17 (11.9)	2.543	85.63 (10.28)	16.78	86.54 (10.38)	6.40	$\chi2(2) = 34.90$, $p < 0.001$	$p < 0.001$	$p < 0.001$	$p = 0.183$
	zero accuracy	99.72 (11.97)	1.52	62.92 (7.55)	27.7318	73.72 (8.85)	17.63	$\chi2(2) = 47.95$, $p < 0.001$	$p < 0.001$	$p < 0.001$	$p = 0.567$

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

*c. **Accuracy of L2 English article use within a specific semantic context***

The accuracy scores were also measured for the use of articles within each semantic context, and descriptive statistics and between-group analyses were conducted. Table 6.13 presents the result of these tests.

A similar pattern was shown for the three generic articles. Respecting the accuracy of using generic *zero*, the groups exhibited significantly different accuracy scores ($\chi2(2) = 22.555$, $p < 0.001$). Post-hoc pairwise comparison tests revealed that the ENS group ($M = 100$) markedly demonstrated more accuracy in generic *zero* than the BA group ($M = 73.13$; $p < 0.001$, $r = 0.54$). The ENS group ($M = 100$) were more accurate than the BC group ($M = 84.62$; $p = 0.002$, $r = 0.47$). However, the BC group ($M = 84.62$) and the BA group ($M = 73.13$) were not noticeably different ($p = 0.837$, $r = -0.03$). Regarding the accuracy of using generic *a/an*, the groups also exhibited a significant difference ($\chi2(2) = 20.685$, $p < 0.001$). Post-hoc pairwise comparison tests revealed that, in generic *a/an*, the ENS group ($M = 97.5$)

were significantly more accurate than the BA group (M = 78.75; $p < 0.001$, r = 0.47) and significantly more accurate than the BC groups (M = 78.85; $p < 0.001$, r = 0.57). Meanwhile, the BC group (M = 78.85) and the BA group (M = 78.75) were not importantly different (p = 0.348, r = 0.13). As for the accuracy of using generic *the*, the results also showed a significant difference between the groups in the accuracy scores of generic *the* use ($\chi 2(2) = 17.350$, $p <$ 0.001). Post-hoc pairwise comparison tests revealed that, in generic *the*, the ENS group (M = 95.83) were also notably more accurate the BA group (M = 75.62; $p < 0.001$, r = 0.50). Likewise, the ENS group (M = 95.83) were markedly more accurate than the BC group (M = 80.77) in using generic *the* (p = 0.042, r = 0.31). Nonetheless, the BC group (M = 80.77) and the BA group (M = 75.62) were not importantly different (p = 0.307, r = -0.14).

In examining the accuracy of non-generic uses of *the* in the [definite, specific] context, the results revealed a significant difference between the groups in the accuracy score of using situational *the* ($\chi 2(2) = 16.105$, $p < 0.001$). Post-hoc pairwise comparison tests revealed that, in situational *the*, the ENS group (M = 100) were markedly more accurate than the BA group (M = 81.25; $p < .001$, r = 0.42). The ENS group (M = 100) were significantly more accurate than the BC group (M = 76.92; p = 0.001, r = 0.48). Nonetheless, the BC group (M = 76.92) and the BA group (M = 81.25) were not significantly different (p = 0.535, r = 0.09). For the other non-generic categories of *the*, there were no significant divergences between the groups in the accuracy score of using cultural *the* ($\chi 2(2) = 5.365$, p = 0.068), in the accuracy score of using textual *the* ($\chi 2(2) = 3.463$, p = 0.177) or in the accuracy score of using structural *the* ($\chi 2(2) = 2.440$, p = 0.295).

Regarding the accuracy of using *a/an* in the [indefinite, specific] context, the groups exhibited a significant difference ($\chi 2(2) = 12.815$, p = 0.002). Post-hoc pairwise comparison tests revealed that the ENS group (M = 100) were importantly more accurate in using *a/an* than the BA group (M = 88.75; $p < 0.001$, r = 0.41); the ENS group (M = 100) were also

notably more accurate than the BC group (M = 90.38) in this aspect (p = 0.026, r = 0.34). However, the BC group (M = 90.38) and the BA group (M = 88.75) did not significantly diverge in their *a/an* use (p = 0.758, r = -0.04). Similarly, for the accuracy of using *zero* in the [indefinite, specific] context, the groups showed a significant difference ($\chi2(2) = 45.901$, $p < 0.001$). Post-hoc pairwise comparison tests revealed that the ENS group (M = 100) were significantly more accurate in using *zero* than the BA group (M = 43.125; $p < 0.001$, r = 0.81) and markedly more accurate than the BC group (M = 65.38; p = 0.002, r = 0.48). However, the BC group (M = 65.38) and the BA group (M = 43.125) were not importantly different (p = 0.066, r = -0.25).

Table 6.13

Kruskal−Wallis H and Post-Hoc Pairwise Comparison Results in the Accuracy of Using English Articles within each Semantic Context in the English Sentence-Repetition Task for the ENS, BA and BC Groups

		ENS		BA		BC		Kruskal−Wallis H results	Post-hoc pairwise comparison		
Accuracy scores/ Mean score		*M*	*SD*	*M*	*SD*	*M*	*SD*		BA-ENS	BC-ENS	BA-BC
Accuracy of articles in a generic context	Generic *the*	95.83 (3.83)	9.48	75.62 (3.03)	22.28	80.77 (3.23)	25.32	$\chi2(2) = 17.35$, $p < 0.001$	$p < 0.001$	$p = 0.042$	$p = 0.307$
	Generic *a/an*	97.5 (3.9)	7.63	78.75 (3.15)	26.28	78.85 (3.15)	13.87	$\chi2(2) = 20.69$, $p < 0.001$	$p < 0.001$	$p < 0.001$	$p = 0.348$
	Generic *zero*	100 (4)	0	73.13 (2.93)	31.21	84.62 (3.38)	12.66	$\chi2(2) = 22.56$, $p < 0.001$	$p < 0.001$	$p = 0.002$	$p = 0.837$
Accuracy of articles in [indefinite, specific]	*Zero*	100 (4)	0	43.125 (1.73)	33.0052	65.38 (2.61)	36.14	$\chi2(2) = 45.90$, $p < 0.001$	$p < 0.001$	$p = 0.002$	$p = 0.066$
	a/an	100 (4)	0	88.75 (3.55)	17.86	90.38 (3.61)	16.26	$\chi2(2) = 12.82$, $p = 0.002$	$p < 0.001$	$p = 0.026$	$p = 0.758$
Accuracy of articles in [indefinite, nonspecific]	*Zero*	99.17 (3.97)	4.56	72.5 (2.9)	32.42	73.08 (2.92)	25.94	$\chi2(2) = 24.21$, $p < 0.001$	$p < 0.001$	$p < 0.001$	$p = 0.430$

	a/an	100 (4)	0	89.38 (3.58)	21.10	90.38 (3.61)	12.66	$\chi2(2) = 11.44$, $p = 0.003$	$p = 0.004$	$p = 0.006$	$p = 0.504$
Non-generic uses of *the* (i.e. in [definite, specific] context)	Cultural *the*	98.33 (1.97)	9.13	87.5 (1.75)	24.68	88.46 (1.77)	21.93	$\chi2(2) = 5.37$, $p = 0.068$	-	-	-
	Situational *the*	100 (2)	0	81.25 (1.63)	24.51	76.92 (1.54)	25.94	$\chi2(2) = 16.11$, $p < 0.001$	$p < 0.001$	$p = 0.001$	$p = 0.535$
	Textual *the*	91.67 (1.83)	18.95	78.75 (1.58)	31.80	88.46 (1.77)	21.93	$\chi2(2) = 3.46$, $p = 0.177$	-	-	-
	Structural *the*	98.33 (1.97)	9.13	97.5 (1.95)	11.04	92.31 (1.85)	18.78	$\chi2(2) = 2.44$, $p = 0.295$	-	-	-

Note. ENS: English native speakers, BA: bilingual adults, BC: bilingual children

Like the [indefinite, specific] context article, regarding the accuracy of using *a/an* in the [indefinite, nonspecific] context, the three groups exhibited a significant disparity ($\chi 2(2) = 11.435$, $p = 0.003$). Post-hoc pairwise comparison tests revealed that the ENS group ($M = 100$) were significantly more accurate in using *a/an* than the BA group ($M = 89.38$; $p = 0.004$, $r = 0.35$). However, there was no significant difference between the ENS ($M = 100$) and BC ($p = 0.006$, $r = 0.42$) groups or between the BC group ($M = 90.38$) and the BA group ($M = 89.38$; $p = 0.504$, $r = 0.09$). Likewise, for the accuracy of using *zero* in the [indefinite, nonspecific] context, the results showed significant differences between the groups ($\chi 2(2) = 24.208$, $p < 0.001$). Post-hoc pairwise comparison tests proved that the ENS group ($M = 99.17$) were notably more accurate in using *zero* than the BA group ($M = 72.5$; $p < 0.001$, $r = 0.52$) and significantly more accurate than the BC group ($M = 73.08$; $p < 0.001$, $r = 0.60$). However, the BC group ($M = 73.08$) and the BA group ($M = 72.5$) were not significantly different ($p = 0.430$, $r = 0.11$).

In summary, the ENS group demonstrated better performance in using the three articles (*the*, *a/an* and *zero*) within the generic context and in using both *a/an* and *zero* within the [indefinite, specific] context than both bilingual groups. The ENS group also performed better in using situational *the* in the [definite, specific] context and in using *zero* in the [indefinite, nonspecific] context than both bilingual groups. For the use of *a/an* in the [indefinite, nonspecific] context, the ENS group performed better than the BA group, while the BC group showed a similar performance to the ENS group in this aspect. In all these aspects, both the BA and the BC groups showed similar levels in the use of L2 English articles.

6.5.3. English Sentence-Repetition: Role of Background Variables Regarding Accuracy in Using L2 English Articles

a. Role of background variables in accurate L2 English article use: Bilingual adults' results

Table 6.14 presents the result for Spearman's correlations for the BA group's accuracy measures and LORUK, L2AOA and L2 proficiency. The results revealed a significant negative correlation between L2AOA and the overall accuracy of English article use (r = -0.434, P = 0.005), suggesting that, with higher L2AOA, the BA group were less accurate in using L2 English articles. This was particularly exhibited in the generic and the [indefinite, nonspecific] contexts. The result also yielded a significantly negative correlation between L2AOA and accuracy in the generic context (r = -0.476, p = 0.002) and a significantly negative correlation between the L2AOA and accuracy in the [indefinite, nonspecific] context (r = -0.443, p = 0.004). Accordingly, this suggests the accuracy of using L2 English articles in the generic and the [indefinite, nonspecific] context would likely be less with a higher L2AOA.

Table 6.14
Spearman's Correlation Test Results for Bilingual Adults on the Relationship between Accuracy Measures in the English Sentence-Repetition Task and Background Variables of LORUK, L2AOA and L2 Proficiency

			Independent variables		
Accuracy scores			Time living in the UK	Age of L2 acquisition	TROG-2 score
General accuracy scores		*r*	-0.135	-0.434	0.836
		p-value	0.406	0.005	< 0.001
Accuracy per semantic context	Generic scores	*r*	-0.156	-0.476	0.782
		p-value	0.336	0.002	< 0.001
	[definite, specific] scores	*r*	-0.001	-0.160	0.529
		p-value	0.997	0.325	< 0.001
	[indefinite, specific] scores	*r*	-0.138	-0.294	0.745
		p-value	0.396	0.065	< 0.001

	[indefinite, nonspecific] scores	*r*	-0.172	-0.443	0.706
		p-value	0.288	0.004	< 0.001
Accuracy per obligatory context	Accuracy of using *the*	*r*	0.007	-0.171	0.549
		p-value	0.966	0.292	< 0.001
	Accuracy of using *a/an*	*r*	-0.134	-0.454	0.755
		p-value	0.411	0.003	< 0.001
	Accuracy of using *zero*	*r*	-0.126	-0.432	0.772
		p-value	0.440	0.005	< 0.001
Accuracy of articles in generic context	Generic *the*	*r*	-0.16	-0.073	0.402
		p-value	0.922	0.654	0.010
	Generic *a/an*	*r*	-0.098	-0.431	0.629
		p-value	0.546	0.006	< 0.001
	Generic *zero*	*r*	-0.138	-0.469	0.709
		p-value	0.394	0.002	< 0.001
Accuracy of articles in [indefinite, specific]	*Zero*	*r*	-0.081	-0.227	0.633
		p-value	0.619	0.159	< 0.001
	a/an	*r*	-0.166	-0.218	0.528
		p-value	0.307	0.176	< 0.001
Accuracy of articles in [indefinite, nonspecific]	*Zero*	*r*	-0.161	-0.448	0.677
		p-value	0.321	0.004	< 0.001
	a/an	*r*	-0.191	-0.279	0.630
		p-value	0.238	0.082	< 0.001
Non-generic uses of *the* (i.e. in [definite, specific] context)	Cultural *the*	*r*	-0.086	0.041	0.464
		p-value	0.597	0.801	0.003
	Situational *the*	*r*	0.193	-0.101	0.346
		p-value	0.234	0.536	0.029
	Textual *the*	*r*	0.002	-0.231	0.402
		p-value	0.991	0.151	0.010
	Structural *the*	*r*	0.139	-0.128	0.095
		p-value	0.392	0.432	0.560

Note. L2AOA = age of acquisition of the second language, LORUK = length of residency in the UK, TROG = test for the reception of grammar

In obligatory contexts, similarly, the results exhibited a significantly negative correlation between L2AOA and the accuracy of *a/an* use (r = -0.454, p = 0.003) and a noticeably negative correlation between L2AOA and the accuracy of *zero* use (r = -0.432, p = 0.005). Therefore, with a higher L2AOA among the BA group, less accuracy is likely to be shown in the use of indefinite articles (*a/an* and *zero*).

Within the semantic contexts, in the generic context, the results exhibited a significantly negative correlation between L2AOA and the accuracy of using generic *a/an* (r = -0.431, p = 0.006) and a significant negative correlation between L2AOA and the accuracy of generic *zero* use (r = -0.469, p = 0.002). In the [indefinite, nonspecific] context, the results yielded a significantly negative correlation between L2AOA and the accuracy of *zero* use (r = -0.448, p = 0.004). Hence, the results revealed that, with higher L2AOA, the BA group's accuracy in using generic *a/an*, generic *zero* and *zero* in the [indefinite, nonspecific] context decreased.

Regarding L2 proficiency, the results illustrated a significantly positive correlation between L2 proficiency and the overall accuracy of English article use (r = 0.836, p < 0.001), suggesting that the overall accuracy of English article use improves with higher L2 proficiency in the BA group. Across semantic contexts, the findings also portrayed a significantly positive correlation between L2 proficiency and accuracy within all semantic contexts: generic (r = 0.782, p < 0.001), [definite, specific] (r = 0.529, p < 0.001), [indefinite, specific] (r = 0.745, p < 0.001) and [indefinite, nonspecific] (r = -0.706, p < 0.001), indicating that the accuracy of L2 English article use in all semantic contexts also augmented higher L2 proficiency.

The results also yielded a significant positive correlation between L2 proficiency and the accuracy of using *the* (r = 0.549, p < 0.001), the accuracy of using *a/an* (r = 0.755, p < 0.001) and the accuracy of *zero* (r = 0.772, p < 0.001). Similarly, the accuracy of using the English articles *the*, *a/an* and *zero* improves with higher L2 proficiency.

Within the semantic context, in the generic context, the results displayed a significant positive correlation between L2 proficiency and the accuracy of using generic *the* ($r = 0.402$, $p = 0.010$), a significant positive correlation between L2 proficiency and accurate generic *a/an* use ($r = 0.629$, $p < 0.001$) and a significant positive correlation between L2 proficiency and the accuracy of using generic *zero* ($r = 0.709$, $p < 0.001$). This indicates that, with higher L2 proficiency, the BA group are likely to display better use of the three articles (*the*, *a/an* and *zero*) in expressing generic meaning. In the [indefinite, specific] context, there was a significant correlation between L2 proficiency and the accurate use of *zero* ($r = 0.633$, $p < 0.001$) and a significant positive correlation between L2 proficiency and the accurate use of *a/an* ($r = 0.528$, $p < 0.001$). Similarly, in the [indefinite, nonspecific] context, the results showed a significant correlation between L2 proficiency and the accurate use of *zero* ($r = 0.677$, $p < 0.001$) and a significant positive correlation between L2 proficiency and the accurate use of *a/an (*$r = 0.630$, $p < 0.001$). Based on these findings, with higher L2 proficiency, the BA group are more accurate in using the indefinite articles (*a/an* and *zero*) in indefinite contexts.

Similarly, for the non-generic uses of *the*, there was a significant positive correlation between L2 proficiency and the accuracy in using cultural *the* ($r = 0.464$, $p = 0.003$), a marked correlation between L2 proficiency and the accuracy in using situational *the* ($r = 0.346$, $p = 0.029$) and a significant correlation between L2 proficiency and the accuracy in using textual *the* ($r = 0.402$, $p = 0.010$). Thus, the results generally indicate an improvement in using all types of non-generic *the*, except the use of structural *the*, with heightened L2 proficiency.

Based on the results, L2 proficiency seemed to play a dominant role in the BA groups' use of L2 English articles. With higher L2 proficiency, the BA group displayed more accuracy in the use of L2 English articles overall and in all aspects. L2AOA seemed to exclusively affect the overall use of L2 English articles, the use of L2 English articles in the generic and the [indefinite, specific] context and the use of *zero* and *a/an* in the obligatory context, in which

the BA group showed less accuracy with L2 English articles with higher L2AOA. Respecting LORUK, the results revealed no important aspects, so it can be assumed that LORUK shows no impact on the BA group's performance.

b. Role of background variables on accuracy in L2 English article use: Bilingual children's results

Table 6.15 presents the Spearman's correlation results for the BC group's accuracy measures and LORUK, L2AOA and L1 and L2 proficiency. Based on the findings, there was a significant negative correlation between L2AOA and the accuracy of *a/an* use (r = -0.738, p = 0.004) within the [indefinite, specific] context, suggesting a decrease in the accuracy of using *a/an* in this context's higher L2AOA. Based on the results, similarly, there was a marked correlation between L2 proficiency and the accuracy of using *a/an* (r = 0.635, p = 0.020) within the [indefinite, specific] context. The higher the L2 proficiency, the more accurate the BC group was in the use of *a/an* in the [indefinite, specific] context.

Table 6.15
Spearman's Correlation Test Results for Bilingual Children on the Relationship between Accuracy Measures in the English Sentence-Repetition Task and Background Variables of LORUK, L2AOA and L1/L2 Proficiency

			Independent variables			
Accuracy scores			LOUK	L2AoA	L2 proficiency (TROG-2 Score)	L1 proficiency (ASCT)
General accuracy scores		*r*	0.052	-0.003	0.097	0.382
		p-value	0.866	0.993	0.753	0.197
Accuracy per semantic context	Generic scores	*r*	-0.300	0.175	0.006	0.294
		p-value	0.320	0.568	0.985	0.330
	[definite, specific] scores	*r*	0.017	-0.161	0.187	0.156
		p-value	0.956	0.600	0.541	0.610
	[indefinite, specific] scores	*r*	0.053	-0.009	0.056	0.145
		p-value	0.862	0.977	0.856	0.636
		r	0.368	0.097	-0.112	0.057

	[indefinite, nonspecific] scores	*p*-value	0.216	0.753	0.714	0.853
Accuracy per obligatory context	Accuracy of using *the*	*r*	-0.275	0.039	0.135	0.309
		p-value	0.363	0.899	0.660	0.305
	Accuracy of using *a/an*	*r*	-0.012	-0.337	0.550	0.216
		p-value	0.968	0.260	0.051	0.478
	Accuracy of using *zero*	*r*	0.213	0.062	0.085	0.001
		p-value	0.486	0.841	0.781	0.996
Accuracy of articles in generic context	Generic *the*	*r*	-0.359	0.242	-0.055	0.324
		p-value	0.228	0.426	0.859	0.280
	Generic *a/an*	*r*	-0.402	0.226	0.000	0.331
		p-value	0.173	0.457	1.000	0.269
	Generic *zero*	*r*	0.343	-0.239	0.256	-0.171
		p-value	0.251	0.431	0.399	0.577
Accuracy of articles in [indefinite, specific]	*Zero*	*r*	0.058	0.276	-0.237	0.023
		p-value	0.851	0.360	0.436	0.940
	a/an	*r*	0.124	-0.738	0.635	0.082
		p-value	0.687	0.004	0.020	0.790
Accuracy of articles in [indefinite, nonspecific]	*Zero*	*r*	0.106	-0.198	0.067	0.178
		p-value	0.731	0.517	0.828	0.560
	a/an	*r*	0.236	0.239	-0.021	-0.085
		p-value	0.438	0.431	0.945	0.782
Non-generic uses of *the* (i.e. in [definite, specific] context)	Cultural *the*	*r*	0.000	0.226	-0.394	-0.099
		p-value	1.000	0.458	0.183	0.749
	Situational *the*	*r*	-0.314	-0.085	0.167	0.312
		p-value	0.296	0.783	0.587	0.299
	Textual *the*	*r*	0.149	-0.552	0.394	0.148
		p-value	0.628	0.050	0.183	0.630
	Structural *the*	*r*	-0.029	0.410	0.029	0.058
		p-value	0.925	0.164	0.926	0.852

Note. L2AOA = age of acquisition of the second language, LORUK = length of residency in the UK, TROG = test for the reception of grammar.

In summary, the results show that L2AOA and L2 proficiency seems to have affected the BC group's use of *a/an* within the [indefinite, specific] context. The higher the L2AOA, the less accurate the BC is in using *a/an* within the [indefinite, specific] context. In contrast,

with higher L2 proficiency, the BC is more accurate in using *a/an* within the [indefinite, specific] context. Concerning the other factors, neither LORUK nor the L1 proficiency of the BC group seems to affect their use of L2 English articles.

6.5.4. Type of Errors in the Use of English Articles in the English Sentence-Repetition Task

Table 6.16 presents descriptive statistics of the mean and the standard deviation of the error-type proportions in the BA and BC groups' use of English articles. The BA group's errors mostly included overusing *a/an* in the *zero* context (24.68%), followed by pluralisation errors (14.70%), pluralisation and article errors combined (14.70%), other (14.35%), *the* omission (10.91%), *the* overuse in the *zero* context (9.76%), *a/an* overuse in the *the* context (5.74%), *the* overuse in the *a/an* context (5.17%), and *a/an* omission (3.21%). The BC group produced the most errors in the categories of *other* (30.14%), followed by pluralisation errors (21.66%), *the* overuse in the *a/an* context (16.95%), pluralisation and article errors combined *(*15.70%), *the* overuse in the *zero* context (5.97%), *a/an* in the *the* context (5.97%,) and *a/an* overuse in the *zero* context (2.35%). Further details about the distribution of these errors in each semantic context by the bilingual groups are provided in Appendix 8.

Table 6.16
Descriptive Statistics of Errors in Using L2 English Articles in the Sentence-Repetition Task by the BA and the BC Groups

Error type	BA		BC	
	M	*SD*	*M*	*SD*
a/an omission	3.21%	.51	0	.00
the omission	10.91%	1.13	1.26%	.28
the for *a/an*	5.17%	.96	16.95%	.86
the for *zero*	9.76%	1.03	5.97%	.51
a/an for *the*	5.74%	1.01	5.97%	.77

a/an for *zero*	24.68%	2.33	2.35%	.38
Pluralisation errors	14.70%	1.30	21.66%	.87
Pluralisation and article errors combined	14.70%	1.30	15.70%	1.15
Other	14.35%	1.77	30.14%	1.75

Note. BA: bilingual adults, BC: bilingual children

The errors of the groups were combined under two categories based on grammaticality: grammatical errors and ungrammatical errors. Table 6.17 presents descriptive statistics of the mean and standard deviation of the errors in both categories by the BA and BC groups. Based on the results, both the BA and BC groups produced more of the ungrammatical errors.

Table 6.17
Descriptive Statistics of Grammatical and Ungrammatical Errors in the Use of L2 English Articles in the English Sentence-Repetition Task by the BA and the BC Groups

Error type	BA		BC	
	M	*SD*	*M*	*SD*
Grammatical errors	2.65	2.15	2.85	1.91
Ungrammatical errors	5.60	4.50	3.77	1.96

Note. BA: bilingual adults, BC: bilingual children

Regarding noun phrase structures, errors in the (article + adjective + noun) case and (article + noun) case were calculated for each of the two groups. Table 6.18 presents descriptive statistics of the mean and standard deviation of the errors in both categories by the BA and BC groups. The BC groups produced more errors in the (article + noun) case while, for the BA, more errors were produced in the (article + adjective + noun) case. Based on the Wilcoxon signed ranks test results, the BA group showed significant difference in the amount of errors in the (article + adjective + noun) and the (article + noun) case. Likewise for the BC

groups, no significant difference was noted between the proportions of errors in the two cases.

Table 6.18
Descriptive statistics of errors in the (article + adjective + noun) case and the (article + noun) case

Group	(article + adjective + noun) case errors		(article + noun) case		Wilcoxon signed-rank test results
	M	*SD*	*M*	*SD*	
BA	4.45	3.52	3.73	2.996	Z = -1.55, p = 0.120
BC	3.23	1.83	3.31	2.02	Z = -0.135, p = *0.892*

Note. BA: bilingual adults, BC: bilingual children

6.5.4.1. Omission Errors in the (article + adjective+ noun) and (article + noun) Cases

Spearman correlation tests were performed to examine whether the noun phrase structure when pre-modified by an adjective (article + adjective + noun) or not (article + noun) has a relationship to error production, particularly if the case of the adjectivally pre-modified nouns can result in more article omission errors. The test was performed regarding errors by both bilingual groups in the case of *a/an* omission and *the* omission errors regarding grammaticality. The results are presented in Table 6.19.

Table 6.19
Omission Errors in the (article + adjective + noun) and (article + noun) Case

		A/an omission	*The* omission	Grammatical errors	Ungrammatical errors
(article + adjective + noun) case errors	*r*	.332	.488	.707	.900
	p-value	.015	< 0.001	< 0.001	< 0.001
(article + noun) case error	*r*	.316	.320	.776	.794
	p-value	.021	.019	< 0.001	< 0.001

Based on the results presented in Table 6.20, it appears that in both cases, the noun phrase structure exhibits the same patterns. Errors in the case of (article + adjective + noun) showed a significant positive correlation with both *a/an* omission (r = .332, p = .015) and *the*

omission errors (r = .488, p < 0.001*)*, suggesting that with the increase in *a/an* omission and *the* omission errors, the errors in the (article + adjective + noun) case also increase. Similarly, for error categories based on grammaticality, the errors in the (article + adjective+ noun) case showed a significant positive correlation with both grammatical (r = .707, p < 0.001) and ungrammatical errors (r = .900, p < 0.001), indicating that errors in these categories increase with the increase in errors in the (adjective + article+ noun) case.

Likewise, for the (article + noun) case, the results revealed a significant positive correlation between errors in the (article + noun) case and *a/an* omission (r = .316, p = .021) and *the* omission errors (r = .320, p = .019), which indicates that with the increase in *a/an* omission and *the* omission errors, the errors in the (article + noun) case also increase. Similarly, for error categories based on grammaticality, the error in the (article + noun) case showed a significant positive correlation with both grammatical (r = .776, p < 0.001*)* and ungrammatical errors (r = .794, p < 0.001*)* suggesting that errors in these categories also increase with the increase in errors of the (article + noun) case.

Based on the results, omission errors do not increase with the adjectival pre-modification of the noun. The relationship between producing errors and the noun phrase structure does not present any difference between the (article + adjective + noun) case and the (article + noun) case. Producing omission errors and errors in general is similar in both cases.

6.6. Arabic Sentence-Repetition Results

6.6.1. Order of Accuracy in Arabic Article Use in Semantic and Obligatory Contexts

For each group, the order of accuracy was determined across semantic contexts and obligatory contexts. To confirm whether this order was comparable, within-subjects Friedman's tests and follow-up Wilcoxon signed rank tests were conducted to examine if there were any significant difference between accuracy measures within these contexts for each of the three groups. Results of these tests are presented in tables 6.20 and 6.21.

For accuracy in using articles in semantic contexts, the MAS group exhibited the highest accuracy in the generic (M = 99.68) context, followed by both the [definite, specific] and the [indefinite, specific] context (M = 98.72) and then the [indefinite, nonspecific] context (M = 86.86), respectively. Friedman's test results revealed that, for the MAS, there was a significant difference in the levels of accuracy between the semantic contexts ($\chi^2(2) = 91.79$, $p < 0.001$). Follow-up Wilcoxon signed-ranks test results showed that the accuracy level in the generic context was notably higher than in the [indefinite, nonspecific] context ($Z = -5.88$, $p < 0.001$, $r = -0.67$). The level of accuracy in the [definite, specific] context was significantly higher than in the [indefinite, nonspecific] context ($Z = -5.48$, $p < 0.001$, $r = -0.62$), and the level of accuracy in the [indefinite, specific] context was importantly higher than in the [indefinite, nonspecific] context ($Z = -5.48$, $p < 0.001$, $r = -0.62$).

Table 6.20

Friedman's Within-Subjects and Wilcoxon Signed-Rank Test Results for Accuracy Measures in Using L1 Arabic Articles across Semantic Contexts for the MAS and the BA Groups

Group	Friedman's test results	Wilcoxon signed-rank test results					
		C1-C2	C1- C3	C1-C4	C2-C3	C2-C4	C3-C4
MAS	$\chi^2(2) = 91.79$, $p < 0.001$	$Z = -1.34$, $p = 0.180$	$Z = -1.34$, $p = 0.180$	$Z = -5.88$, $p < 0.001$	$Z = 0.00$, $p = 1.00$	$Z = -5.48$, $p < 0.001$	$Z = -5.48$, $p < 0.001$
BA	$\chi^2(2) = 82.91$, $p < 0.001$	$Z = -1.00$, $p = 0.317$	$Z = -1.63$, $p = 0.102$	$Z = -5.51$, $p < 0.001$	$Z = -0.82$, $p = 0.414$	$Z = -5.33$, $p < 0.001$	$Z = -5.18$, $p < 0.001$

Note. C1: generic context, C2: [definite, specific] context, C3: [indefinite, specific] context, C4: [indefinite, nonspecific] context, MAS: monolingual Arabic speakers, BA: bilingual adults

The BA group showed similar patterns to the MAS. The BA exhibited the highest accuracy in the generic (M = 99.69) context, followed by the [definite, specific] context (M = 99.06), the [indefinite, specific] context (M = 98.44), and then the [indefinite, nonspecific] context (M = 87.19), respectively. Friedman's test results revealed that, for the BA, there were also significant disparities in the levels of accuracy between the semantic contexts ($\chi^2(2) = 82.91$,

$p < 0.001$). Follow-up Wilcoxon signed-ranks test results showed that the accuracy level in the generic context was significantly higher than in the [indefinite, nonspecific] context (Z = -5.51, $p < 0.001$, $r = -0.62$); the level of accuracy in the [definite, specific] context was significantly higher than in the [indefinite, nonspecific] context (Z = -5.33, $p < 0.001$, $r = -0.60$). Moreover, the accuracy in the [indefinite, specific] context was markedly higher than in the [indefinite, nonspecific] context (Z = -5.18, $p < 0.001$, $r = -0.58$).

Regarding accuracy in obligatory contexts, based on Wilcoxon test results, for the MAS group, the accuracy of *al-* use (M = 99.20) was markedly higher than in *zero* (M = 92.79; $Z = -5.60$, $p < .001$, r = -0.63). Likewise, for the BA group, the accuracy in *al-* use (M = 99.22) was also higher than in *zero* (M = 92.97; Z = -5.08, $p < .001$, r = -0.57).

Table 6.21
Wilcoxon Signed-Rank Within-Subjects Test Results Comparing Variations in the Accuracy of L1 Arabic Articles in Obligatory Contexts for the MAS and BA Groups

Group	Wilcoxon signed-rank test results
MAS	$Z = -5.60$, $p < .001$
BA	Z = -5.08, $p < .001$

*Note.*MAS: monolingual Arabic Speakers, BA: bilingual adults

Overall, the findings indicate that both the MAS group and the BA group showed a similar order of accuracy. Both groups (the MAS and the BA) depicted the least accuracy in the [indefinite, nonspecific] context, exhibiting a significantly lower accuracy in this context than the other three contexts (the generic, the [definite, specific] and [indefinite, nonspecific]). In obligatory contexts, both groups were more accurate at using *al-* than in using *zero*.

6.6.2. Accuracy of using L1 Arabic articles: Analysis of language groups

Descriptive statistics of the mean and the standard deviation, with a summary of the between-group Mann−Whitney U test results, are presented in Table 6.22. Differences between

BA and MAS groups were observed for the overall accuracy scores in Arabic article use, accuracy scores per semantic context and accuracy scores per obligatory context.

The results indicate that the performance of the BA group did not differ from the MAS group. For the overall accuracy of Arabic article use, the results exhibited no significant difference between the MAS controls and the BA group (U = 796.000, z = 0.187, *p* = 0.852, r = 0.021). Additionally, the results showed no significant difference between the two groups in the accuracy scores of using articles in the generic context (U = 780.000, z = 0.018, *p* = 0.986, r = 0.002), in the [definite, specific] context (U = 801.500, z = 0.428, *p* = 0.668, *r* = 0.05), in the [indefinite, specific] context (U = 762.500, z = -0.312, *p* = 0.755, *r* = -0.04), or in the [indefinite, nonspecific] context (U = 813.000, z = 0.462, *p* = 0.644, *r* = 0.05). In addition, there was no significant difference in the accuracy between the BA group and the MAS control group in using *al-* (U = 782.500, z = 0.043, *p* = 0.966, *r* = 0.005) and no significant difference between the two groups in the accuracy of using *zero* (U = 821.500, z = 0.510, *p* = 0.610, *r* = 0.06).

Within the [definite, specific] context, in examining the difference in the uses of non-generic *the*, the statistical results showed no significant difference between the BA and MAS group in the accuracy of using cultural *al-* (U = 801.000, z = 0.488, *p* = 0.625, *r* = 0.05), situational *al-* (U = 780.000, z = 0.000, *p* = 1.000, r = 0), textual *al-* (U = 799.500, z = 0.987, *p* = 0.323, *r* = 0.11) and structural *al-* (U = 800.000, z = 1.013, *p* = 0.311, *r* = 0.11). The results indicate that the BA and the MAS groups similarly use L1 Arabic articles.

Table 6.22

Kruskal−Wallis H and Post-Hoc Pairwise Comparison Results in the Accuracy of Using L1 Arabic Articles in the Arabic Sentence-Repetition Task for the MAS and the BA Groups

Accuracy scores/ Mean score		MAS		BA		
		M	SD	M	SD	Mann−Whitney
	General accuracy scores	95.99 (30.72)	2.14	96.09 (30.75)	2.32	U = 796.00, z = 0.187, *p* = 0.852
Accuracy per semantic context	Generic scores	99.68 (7.97)	2.00	99.69 (7.98)	1.98	U = 780.00, z = 0.018, *p* = 0.986
	[definite, specific] scores	98.72 (7.90)	3.84	99.06 (7.93)	3.33	U = 801.50, z = 0.428, *p* = 0.668
	[indefinite, specific] scores	98.72 (7.90)	3.84	98.44 (7.88)	4.19	U = 762.50, z = -0.312, *p* = 0.755
	[indefinite, nonspecific] scores	86.86 (6.95)	4.92	87.19 (6.98)	7.20	U = 813.00, z = 0.462, *p* = 0.644
Accuracy per obligatory context	Accuracy of using *al-*	99.20 (15.87)	2.12	99.22 (15.88)	2.09	U = 782.50, z = 0.043, *p* = 0.966
	Accuracy of using *zero*	92.79 (14.85)	3.05	92.97 (14.88)	4.29	U = 821.50, z = 0.510, *p* = 0.610
Non-generic uses of *the* (i.e. in [definite, specific] context)	Cultural *al-*	96.15 (1.92)	13.50	97.5 (1.95)	11.03	U = 801.00, z = 0.488, *p* = 0.625
	Situational *al-*	100 (2)	0	100 (2)	0	U = 780.00, z = 0.000, *p* = 1.000
	Textual *al-*	100 (2)	0	100 (2)	0	U = 799.50, z = 0.987, *p* = 0.323
	Structural *al-*	98.72 (1.97)	8.01	100 (2)	0	U = 800.00, z = 1.013, *p* = 0.311

Note.MAS: monolingual Arabic Speakers, BA: bilingual adults

6.6.3. Arabic Sentence-Repetition Task: Role of Background Variables on Accuracy in Using L1 Arabic Articles

Correlation coefficient tests were conducted to examine the relationship between the BA group's accuracy scores and the independent variables: LORUK, L2AOA and L2 proficiency (Table 6.23). Respecting L2 proficiency, the results yielded a significant positive correlation between L2 proficiency and the overall accuracy of Arabic article use ($r = 0.332$, $p = 0.36$), indicating an increase in the overall accuracy in the use of L1 Arabic articles by the BA group with a higher L2 proficiency. Across the semantic context, the results also showed a significant positive correlation between L2 proficiency and the accuracy score in the [definite, specific] context ($r = 0.331$, $p = 0.037$) and in the [indefinite, specific] context ($r = 0.326$, $p = 0.040$). The findings suggest an increase of accuracy by the BA group in their use of L1 Arabic articles in these two contexts (the [definite, specific] and the [indefinite, specific] contexts) with higher-level L2 proficiency. Across obligatory contexts, a significant positive correlation appears between L2 proficiency and the accuracy of using *al-* ($r = 0.329$, $p = 0.038$), suggesting a better use of *al-* with higher L2 proficiency in the BA group.

With regard to the other two factors (LORUK and L2AOA), the results showed no significant relationship between these two factors and any of the accuracy measures of using L1 Arabic. Consequently, it can be concluded that neither LORUK nor L2AOA had any effect on the BA group's use of L1 Arabic articles.

Table 6.23

Spearman's Correlation Test Results for the Relationship between the BA Accuracy Measures and Background Variables of LORUK, L2AOA and L2 Proficiency

Accuracy scores			LORUK	L2AOA	L2 proficiency (TROG-2 score)
General accuracy scores		*r*	-0.233	-0.126	0.332
		p-value	0.149	0.440	0.036
Accuracy per semantic context	Generic scores	*r*	-0.062	0.201	-0.028
		p-value	0.702	0.214	0.864
	[definite, specific] scores	*r*	0.049	-0.159	0.331
		p-value	0.762	0.328	0.037
	[indefinite, specific] scores	*r*	-0.56	-0.214	0.326
		p-value	0.733	0.185	0.040
	[indefinite, nonspecific] scores	*r*	-0.220	-0.001	0.067
		p-value	0.173	0.996	0.682
Accuracy per obligatory context	Accuracy of using *al-*	*r*	-0.007	-0.074	0.329
		p-value	0.968	0.651	0.038
	Accuracy of using *zero*	*r*	-0.202	-0.116	0.203
		p-value	0.212	0.478	0.208
Non-generic uses of *the* (i.e. in [definite, specific] context)	Cultural *al-*	*r*	0.174	-0.128	0.280
		p-value	0.283	0.432	0.080
	Situational *al-*	*r*	-	-	-
		p-value	-	-	-
	Textual *al-*	*r*	0.160	0.089	-0.167
		p-value	0.325	0.584	0.302
	Structural *al-*	*r*	-	-	-
		p-value	-	-	-

Note. L2AOA = age of acquisition of the second language, LORUK = length of residency in the UK, TROG = test for the reception of grammar

6.7. Discussion

This study aimed to explore L2 English article acquisition by two populations of L1 Arabic and L2 English bilingual adults and children (7−12). In examining the performance of each group, several individual and linguistic factors were considered. The study investigated whether L1 Arabic groups experience any difficulty in the use of L2 English articles and whether their performance is influenced by L1 Arabic. In those individual factors of L2AOA, L1/L2 proficiencies, LOR and exposure were considered. Furthermore, within the English data, the study assessed whether the participants were likely to show more omission with (article + adjective + noun) structures as opposed to (article + noun) structures. Regarding the Arabic data, the task was performed only among the adult groups. Like the case with English, the study examined whether L1 Arabic exhibited any L2 influence due to acquiring L2 English articles and if that was likely to be impacted by the individual factors of L2AOA, L2 proficiency, LOR and exposure as well.

6.7.1. What Patterns of English Article Use do Bilingual Arabic−English-Speaking Adults and Children Exhibit during their Acquisition of the English Language? (RQ1)

In this study, the use of L2 English articles by each of the two bilingual groups and the ENS control group was examined in relationship to: i) semantic contexts and ii) obligatory contexts. Additionally, an overall score was measured to investigate the overall use of the L2 English article system. Accuracy across both semantic contexts and obligatory contexts was compared to determine the order of accuracy. Between-group analysis was performed to examine any divergences between the groups. Errors were calculated across the contexts and categorised into: *a/an* omission, *the* omission, *the* overuse in the *a/an* context, *the* overuse in the *zero* context, *a/an* overuse in the *the* context, *a/an* overuse in the *zero* context, *pluralisation* errors, *pluralisation and article errors combined* and *other*.

Concerning the order of accuracy, the findings showed that the BA group were more accurate in using L2 English articles in the [definite, specific] context followed by the generic and the [indefinite, specific] contexts, respectively. Moreover, the BA group's use of L2 English articles in the [indefinite, nonspecific] context had a similar accuracy to both the generic context and the [definite, specific]. However, the use of L2 English articles in the [indefinite, nonspecific] context showed more accuracy than the [indefinite, specific] context. In the obligatory context, the results showed that, for the BA, the use of both *the* and *a/an* was easier than *zero*. The children in the BC showed similar levels in their use of articles across the semantic context. Based on the obligatory context, however, the results indicate that the BC group performed better at using *a/an* than *zero*. Based on these findings, both groups were different from the ENS group; the ENS group exhibited more accuracy when using English articles in indefinite contexts and generic contexts than in the [definite, specific] context. Likewise, the ENS group showed a different order of accuracy in the obligatory context in which the ENS group was more accurate in the use of *a/an* and *zero* than in *the*. Notably, the significance of these findings was small, which could be explained due to the small data, particularly for the BC group. However, the findings of the BA group regarding the semantic contexts partially confirm Hypothesis 1a.

When examining the variations between the three groups, the two bilingual groups were similar in general and in all aspects of L2 English article use. However, both bilingual groups were less accurate than the ENS group in general and in all aspects of L2 English article use, which suggests the difficulty that each group experienced in their use of L2 English articles. Such challenges can be explored by examining groups' error patterns.

With respect to errors, the BA mostly produced errors in overusing *a/an* in *zero* contexts, followed by pluralisation errors, errors with the article and pluralisation combined, the *other* category, the omission of *the*, the overuse of *the* in the *zero* context, *a/an* overuse in

the, *the* overuse in the *a/an* context and, finally, the omission of *a/an.* For the BC group, conversely, pluralisation errors were most common after the others error category, followed by errors of *the* overuse in the *a/an* context, article and pluralisation combined, *the* overuse in the *zero* context, *a/an* overuse in the *the* context and *a/an* overuse in the *zero* context. The findings of this study contradicted the predictions in Hypothesis 1b, as *a/an* omission was not really prominent among the adults and was never actually produced by the children.

The errors produced by each of the two bilingual groups illuminate the aspects of difficulty each group has in their use of L2 English articles. In the BA group, the first three most dominant errors − *a/an* in *zero* contexts, pluralisation errors and errors of the article and pluralisation combined − often indicate problems in understanding noun countability and the use of number of English. These errors are consistent with the accuracy results, in which the BA group demonstrated lower accuracy in the [indefinite, specific] and the generic in which number (i.e. noun countability) is marked.

The findings in the BA group align with previous findings in which the use of L2 English articles in the [indefinite, specific] was viewed as more challenging than the [definite, specific] context (Ekeirt, 2007; Ekiert & Han, 2016) due to the multiple form−meaning mappings where the structures of *a/an* and *zero* are used to encode both indefiniteness and number. The fact that the BA group's performance indicates a struggle with noun countability supports previous findings in which noun countability is considered the most challenging aspect to acquiring English articles (Butler, 2002; Lardiere, 2004). The lower accuracy in the generic also aligns with the literature where the Arabic L1 produces errors when encoding generic meaning in L2 English (Farghal & Al-Zou'bi, 2004; Alzamil, 2019; Crompton, 2011). The *generic* context brings even more complexity, considering that marking generic meaning and number requires a distinction between three forms (*a/an*, *zero* and *the*). An interesting aspect in the adult findings, however, is the accuracy in the

[indefinite, nonspecific] contexts in which, unlike the case with the [indefinite, specific] context, showed relatively higher accuracy. This pattern could be explained by the small sampling of the group in the study. Besides the semantic complexity, given that marking numbers by articles is absent from L1 Arabic, the performance of the BA group seems to reflect instances of L1 Arabic influence; further discussion about the L1 influence is provided in Section 6.10.2.

Concerning the BC group, due to the small sampling, it was not possible to explore all the aspects of their performance. Regarding errors, the domination of pluralisation errors cannot be necessarily attributed to an incomplete understanding of noun countability, as it is not combined with *a/an* overuse in the *zero* context. Pluralisation errors can be explained by several reasons. According to Goldschneider and DeKeyser (2001), this can be challenging due to what is called the *number of phonological alternations* in which the *-s* form can be presented with three sounds [s, z, əz]. In addition, the *-s* plural can present aspects of form−meaning mapping complexity in which the form *-s* is used to encode other meanings in English (e.g. the possessive *-s* and the third-person singular -s), which often could make acquiring these forms challenging (Goldschneider & DeKeyser, 2001).

6.7.2. How do Individual Factors of Age, L2AOA, L1 (in Children) and L2 Proficiencies, LOR in an English-Speaking Country (i.e. the UK) and Linguistic Factors of the L1 article System and the Noun Phrase Structure Impact the Acquisition Patterns of L2−English Articles in Adults and Children? (RQ2)

Age and L2 age of onset of acquisition

Regarding age, the study checked whether adults and children (7–12) exhibit any disparities in their use of L2 English articles. The results showed that both groups were similar in all aspects in this study; both groups were less accurate than native speakers. Correlation results showed that, for the BA group, the earlier the L2AOA, the higher the overall accuracy in using L2 English articles and the higher the accuracy in using *a/an* and

zero in obligatory contexts, the higher the accuracy of both generic *a/an* and generic *zero* and the accuracy of *zero* within the [indefinite, nonspecific] context. For the BC group, the analysis showed that, the earlier the L2AOA, the higher the accuracy of using *a/an* within the [indefinite, specific] context.

While the two groups exhibits were generally similar, the correlation results illustrated that early learners were generally more accurate than late learners in the above aspects. Accordingly, the findings regarding L2AOA partially confirm Hypothesis 2a.

Interestingly, the findings regarding age are presented in aspects that are generally more complex for L2 learners and L1 Arabic speakers in particular. Respecting the literature, generic and indefinite contexts present more form-mapping complexity than the [definite, specific] context and are likelier to suggest L1 Arabic influence. Therefore, the findings seem to support previous studies in which early learners are likely to be more accurate in using English articles and to exhibit less L1 influence than late learners (e.g. Diez-Bedmar & Papp, 2008).

L2 and L1 proficiencies

The correlation results of the BA group displayed that, with an increase in L2 proficiency, the BA group was more accurate in their use of L2 English articles overall and in all semantic and obligatory contexts. However, for the children, the correlation results showed that with higher L2 proficiency, they were more accurate in their use of L2 English articles in the [indefinite, specific] context, particularly the use of *a/an* in the [indefinite, specific] context. Tapping into L1 Arabic proficiency, L1 Arabic was examined in children. The results of the correlation showed no relationship between L1 Arabic proficiency and children's use of L2 English articles. Based on the findings respecting L2 proficiency, Hypothesis 2b is partially confirmed.

The findings reflect Butler's (2002) statement that more awareness is gained about the use of L2 English articles with higher L2 proficiency levels. Correspondingly, the findings are consistent with the literature in which L2 learners of L1 Arabic groups (e.g. Sarko, 2008, 2009) and other L1 groups (e.g. Chaudron & Parker, 1990; Liu & Gleason, 2002) showed more accuracy in their use of L2 English articles. The findings support Kim et al.'s (2020) explanations that, with greater proficiency, the ability of L2 learners to differentiate form−mapping distinctions also increases.

Length of residence in the UK

Based on the results of the correlation tests, neither the results of the BA nor the BC group showed any relationship to LORUK. Hence, the findings reject the prediction in Hypothesis 2c, in which more accuracy is expected with longer residence. As explained in Section 5.7.2 regarding LOR, the impact of LOR is constrained by the amount of engagement in both the L1 and L2. Therefore, L2 exposure can be further examined by considering the extent to which each BA and the BC are engaged in using both L1 and L2 in the L2 context.

L1 to L2 influence

The L1 influence on L2 English article use can be identified through the performance of each of the bilingual groups regarding their L1−L2 similarities and differences as well as how they generally perform compared to native speakers and other L1 groups. For these purposes, Jarvis and Pavlenko's (2008) framework was adopted. In this section, we examine the performance of each of the bilingual groups regarding three types of evidence: i) intragroup homogeneity, ii) intergroup heterogeneity and iii) L2−L1 performance congruity.

Concerning the first evidence, each of the bilingual groups performed differently compared to the ENS control group. Both groups were less accurate in their use of L2 English articles than the ENS controls. Respecting Selinker (1983), Jarvis and Pavlenko (2008) state that if bilinguals exhibit a different performance from native speakers of the

source language (i.e. English in this case), which indicates the intragroup homogeneity of the group. Each of the BA and BC groups appears to satisfy this evidence.

In comparing the performance of the two groups to their L1 use of Arabic articles, the findings of the BA group revealed more congruity concerning L1 Arabic article use in their performance than the BC group, especially in using articles across semantic contexts. In the semantic context, more accurate article use was exhibited in [definite, specific] contexts where the use of articles was more similar across Arabic and English. This congruity is further shown in the lower accuracy the BA group demonstrated in the generic and [indefinite, specific] context in which marking these meanings varied across the two languages. Interestingly, for the BA group, the use of L2 English articles in the [indefinite, nonspecific] context was similar in accuracy to their use of L2 English articles in the [definite, specific] context, even though in this context (i.e. the [indefinite, nonspecific]) the use of articles across two languages generally differed. One explanation for this is that the data were considerably small. Respecting errors, the overuse of *a/an* in *zero* contexts and pluralisation errors, however, were the most commonly produced, suggesting problems in understanding number/noun countability. The insufficient understanding of noun countability also presents L2−L1 performance congruity where L1 Arabic articles, unlike English articles, do not mark number.

Regarding the BC group's performance, the order of accuracy, unlike the BA group, does not seem to present congruity between L2 English article use and L1 Arabic article use. The small sampling has led to no statistical variations across the contexts apart from showing more accuracy in using *a/an* compared to using *zero*, which does not reflect any congruity. Furthermore, errors do not seem to indicate relevancy to how L1 Arabic articles are used. The BC group's findings are insufficient to provide a conclusion in this aspect.

Bilingual groups' divergent patterns here compared to other L1 groups reflects some level of intergroup heterogeneity. The BA group's greater accuracy in the [definite, specific] context than in the [indefinite, specific] context is a common pattern in L2 learners regardless of whether the L1 has articles (e.g. Robertson, 2000; White, 2003; Lardiere, 2004; Diez-Bedmar & Papp, 2008). The less accuracy in the generic context, however, can be specific to L1 Arabic groups due to the difference in mapping between form and meaning across English and Arabic. The error patterns within the generic context in this study agree with previous literature (e.g. Crompton, 2011; Fraghal & Al-Zou'bi, 2004) in which L1 Arabic groups (considering that in L1 Arabic, only *al-* is used to mark generic meaning) also overused *the* in *zero* contexts. However, the *the* overuse in the *zero* context error also occurs within the Spanish L1 group in the generic context in Diez-Bedmar and Papp (2008), even though L1 Spanish uses three types of articles (i.e. *definite*, *indefinite* and *zero*). Diez-Bedmar and Papp (2008), however, explain that this pattern (i.e. *the* overuse in the *zero* context) is unusual considering the L1 Spanish system and that it could result from classroom language instruction emphasising the overall use of generic *the* in L2 English. Based on Diez-Bedmar and Papp's (2008) explanation, we cannot completely exclude the proposition that the *the* overuse in the *zero* context is due to L1 Arabic influence, considering that this error also occurred among L1 Arabic speakers in previous studies (Farghal & Al-Zou'bi, 2004; Alzamil, 2019; Crompton, 2011).

Respecting other errors, overusing *a/an* in *zero* contexts and *pluralisation* errors, conversely, were the most commonly produced, suggesting problems in understanding number/noun countability. The insufficient understanding of noun countability presents L2−L1 performance congruity, L1 Arabic articles, unlike English articles, do not mark number. Although marking numbers presents a challenge for L2 English learners due to form−meaning mapping complexity, the difficulty of marking numbers has been found

particularly among groups whose L1 lacks articles, for example Japanese (Butler, 2002) and Chinese (Lardiere, 2004, in Diez-Bedmar & Papp, 2008). In Diez-Bedmar and Papp (2008), for instance, Chinese L1 showed more struggle in marking numbers compared to the L1 Spanish group whose language has articles that encode numbers. Based on this comparison, due to the lack of marking numbers in Arabic, the findings of the BA group seem to confirm intergroup heterogeneity.

In conclusion, the findings of the BA groups indicate that the adults in this group exhibit instances of L1 Arabic influence in their use of L2 English articles and that the difficulty in using the L2 English articles is not just due to the complexity of the use of articles present. Based on this conclusion and the former explanation presented in Section 6.10.1, the findings of the BA group support Ekiert's (2007) and Ekiert and Han's (2016) claims that the process of L2 English articles is impacted by both the complexity within the target language and the L1 influence. Concerning the BC group, due to the small sampling, it was not possible to fully examine the CLI in their performance.

Noun phrase structure

Based on the literature, it is assumed that omission errors are likelier to occur with noun phrases that are pre-modified by an adjective than with no adjectives. This is assumed to be due to pre-modified NPs requiring more processing than when they lack modification. In examining errors, errors were counted for both structures: i) article + adjective + noun and ii) article + noun.

Based on the correlation results, the relationship between producing errors and the NP structure does not present any disparity between the (article + adjective + noun) case and the (article + noun) case. The production of omission errors and errors in general is similar in both cases. The results contradict the prediction in Hypothesis 2d. That is, the findings

contradict previous studies, where more omission was found in the (article + adjective + noun) case (Goad & White, 2004; Trenkic, 2002).

According to Trenkic (2009), more processing is required in the case of pre-modified nouns. While this is confirmed by previous studies, this can be explained because the performance of L2 learners often presents a variability where other external factors can also impact the L2 acquisition process. One explanation is linked to L2 proficiency, where errors often decrease with higher proficiencies. In the current data, the bilinguals had mostly intermediate to advanced levels of L2 proficiency. It would be interesting to examine these aspects with greater variability regarding L2 proficiency.

6.7.3. Does L2 Affect L1 Use of Arabic Articles in Arabic−English Bilingual Adults? (RQ3)

In examining the L2 to L1 effect, the performance of the BA groups were compared to the MAS groups. The findings showed similar performance by both groups in the use of L1 Arabic articles and in all semantic and obligatory contexts. Both groups, the BA and the MAS, showed the same order of accuracy in using L1 Arabic articles across both semantic and obligatory contexts. For each group, the least accuracy was exhibited in the [indefinite, nonspecific] context, while for the other three contexts (i.e. the generic, the [definite, specific] and the [indefinite, specific] context), the levels of L1 Arabic article use were similar. For each of the two groups, the accuracy in using *al-* was higher than *zero.* In addition, between-group analyses showed no variations between the MAS and BA groups in any aspect of L1 Arabic article use.

Reflecting L2−L1 cross-linguistic congruity, in comparing the BA use of L2 English articles to their use of Arabic articles, they showed a different order of accuracy across the four semantic contexts in their use of L2 English articles compared to L1 Arabic articles. However, in obligatory contexts, in both languages, the BA showed more accuracy in using

the definite articles *al-* and *the* than in using the indefinite article *zero* in both Arabic and English.

Based on the existing evidence, the only indication of L2 to L1 influence is presented in the L2−L1 crosslinguistic congruity performance in the level of accuracy within obligatory contexts where the use of the definite articles showed more accuracy. The study presents a limitation in the lack of comparative groups of other source languages (i.e. other L2 groups, in this case). Furthermore, considering the limited studies on the L2 to L1 influence in this area, it was not possible to make these comparisons (i.e. with other L2 groups) based on the existing literature. Therefore, aspects of intergroup heterogeneity cannot be confirmed.

Based on the above, the existing evidence is not sufficient to confirm L2 to L1 influence in the BA group's performance; therefore, Hypothesis 3 is partially confirmed. Further research is needed with the inclusion of other comparative groups to investigate the phenomenon.

6.7.4. How do Age, L2AoA, L2 Proficiency, as well as the LOR in an English-Speaking Country (i.e. the UK) Impact the Use of L1 Arabic Articles in Adults? (RQ4)

L2 age of onset of acquisition

Considering that Arabic was examined only with adult participants, to determine the impact of L2AOA, this was explored mainly in relationship correlation test results. The findings showed no relationship between the BA use of L1 Arabic articles and L2AOA. The findings, therefore, reject the predictions in Hypothesis 4a.

This lack of relationship between L2AOA and the use of the L1 Arabic articles is not surprising. There is little variability in L2AOA among the BA group, as most are late learners of L2 English. Moreover, because the Arabic SRT, for the reasons mentioned in Section 6.5, was performed on adults, it was not possible to witness the performance in children as early learners.

L2 proficiency

The findings showed that with an increase in L2 proficiency, the BA group exhibited more accuracy in using L1 Arabic in the [definite, specific], [indefinite, specific] and obligatory contexts of *al-*. The findings in this aspect partially confirm Hypothesis 4b. The findings are consistent with previous studies (e.g. Major, 1992; Kecskes & Papp, 2003), which determined that proficiency in the source language (i.e. L2) affects L1 use (e.g. Major, 1992; Kecskes & Papp, 2003). Therefore, the findings suggest an L2-to-L1 influence. This was often found among L2 learners with higher levels of L2 proficiency (Kecskes & Papp, 2003). Jarvis (2000), however, explains the extent of how the L2 to L1 influence (i.e. increasing, decreasing or stable) is linked to other variables.

Based on the thinking for speaking concept and the fact that language properties can affect the minds of bilinguals, the findings in this study suggest a positive L2-to-L1 influence due to the acquisition of L2 English articles. Based on Butler (2002), the awareness of L2 English article use increases with greater L2 proficiency. Because of the relationship between form and meaning mapping across L1 Arabic and L2 English, it is likely that, with gaining awareness of how forms are mapped to meanings in L2 English articles, the participants became more aware of the crosslinguistic similarities and disparities with the L1 Arabic article system. Consequently, they became also more aware of the form−meaning mapping in the L1 Arabic article system, which was reflected in their use.

Length of residence in the UK

With reference to the results, the length of time in which the BA group remained showed no relationship to how the BA performed regarding the use of L1 Arabic articles, which rejects Hypothesis 4c. Moreover, given that the impact of LOR is often confounded by the level of engagement in L1 and L2 (MacKay & Flege, 2004), it can be assumed that the

subjects in the BA group were not necessarily engaging enough in L2 to the extent of exhibiting influence in the L1.

6.7.5. General Implications

L2 use of English articles

The English SRT findings bring further evidence to the narrative study's findings (Chapter 5), in which the use of L2 English articles presents an integration between L2 complexity and the knowledge of the L1 system. This is particularly evident in the adults in the BA group. The findings of the BC group in this study lack significant aspects due to the small number of participants. The explanations provided here were, rather, made in association with the adults' performance.

Regarding L2 complexity, the BA group's higher accuracy in the [definite, specific] context as opposed to the generic and the [indefinite, specific] context can be attributed to the fact that the [definite, specific] context presents less form−meaning mapping, in which one form (i.e. *the*) is used to mark one meaning (i.e. definiteness), as opposed to generic and [indefinite, specific] where multiple meanings (generic meaning and number in the generic context and indefinite meaning and number in the [indefinite, specific] context) are surfaced by multiple forms (*the, a/an* and *zero* in the generic and *a/an* and *zero* in the [definite, specific] context). Besides L2 complexity, the use of L2 English articles by the BA groups exhibits L1 influence, where the L2 use of English articles is congruent with L1 article use.

Based on this observed integration, the study, like the case with the narrative (see Section 5.7.6), further supports Cook and Cook's (2003) explanation regarding the concept of multicompetence, in which L1 and L2 systems are integrated in the minds of bilinguals. The findings also provide additional evidence regarding the relationship between language and thought in which formally activated language properties in the L1 facilitate the acquisition of similar L2 patterns (Odlin, 2005).

The findings further confirm the role of the individual factors of L2AOA and L2 proficiency in L2 development and the level of interaction between the L1 and L2. Respecting L2AOA, the evidence further supports previous findings, where early learners are often better and faster at L2 acquisition and overcoming negative L1 influence (Zoderenko & Paradis, 2008, 2012). The findings regarding proficiency are consistent with the role of the L2 experience, where more accuracy is observed with increased L2 proficiency (Kim et al., 2020). This is particularly observed for aspects that are more challenging for L2 learners, either due to complexity or to L1 effects in areas where divergences in form−meaning mapping are observed between L1 and L2.

L1 Arabic article use and L2 effects

Due to the high level of similarity between the BA and the MAS in performance, the Arabic SRT data present no direct indications of L2-to-L1 influence. The only indication of the L2 effects on the L1 is presented in the relationship between L2 proficiency and the heightened accuracy by the BA in using articles in the [definite, specific] context, the [indefinite, specific] context and the obligatory context of *al-*.

The findings illustrate how L2-to-L1 influence is presented differently compared to L1 to L2 influence. The fact that L2 effects were not presented directly in the performance of the BA group aligns with Kecskes and Papp's (2003) statement that an L2 effects on an L1 are often harder to detect, considering that they are rarely presented in the form of errors. Moreover, the findings are consistent with the fact that L2 to L1 influence can rarely be present on a structural level (Kecskes & Papp, 2003).

The findings also suggest that the appearance of an L2-to-L1 influence is linked to the difference in the level of form−meaning complexity between an L1 and L2: hence, the use of the L1 Arabic article. In the use of L1 Arabic articles, the meaning of each semantic context is encoded by one article only, either *al-* or *zero.* Therefore, the use of articles in each context

presents a one-form−one-meaning connection. In using L2 English, the meaning within the indefinite and generic present a multiple-form−multiple meaning connection. Given the level of complexity in L1 and L2 Arabic, the findings support the structural overlap theory in which the CLI on the structural level is often unidirectional from the least complex language to the more complex language (i.e. from L1 Arabic to L2 English), where the overlapping form use is emphasised, but not in the opposite direction (i.e. L2 English to L1 Arabic), which is the case in the Arabic SRT findings.

Given that the accuracy of L1 Arabic articles increases with higher L2 proficiency, the findings are consistent with Cook and Cook's (2003) explanations in relationship multicompetence, and the L1−L2 integration continuum is confounded by the stages of L2 development. The findings support Kecskes and Papp's (2003) explanation that L2 learners need to reach a particular L2 threshold to exhibit an L2 effect on L1 performance, where L2 proficiency plays an important role.

As mentioned in Section 6.10.4, there is an increase of awareness about the use of L1 Arabic articles with L2 proficiency; this suggests the L2−L1 influence was, rather, exhibited in the underlying semantic and pragmatic meaning, which supports Ringbom's (2007) statement that there is more metalinguistic awareness resulting from L2 acquisition. Mihaljević Djigunović's (2010) study discovered that an increase in metalinguistic awareness resulted in learners' heightened awareness of their L1.

CHAPTER SEVEN: GENERAL DISCUSSION

The findings of the two studies were discussed and presented in sections 5.8 and 6.10, respectively. The current discussion addresses the difference across the findings of the two studies as well as the limitations of the overall results.

7.1. Implications of the Studies

The central aim of this project was to examine the use of L2 English articles and L1 Arabic articles within two groups of Arabic−English bilinguals: adults and children (aged seven to 12). The project mainly explored the effect of L1 Arabic on the acquisition of L2 English articles and how L1 Arabic article use is impacted by L2 English in the process. To achieve this aim, two studies were conducted using two experimental tasks: a narrative-elicitation task and an SRT. Considering that this project follows a bidirectional perspective, the studies were conducted in both Arabic and English and included two control groups: ENS and MAS. In addressing the aims of this thesis, certain hypotheses were formulated. The findings of the two studies showed similarities in the way they responded to these hypotheses, but some differences were also observed, which indicates the role of task type in L2 acquisition patterns. In this section, we address the study's implications regarding the research questions.

7.1.1. What Patterns of English Article Use do Bilingual Arabic−English-Speaking Adults and Children Exhibit during the Acquisition of the English Language? (RQ1)

This section addresses the difficulties as well as the ease with which L1 Arabic speakers face the L2 English language. This is presented based on both the accuracy measure and the types of errors across the two studies. In general, both findings showed that expressing definiteness in the use of L2 English articles was the easiest for both experimental groups than expressing indefiniteness. In the SRT, where generic meaning is also examined,

expressing definiteness in the L2 English article use was shown to be easier than both the indefinite and generic meaning. Accordingly, both studies confirmed Hypothesis 1a.

Concerning errors, both studies demonstrated that noun countability (i.e. number) was a general struggle that generally surfaced in the BA group's performance, but not in the BC group. In the narrative study, *a/an* omission occurred as a common pattern among both the BA and the BC groups, which partially confirmed Hypothesis 1b. Overusing *the* also occurred among both groups, but it was not as prominent as *a/an* omission. In the English SRT, *a/an* omission hardly occurred in either group. However, overusing *the* (when considering both contexts of *zero* and *a/an*) was generally common. Therefore, Hypothesis 1b in the English SRT was partially confirmed.

The findings indicated that both the complexity of meaning−form mapping exhibited in the use of L2 English articles and the difference across L1 and L2 article systems play a role in the difficulty that L1 Arabic speakers experience in using L2 English articles.

Notably, the two studies showed a disparity in the performance of the BC. The BC's performance in the English narrative was more accurate and presented a minimal difference from the ENS group. In the sentence-repetition, conversely, aside from being less accurate in the English task, the data were insufficient to examine all aspects of L2 English article use. This could be explained by the small sample of the group.

7.1.2. How do Individual Factors of Age, L2AoA, L1 (in Children) and L2 Proficiencies, LOR in an English-Speaking Country (i.e. the UK) and Linguistic Factors of the L1 article System and the Noun Phrase Structure Impact the Acquisition Patterns of L2−English Articles in Adults and Children? (RQ2)

With respect to the different factors, L1 influence appeared to play an important role in the L2 English article use by the experimental groups, in the BA group in particular. In the English narrative data, both experimental groups exhibited L1 effects to varying extents in

their use of L2 English articles. However, in the English SRT, due to data limitations, it was not possible to confirm the case in children.

The findings regarding L1 influence present evidence on how bilingual performance reflects the integration of both L2 knowledge and former L1 knowledge. The findings of both studies, therefore, support Cook and Cook's (2003) claims under the concept of multicompetence that L1 and L2 systems are presented differently in the minds of bilinguals than monolinguals. Based on the partial integration model and the linked language model, in the process of L2 development, L1 and L2 systems show some level of interaction where L1 knowledge impacts L2 use and vice versa. The findings also corroborate Slobin's (1996) explanation respecting the relationship between language and thought, where the former knowledge of the L1 has power over the concepts inside the mind of bilinguals, which leads this former L1 knowledge to surface in the use of the L2.

Regarding other factors, the findings confirm the role of L2 proficiency that Hypothesis 2b exerted in making bilinguals more aware of the use of L2 forms and accurately map them to their intended meaning. Regarding LOR, both studies reject Hypothesis 2c, explaining how the LOR's impact connects to the amount of L1 and L2 exposure in the L2 context.

Concerning L1 influence, both factors showed an interaction with the L1 influence. With higher L2 proficiency and more awareness of L2 English article use, the L1 influence decreases. Regarding L2AOA, the findings confirm previous studies (Ionin et al., 2009; Morales−Reyes & Gómez Soler, 2016; Zodrenko & Paradis, 2008, 2012), where early learners were likely to display more accuracy and exhibit less L1 influence in L2 English article use than late learners.

Regarding the noun phrase's structure, this aspect was examined in the English SRT, where the findings suggested no difference in producing omission errors between the (article

+ adjective + noun) case and the (article + noun) case. Accordingly, the findings reject the prediction in Hypothesis 2d.

7.1.3. Does L2 Affect L1 Use of Arabic Articles in Arabic−English Bilingual Adults and Children? (RQ3)

The findings of both studies partially confirmed Hypothesis 3. The experimental groups' performance showed a high similarity to the MAS group's performance where L1 to L2 influence was not clearly observed on a structural level. In the Arabic narrative, indications of L2 to L1 influence appeared in the difference in performance between the BA and the BC groups, where the BA group showed better performance in some aspects. This was attributed to two reasons. The first was that the BA group, being older and more experienced in L1, developed a better use of L1 Arabic. Furthermore, the BA group, unlike the BC group, attended school in Saudi Arabia where Standard Arabic is taught formally, as opposed to the BC group, who attended school in the UK with no formal learning of Arabic. The experience of learning Arabic formally was likely to increase the awareness of using L1 Arabic articles in the BAs. The other possibility is that the BA group exhibited possible L2-to-L1 effects. This second possibility can be supported by the fact that, despite the small effect size, the BA groups were statistically better than the MAS group in some aspects. This aspect is consistent with Kecskes and Papp's (2003) study where L2 effects is observed in showing better use of L1. L2-to-L1 effects are further supported by how the accuracy level in the L1 use of Arabic articles showed a relationship with other individual factors of L2 proficiency and LOR (see Section 4.7.4).

In the Arabic SRT task, the L2-to-L1 influence was observed even less. The L2-to-L1 influence in the BA groups was indicated only by the congruity in the group's performance in L1 Arabic and L2 English article use. Additionally, the increase in accuracy in the L1 Arabic

article use with an increase in L2 proficiency gives further indication of the L2 effects in the BA group's use of L1 Arabic articles (see Section 4.7.4).

7.1.4. How do Age, L2AOA, L1 (in Children), L2 Proficiencies and LOR in an English-Speaking Country (i.e. the UK) Impact the Use of L1 Arabic Articles in Adults and Children? (RQ4)

The two studies showed a variation in how the background variables of L2AOA, LOR and proficiencies are shown in the use of L1 Arabic articles. Concerning L2AOA, the effects of age were observed only in the narrative study, in which contrary to predictions in Hypothesis 4a, adults were more accurate and appeared to show more L2-to-L1 effects in their use of L1 Arabic articles than in children. Regarding L1 and L2 proficiency, L2 proficiency, in both studies, appeared to affect some aspects of L1 Arabic article use by the BA group, which showed more accuracy with higher L2 proficiency, partially confirming Hypothesis 4b. Concerning LOR, the narrative's findings partially confirm the hypothesis regarding children, with the increased accuracy observed with higher LOR, partially confirming Hypothesis 4c. However, the second study does not show any relationship between the adult use of L1 Arabic articles and LOR, which rejects Hypothesis 4c.

7.2. Limitations

This section presents the limitations of this study; in addition, it suggests potential hypotheses for future research. The limitations of the current studies were mostly methodological. While some of these limitations related to sampling task design and analysis, other limitations were linked to issues regarding the COVID-19 situation, which influenced the data collection process.

Regarding the experimental group, the number of participants was quite small for the children. Due to the situation with COVID-19 and the inability to continue meeting participants in a face-to-face mode, the tools of data collection were moved and transferred

online. This context was too challenging for the children. Notably, this was not the case for the MAS controls, as the data collection took place before COVID-19.

The small number of children in the BC group and the inconsistency in number across the groups have prevented the possibility of using parametric tests in the data. Moreover, the findings of the children cannot be considered a fully accurate representation of how bilingual children of this age group would like to behave. To prevent these patterns in the future, it is recommended to get a sufficient, equal number of participants within the three groups.

The current study was also deficient in providing comparative groups within the suggested framework to examine crosslinguistic influence, that is Jarvis and Pavlenko's (2008) framework. Ideally, for the children's group, it would have been better to include control groups of children in a similar age group for both languages, Arabic and English. However, due to the pandemic, it was not possible to recruit more children for the current study. Moreover, although plans were originally made to collect data from other groups of bilinguals with a different source language, e.g. Dutch learners of English, for both children and adults, this was not possible due to the pandemic. Evidence from another group of L2 learners of English would have made it possible to investigate whether forward or backward CLI was indeed a plausible explanation for the results in the L1 Arabic group: if learners with Dutch as their L1 do not experience the same problems with English articles as learners with Arabic as their L1, this would be evidence for *intergroup heterogeneity*, which according to Jarvis and Pavlenko (2008) is one of the key pieces of evidence needed to investigate forward/backward CLI. Comparing two groups of bilinguals would have been preferable because there is an increasing awareness in the field that comparing bilinguals to monolinguals is problematic: both languages are always active in the bilingual mind (e.g. Birdsong, 2005b, 2006; Singleton, 2001), which means language processing is different in these two groups. In addition, the amount of exposure to each language is reduced in

bilinguals by comparison with monolinguals. There are therefore important qualitative and quantitative differences between monolinguals and L2 learners /L2 users with respect to a range of linguistic variables (Birdsong , 2006). For this reason, many researchers now acknowledge that L1 attainments should not be the standard against which L2 learners and L2 users are evaluated (Cook, 2008). However, Cook (2008) states that such comparisons can be useful in discovering similarities and differences between the two groups. Although this was the aim of this research paper, it would have been preferable to compare the bilingual groups in this paper to other bilinguals of different source and target languages. However, including other bilingual groups would have required assistance from researchers who are speakers of those languages. This was not possible due to limitations of time and resources which was complicated with the COVID-19 situation delaying the data collection process.

To obtain more holistic evidence of the effects of L1 on L2 and L2 on L1, based on Jarvis and Pavlenko's (2008) framework, the inclusion of comparative groups seems necessary. Although these comparisons in the current research were done using external references, it would bring more consistency to have these groups within the study. This would apply to both the case of the adults and the children, in which each group's performance is compared to other equivalent groups of different source languages. In the case of the L1-to-L2 effect, it would be advised to include at least two comparative groups of different first languages to compare to L1 Arabic participants. As the research is relevant to whether the first language includes an article system, it would help to include one with a group of L1 which has an article system and another in which the L1 lacks articles. Regarding the effect of the L2 on the L1, in which L2 English is the source language, it would be useful to include a group in which L2 is a language that lacks articles and another in which the article system is different or more complex than the L2 English article system.

In respect to methodology, some decisions affected the design of the SRT. The Arabic SRT was designed in Standard Arabic, which was too challenging for the children in the study. Considering that Standard Arabic was learnt mainly in school and children mostly arrived in the UK before or only a little after they started school, they could not develop enough competence in using Standard Arabic. Moreover, attempts to contact a bilingual school in London, where Standard Arabic is taught to children, were often delayed by the principal of the school due to certain protocols. Consequently, it was decided to collect data outside with children who studied in general UK schools. By that time, it was too late to re-design the task in colloquial Arabic. Since Standard Arabic was too challenging for them, the Arabic version of the SRT was cancelled for the BC group. Therefore, the Arabic SRT was used only with adult participants.

The SRT additionally present some major issues in relation to how items are processed which could question if the errors made were the result of processing effort rather than an actual presentation of the participant's grammatical level in using English and Arabic articles. These issues are related to two aspects: 1) sentence structural complexity and 2) the position of the target noun structure within the sentence. In respect to the structural complexity, it has been reported that an increase in structural complexity can lead to more processing effort which accordingly results in more errors than in cases with less complex structure (Trenkic, 2009). According, sentences should be of an approximately equal level of complexity where it would be preferable to use a simple sentence structure for all items. This issue was mainly present in the English SRT and to a limited extent within the Arabic SRT. The English SRT included structures of varying levels of complexity in the target sentences across the items of the task. Although it was not always possible to use a simple structure (e.g. using a modifying clause for the case of the *structural* use of *the* and *al-*), ideally all the target sentences should be of the same structure to prevent errors resulting from complexity.

In respect to the second issue, it has been reported that omission errors were more likely to occur when the noun is in a topic position than in a non-topic position (Huebner, 1983; Jarvis, 2002; Trenkic, 2002). This was present on both the English and the Arabic version of the SRT where target noun phrases occurred in different positions across each version of the task. This was not always preventable as certain items can only occur in complement position in active voice sentences (e.g. non-referential nouns and attributive indefinites in the [indefinite, nonspecific] context). As these issues are not always preventable, a suggestion is to include both sentence syntactic complexity and noun phrase position as additional control/independent factors when analysing similar data in the future.. This can be done by further consideration to balancing items across the task including equal number of simple structure versus complex sentences. Similarly, for the noun phrase position, the items would be preferably balanced to include an equal number of target noun phrases occurring in a subject position as oppose to noun phrases occurring in a complement position.

In addition to the syntactic structure, more considerations are recommended in terms of selection of the lexical items with the SRT. In the current study, the selection of vocabulary was made based on topics assumed to be familiar to children which includes names of animals and words likely to occur in the daily life of the child. Piloting was done as a following step to confirm that children comprehend the presented words and changes were made where required when necessary. For future research, it is recommended to ensure that the lexical items presented are appropriate for the children of the selected age group by checking AoA, imageability and frequency of the words in the SRT. For the current study, the AoA of the content words (i.e. common nouns, verbs and adjectives) in the English SRT was checked using Kuperman, Stadthagen and Brysbaert's database (2012) which confirmed that children were likely to be familiar with the words in the SRT (see Appendix 9). Databases such as the MRC Psycholinguistic database (Fearnley, 1997) and the CELEX

database (Baayen et al., 1995) could be also be used for these purposes (Marinis & Armon-Lotem, 2015).

Some limitations related to the scope in which the articles were examined in the SRT. The task was designed to cover all the semantic contexts of English and Arabic article use. Even though the tasks were successful in measuring accuracy levels and comparing the use of articles across contexts, they did not provide sufficient data to examine errors. The variability in error patterns across the four semantic contexts resulted in a small number of errors within each error category; therefore, this restricted the conducting of statistical analyses regarding errors. Therefore, attempts should be made to increase the amount of data to examine the required aspects. One way to do that is to include more items within each semantic context and to include more participants. Another way could be to narrow the scope in examining how articles are used. As has been found in the literature, certain studies have focused on one or two aspects of English article use. For example, the task can be dedicated to examining generic use (e.g. Crompton, 2011) only or focusing only on the meaning of (in)definiteness (e.g. Zodrenko & Paradis, 2008). Furthermore, regarding an examination of Arabic use, it would be useful to conduct research using everyday colloquial Arabic.

To improve the use of narratives as a tool, certain considerations can be taken. To prevent dealing with subsequent stories as continuation to former ones, it would be better to have stories that are fundamentally different concerning context, content and characters. To generally prevent assumed shared knowledge generated from the use of pictures, other storytelling methods, such as retelling a story or asking the participants to directly tell a story, can be useful.

Overall, methodologically, including different methods of testing will likely bring more insight about article use. The use of articles across Arabic and English presents variations depending on the investigated aspects. Future studies might include different aspects of comparison, such as examining written data versus spoken data. Similarly, this might include examining how the orthography or side of writing could possibly play a role in or hinder the process of acquisition. Various options and methodologies can be considered.

7.3. Suggested Statistical Analysis

Traditional statistical methods of analysis, such as ANOVA and non-parametric equivalents, have been criticized because they cannot deal with clustering of subjects within another cluster (e.g. participants that are nested within groups), nor handle missing values as efficiently as mixed models. In the field of language acquisition and psycholinguistics, mixed effects models are also increasingly being used, particularly for complex multivariate designs. Such mixed effects models make it possible to analyse between group differences as well as variation within participants (and across items within a test) within a single analysis.

We therefore offer an alternative analysis for the data of the SRT presented in chapter six. An explanation along with an example of how this analysis is presented in this section. The analysis was performed using the statistical package R (R development Core Team, 2022). Initially, we discuss how the data was set up and presented in an excel sheet followed by how the data was imported in R to perform the analysis.

To set up a mixed effects model with crossed random effects for subjects and items, we, first, transformed the data in excel from the “wide format” to the “long format” in which a separate row is created for each unique observation (i.e. trial, **with multiple rows per subject**) and

columns indicating grouping factors. **A mixed effects logistic regression** was used to analyse the sentence repetition task data, because **the dependent variable was categorical (correct= 1, incorrect= 0).** In the analysis a number of **independent variables** were also considered:

- **Semantic context** for the items as a categorical variable: (generic, [definite, specific], [indefinite, specific], [indefinite, nonspecific]).

- **Form** (i.e. obligatory context) for the items as a categorical variable: (zero, a/an, the).

- **Noun pre-modification** for the items as a categorical variable: (preceded by an adjective, no adjective).

Individual differences among the participants in the BA group were also considered by including the **independent variables**:

- **L2 proficiency** as a continuous variable.
- **L2AOA** as a continuous variable.
- **LOR in the UK** as a continuous variable.

Once the data was set up, the excel sheet was then imported in R software for the analysis. The data was then presented to an expert for consultation of the appropriate analysis for the presented data. Considering that the ENS group were at ceiling on this task (with almost all participants obtaining correct answers for all items), it was decided that a separate model was to be used to analyse the BA data only. The analysis was then performed in R in which the following packages were first installed and used. The lme4 package was used for the mixed effects model.

```
library(emmeans)
library(lme4)
library(lmerTest)
library(report)
library(sjPlot)
library(tidyverse)
library(randomForest)
library(caret)
library(e1071)
```

First, we specified that the analysis was to be performed only on the BA group, and the variable type was set as required with the “as.factor” command, as follows:

```{r}
data %>% filter(grp == "BA") %>%
  group_by(subject) %>%
  mutate(subject = as.factor(subject),
         item = as.factor(item),
         acc = as.factor(acc)) %>%
  ungroup() -> data
```

Next, a mixed effects logistic regression analysis was performed with glmer, with accuracy ("acc") as the dependent variable. L2 proficiency (L2prof_Z) and L2 AoA (L2aoa) were transformed to Z-scores with "scale", because both variables were measured on different scales (LoR: 0.5-9.1) and (AoA: 6-12). Interactions between the semantic context (semco) and the form of the article (form), as well as between these two independent variables and L2prof_Z, L2prof_Z were built into the model. Subjects and items were included as random effects.

```
data %>% glmer(formula = acc ~ semco * form + scale(l2prof) + scale(l2aoa) * form + (1 | subject) + (1 | item), family = "binomial", control = glmerControl(optimizer = "bobyqa")) -> model
```

The results show that the model was rank deficient, which means that one or more variables were not linearly independent, and that four columns were dropped. In the new model, one interaction term was dropped (with drop1), namely the interaction between semco and L2prof_z, and because of the strong negative correlation between L2AoA and L2 proficiency (r = -.41), only L2 proficiency was used in the model (not L2AoA).

The new model showed there was a main effect of semantic context and of form, and an interaction between semantic context and form, as well as an interaction between L2 proficiency and form. We also compared the new model against a null model (an intercept only model). The null model has an AIC of 1552.2, and the model that was chosen by R had an AIC of 1205.3. This means that the model final model is better (because the AIC is lower). This indicates that this models fits the data better than the null model. Emmeans was used to

carry out a post hoc analysis, in which the interaction of L2 proficiency with different levels of form and the different levels of semantic contexts was explored.

```
Generalized linear mixed model fit by maximum likelihood (Laplace
 Approximation) [glmerMod]
 Family: binomial  ( logit )
Formula: acc ~ semco * form + form * L2prof_z + (1 | subject) + (1 | item)
  Data: data
Control: glmerControl(optimizer = "bobyqa")

    AIC      BIC   logLik deviance df.resid
 1205.3   1273.8   -589.6   1179.3     1427

Scaled residuals:
   Min      1Q  Median      3Q     Max
-7.7203  0.0872  0.2507  0.4502  5.1504

Random effects:
 Groups  Name        Variance Std.Dev.
 subject (Intercept) 0.3766   0.6137
 item    (Intercept) 0.3954   0.6288
Number of obs: 1440, groups:  subject, 40; item, 36

Fixed effects:
                            Estimate Std. Error z value Pr(>|z|)
(Intercept)                  2.77791    0.62755   4.427 9.57e-06 ***
semcogeneric                -0.92145    0.47198  -1.952 0.050901 .
```

```
semcoindefinie nonspecific          0.16384    0.74385   0.220 0.825668
semcoindefinite specific            0.14614    0.74452   0.196 0.844384
formthe                            -0.48090    0.54561  -0.881 0.378099
formzero                           -3.32770    0.58383  -5.700 1.20e-08 ***
L2prof_z                            1.29197    0.19749   6.542 6.07e-11 ***
semcogeneric:formzero               2.97804    0.79106   3.765 0.000167 ***
semcoindefinite nonspecific:formzero  1.74615    0.80447   2.171 0.029963 *
formthe:L2prof_z                   -0.55526    0.21013  -2.642 0.008230 **
formzero:L2prof_z                  -0.03865    0.20986  -0.184 0.853882
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

The effects of L2 proficiency on accuracy and of L2AoA on accuracy are clearly shown in Figures 7.1 and 7.2

Figure 7.1. The effects of L2 proficiency on accuracy

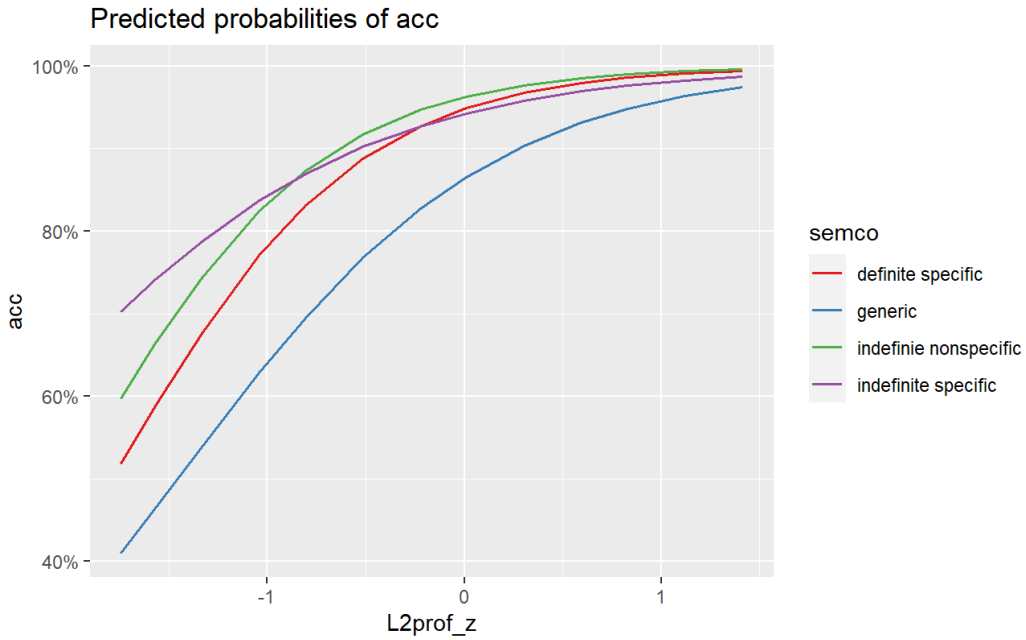
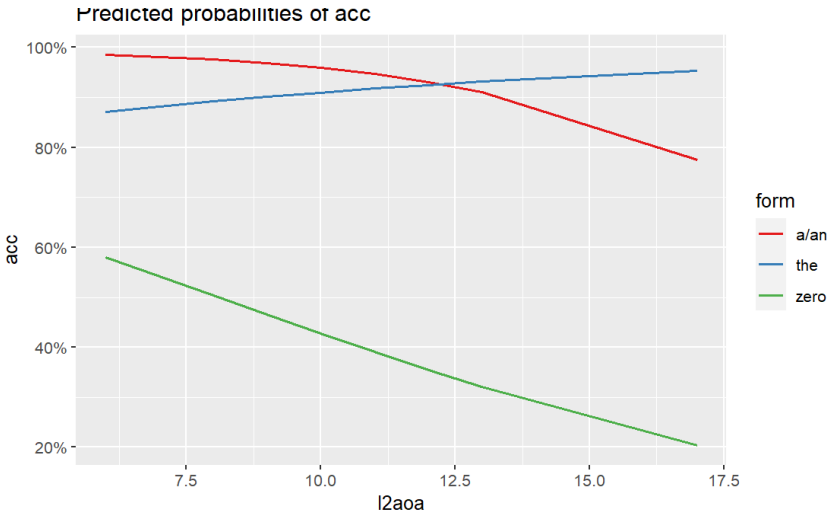


Figure 7.2 The effects of L2 age of acquisition on accuracy



Overall, the results of the analyses in R were similar to the original analyses. The new analyses, however, add new dimensions in that interactions between different variables could also be explored. The use of mixed models has also allowed to shorten the steps in which different analyses can be run under one single model; something which is often difficult to apply with the use of traditional statistics.

CHAPTER EIGHT: CONCLUSION

8.1. Introduction

This chapter presents the conclusion of this thesis. The chapter starts by summarising the research goals, the sampling, the methods of testing and the findings. Additionally, the chapter presents how the current research contributes to the existing research of L2 acquisition and CLI.

8.2. Summary of the Studies

The study aimed to investigated L2 English acquisition by Arabic-English bilingual adults and children (age: 7–12) by conducting two studies using two testing methods: a narrative-elicitation task and an SRT. The two studies addressed how the use of L2 English articles is impacted by different factors, such as the influence of the learners' L1, age and L2AOA, L1 proficiency (in children) and L2 proficiency and LORUK. Additionally, in the SRT, the study examined the role of the noun phrase structure and whether more article omission errors occur when the noun is preceded by an adjective (Trenkic, 2009).The studies further examined the use of L1 Arabic articles using the same tasks. The studies examined whether the use of L1 Arabic is likely to be impacted by the use of L2 English articles and likewise whether the background variables exhibit any influence on the performance of the bilinguals. Thus, the accuracy and errors in the use of articles in both languages were examined. The performance of the bilingual groups was compared to two control groups, one consisting of English native speakers (for the English findings) and one consisting of monolingual Arabic speakers (for the Arabic findings).

In the use of L2 English articles, the results of the two studies suggest that encoding definiteness and the use of the definite article, *the*, in L2 English is easier than encoding both indefinite articles and generic meanings and using *a/an* and *zero*. The findings confirm the

role of form-meaning complexity in that they show variations accuracy across the different semantic contexts and when using the different forms. Furthermore, the results indicate the role of L1 in impacting L2 acquisition; the bilingual groups showed more accuracy in the aspects in which L1 Arabic and L2 English are similar (encoding the definite meaning). In contrast, the bilingual groups showed less accuracy where differences between the two languages are observed (i.e. encoding the indefinite articles and the generic meaning). Thus, the findings provide further evidence of Cook and Cook's (2003) proposal in relation to multicompetence in which the use of L2 interacts with the L1. Additionally, the study aligns with a proposal given in relation to language and thoughts and the predictions that articles as language-specific forms have an influence on a person's thoughts (Slobin, 1996).

The findings varied in relation to the background variables (L2AOA and L2 proficiency); overall, this reflects the role of the L2 experience. The findings confirmed how early learners often show more accuracy and exhibit less L1 influence than Late learners. The patterns the participants exhibited showed how, generally, higher L2 proficiency results in better accuracy and less L1 influence.

With respect to the use of L1 Arabic articles, the findings showed indications of L2 to L1 effects by the BA group. This was reflected mainly in the interaction between accuracy in using L1 Arabic articles and the background variables, reflecting the L2 experience (L2 proficiency, LOR) where greater accuracy is observed with more L2 experience. Interestingly, the findings suggest that, unlike former predictions, the L2 to L1 effect is exhibited more in adult learners than in learners that are children. Consequently, the findings give indications of the role of other factors, such as the similarity between L1 and L2 and the role that language instruction might play in influencing the use of L1.

8.3. Contribution of the Current Research

The current study makes a significant contribution to the existing literature on L2 acquisition. Specifically, the findings identified new patterns and interesting aspects that are new to this area of research.

The current study is the first to examine patterns of CLI within Arabic-English bilinguals following a specific framework and criteria, such as Jarvis and Pavlenko's (2008) framework. In general, studies on CLI, and in particular, article use, have not considered the guidelines or rules, which has resulted in discrepancies across the findings reported in the literature. The application of this framework was enlightening both in terms of investigating the patterns of article use within the targeted groups and the ways in which the advantages and disadvantages of the suggested framework were addressed. Furthermore, using the current framework helps link the existing patterns with the findings reported in previous studies facilitating a broader understanding to the process of acquiring proficiency in the use of English articles and the role of the influence of L1, in particular the role of L1 Arabic.

The bidirectionality of the studies also provides new findings in relation to the study of CLI. In previous studies of CLI, and mainly CLI in article use, reverse CLI has rarely been examined. Prior studies attempted to find reverse patterns by considering different groups of bilinguals (Azaz, 2014; Ionin et al., 2013). The current project adds to the existing research on the acquisition of English articles as it is the first to address reverse CLI in which Arabic is the L1 within the same population of bilinguals (L1 Arabic-L2 English bilinguals).

Overall, the current study provides further insights about L2 acquisition. First, the two studies exemplify how languages are dynamic; when acquiring an L2, the L1 will not remain the same. This reinforces Cook and Cook's (2003) explanation of how languages are presented differently in bilinguals' minds in comparison to monolinguals. The findings further support

former hypotheses in relation to L2 universal development versus language-specific development where the complexity of form-meaning mapping in L2 alone is insufficient to determine the sequence in which L2 morphemes are acquired (Cook & Cook, 2003; Ekiert & Han, 2016; Murakami & Alexopoulou, 2016). Moreover, the current study's findings confirm the hypotheses posited in previous studies on the effects of the extra-linguistic variables of age and proficiency on the L2 acquisition process.

Among studies investigating language acquisition and children, the current study is the first to address CLI in the use of articles among this age group of Arabic-English children. As mentioned in the literature, L1 Arabic children's use of articles has only been investigated by a limited number of studies and within relatively younger populations (Zodernko & Paradis, 2008, 2012). In these studies, only forward CLI was examined, including some aspects of the use of English articles in which neither specificity nor generic use were addressed.

Methodologically, the second study (the sentence-repetition study) conducted in the current research is the first to examine article use wholistically using SRTs. The investigation of L2 English article use of sentence-repetition is very rare (Chrabaszcz & Jiang, 2014). Among the studies that have examined this, article use was often targeted within specific contexts. For example, Chrabaszcz and Jiang (2014) only considered nongeneric uses of the article *the* in English among L1 Spanish learners of L2 English. In respect to using SRT in Arabic, the current study is the first to design this task with the purpose of examining Arabic article use.

Consequently, this study provides a solid foundation for future research. It creates opportunities to further study larger groups of learners and investigate improvements in a wider range of tasks. Moreover, the performance of the groups and the identification of their language behaviour relative to article use can help improve many of applied linguistics and L2 English language teaching. By understanding the role of the L1 of the learners and how

different age groups perform in their use of L2 English articles helps make the appropriate decisions in respect to the materials and content within language classrooms.

References

Abumlhah, M. A. (2016). *The role of input in the acquisition of English articles by L1 Najdi Arabic speakers* (Doctoral dissertation, University of Leeds). https://www.proquest.com/docview/1896109536

Al-Akeel, A. (1998). *The acquisition of Arabic language comprehension by Saudi children*. Unpublished Ph.D. thesis, University of Newcastle upon Tyne, UK. http://theses.ncl.ac.uk/jspui/handle/10443/169

Alenizi, A. M. (2013). *The acquisition of non-generic uses of the English definite article the by Arabic speakers of English* (Doctoral dissertation) Retrieved from ProQuest Dissertations Publishing Database (UMI Number: 1541913). Southern Illinois University, Carbondale. https://www.proquest.com/docview/1419422638

Alhawary, M. T. (2011). *Modern standard Arabic grammar: A learner's guide*. John Wiley & Sons.

Aljarim, A., & Alameen, M. (1999). *Annahw alwadih fi qua'ed allogha alarbiah [Grammar rules in Arabic]*. Dar Almaarif.

Al-Qadi, M. M. (2017) English article system errors among Saudi Arab EFL learners: A case of the preparatory year English program learners of King Saud University. *Language & Translation*, *5*(1), 69-77.

Alzamil, A. (2019). Sentence-level vs. NP-level Genericity: Are Arabic Learners of English Sensitive to Genericity Type?. *Advances in Language and Literary Studies*, *10*(2), 95-101. http://dx.doi.org/10.7575/aiac.alls.v.10n.2p.95

Ambridge, B., & Pine, J. M. (2006). Testing the agreement/tense omission model using an elicited imitation paradigm. *Journal of child language*, *33*(4), 879-898. https://doi.org/10.1017/S0305000906007628

Anderson, J. A., Mak, L., Keyvani Chahi, A. K., & Bialystok, E. (2017). The language and social background questionnaire: Assessing degree of bilingualism in a diverse population. *Behavior Research Methods*, 50(1), 1-14. https://dx.doi.org/10.6084/m9.figshare.3972486.v1.

Akbaş, E., & Ölçü-Dinçer, Z. (2021). Accuracy order in L2 grammatical morphemes: Corpus evidence from different proficiency levels of Turkish learners of English. *Studies in Second Language Learning and Teaching*, *11*(4), 607-627. https://doaj.org/article/7092fcf347e140ae8532cb24b4e16147

Azaz, M. (2014). *Acquisition of form-meaning mapping in L2 Arabic and English noun phrases: A bidirectional framework* (Doctoral dissertation) Retrieved from ProQuest Dissertations Publishing Database (UMI Number: 3634229). Chicago: the University Of Arizona**.** https://www.proquest.com/docview/1613244637

Azaz, M. (2016). Crosslinguistic effects in L2 acquisition: The case of Arabic determiner phrase. *Al-ʿArabiyya*, 49, 1-24. https://www.jstor.org/stable/26451373

Azaz, M., & Frank, J. (2018). Bidirectional cross-linguistic influence in late bilingualism: Evidence from the container-content relation. *Linguistic Approaches to Bilingualism, 8*(4), 411-445. https://doi.org/10.1075/lab.15012.aza

Baayen, R.H., Piepenbrock, R. and Gulikers, L. (1995) The CELEX lexical database (CD-ROM). Paper presented at the Linguistic Data Consortium, University of Pennsylvania, PA.

Bailey, N., Madden, C., & Krashen, S. D. (1974). Is there a “natural sequence” in adult second language learning? Language Learning, *24*, 235–243. https://doi.org/10.1111/j.1467-1770.1974.tb00505.x

Bartolović, B. (1993). Young Children's Cognitive Abilities in Learning Foreign Language. *Children and foreign languages*, 27-44.

Bataineh, R. F. (2005). Jordanian undergraduate EFL students' errors in the use of the indefinite. *The Asian EFL Journal Quarterly June 2005, 7*(1), 56-76.

Bley-Vroman, R., & Chaudron, C. (1994). Elicited imitation as a measure of second language competence. In E. Tarone, S. M. Gass, and A. D. Cohen (Eds.), *Research Methodology in Second-Language Acquisition*, (pp. 245–261). Routledge.

Bickerton, D. (1981). *Roots of language*. Ann Arbor. MI: Karoma Publishers.

Brown, J. D. (1983). An exploration of morpheme-group interactions. In K. M. Bailey, M. H. Long, and S. Peck (Eds.),*Second language acquisition studies* (pp. 25–40). Rowley, MA: Newbury House.

Brown, R. (1973). *A first language: The early stages*. Cambridge, MA: Harvard University Press.

Brown, H. D. (2007). *Principles of language learning and teaching*. London: Pearson Longman.

Butler, Y. (2002). Second language learners' theories on the use of English article: An analysis of the metalinguistic knowledge used by Japanese students in acquiring the English article system. *Studies in Second Language Acquisition, 24,* 451-480. https://doi.org/10.1017/S0272263102003042

Birdsong, D. (Ed.). (1999). *Second language acquisition and the critical period hypothesis*. Routledge.

Birdsong, D. (2005). Interpreting age effects in second language acquisition. In J. F. Kroll, A. M. B. de Groot (Eds), *Handbook of bilingualism: Psycholinguistic approaches, 109,* 127. Oxford University Press.

Birdsong, D. (2005) Nativelikeness and non-nativelikeness in L2A research. International Review of Applied Linguistics, 43, 319–28.

Birdsong, D. (2006). Age and second language acquisition and processing: A selective overview. *Language learning, 56*, 9-49. https://doi.org/10.1111/j.1467-9922.2006.00353.x

Birdsong, D. (2018). Plasticity, variability and age in second language acquisition and bilingualism. *Frontiers in psychology, 9*, 81. https://doi.org/10.3389/fpsyg.2018.00081

Bishop, D. V. M. (1983). Comprehension of English syntax by profoundly deaf children. *Journal of Child Psychology and Psychiatry*, *24*(3), 415-434. https://doi.org/10.1111/j.1469-7610.1983.tb00118.x

Bishop, D. V. (2003). *Test for reception of grammar: TROG-2: manual*. Pearson.

Chaudron, C., & Parker, K. (1990). Discourse markedness and structural markedness: The acquisition of English noun phrases. *Studies in Second Language Acquisition, 12*, 43-64. https://doi.org/10.1017/S0272263100008731

Chee, M. W. L., Tan, E. W. L., & Thiel, T. (1999). Mandarin and English single word processing studied with functional magnetic resonance imaging. *Journal of Neuroscience*, 19, 3050–3056. https://doi.org/10.1523/JNEUROSCI.19-08-03050.1999

Chondrogianni, V., Vasić, N., Marinis, T. & Blom, E. (2015). Production and on-line comprehension of definiteness in English and Dutch by monolingual and sequential bilingual children. *Second Language Research, 31*(3), 309–341. https://doi.org/10.1177/0267658314564461

Chrabaszcz, A., & Jiang, N. (2014). The role of the native language in the use of the English nongeneric definite article by L2 learners: A cross-linguistic comparison. *Second Language Research, 30*(3), 351-379. https://doi.org/10.1177/0267658313493432

Chung, T. (2011). Variability in the L2 acquisition of English articles. *English Teaching*, *66*(2), 169-187. https://doi.org/10.15858/engtea.66.2.201106.169

Conti-Ramsden, G., Botting, N., & Faragher, B. (2001). Psycholinguistic markers for specific language impairment (SLI). *Journal of child psychology and psychiatry*, *42*(6), 741-748. https://doi.org/10.1111/1469-7610.00770

Conrad, S., Biber, D., & Leech, G. (2003). *Student grammar of spoken and written English*. London: Pearson Longman.

Cook, V., & Cook, V. J. (Eds.). (2003). *Effects of the second language on the first (Vol. 3). Clevedon: Multilingual Matters.*

Cook, V. (2008) Multi-competence: black hole or wormhole for second language acquisition research? *In Z. Han (ed.), Understanding second language process* (pp. 16–26). Clevedon, UK: Multilingual Matters.

Cook, V.J. (1991) The poverty of stimulus argument and multi-competence. *Second Language Research* 7, 103–117. https://doi.org/10.1177/026765839100700203

Crompton, P. (2011). Article errors in the English writing of advanced L1 Arabic learners: The role of transfer. *Asian EFL Journal*, 50(1), 4-35.

Crutchley, A., Botting, N., & Conti-Ramsden, G. (1997). Bilingualism and specific language impairment in children attending language units. *International Journal of Language & Communication Disorders*, *32*(2), 267-276. https://doi.org/10.3109/13682829709020409

Curtiss, S. (1977). The Case of Genie, A Modern Day 'Wild Child'. New York: Academic Press. *deVilliers, J. and P. deVilliers.(1973) A cross-sectional study of the acquisition of grammatical morphemes in child speech.* Journal of Psycholinguistic Research, 2, 267-278.

Cziko, G. A. (1986). Testing the language bioprogram hypothesis: A review of children's acquisition of articles. *Language,* 62, 878-898. https://doi.org/415175

Dağdeviren, G. (2010). Use of English articles by speakers of Turkish in the EFL setting. *Novitas-ROYAL (Research on Youth and Language), 4*(2), 242-250. https://doi.org/10.53761/1.18.4.7.

DeKeyser, R. M. (2000). The robustness of critical period effects in second language acquisition. *Studies in second language acquisition, 22*(4), 499-533. https://doi.org/10.1017/S0272263100004022

DeKeyser, R. M. (2005). What makes learning second-language grammar difficult? A review of issues. *Language learning, 55*(S1), 1-25. https://doi.org/10.1111/j.0023-8333.2005.00294.x

Diab, N. (1996). The transfer of Arabic in the English writings of Lebanese students. *The ESPecialist, 18*(1), 71-83. http://ken.pucsp.br/esp/article/view/9792/7297

Díez-Bedmar, M. B., & Papp, S. (2008). The use of the English article system by Chinese and Spanish learners. *In Linking up contrastive and learner corpus research* (pp. 147-175). Brill. https://doi.org/10.1163/9789401206204_007

Dowens, M. G., Vergara, M., Barber, H. A., & Carreiras, M. (2010). Morphosyntactic processing in late second-language learners. *Journal of Cognitive Neuroscience*, *22*(8), 1870-1887. https://doi.org/10.1162/jocn.2009.21304

Dulay,H.C.,& Burt,M.K.(1973).Should we teach children syntax? *Language Learning*, 23, 245–258. https://doi.org/10.1111/j.1467-1770.1973.tb00659.x

Eadie, P. A., Fey, M. E., Douglas, J. M., & Parsons, C. L. (2002). Profiles of grammatical morphology and sentence imitation in children with specific language impairment and Down syndrome. *Journal of speech, language, and hearing research*, 08/2002, *45*(4). https://doi.org/10.1044/1092-4388(2002/058)

Eisenstein, M., Bailey, N., & Madden, C. (1982). It take two: Contrasting tasks and contrasting structures. *TESOL quarterly*, *16*(3), 381-393. https://doi.org/10.2307/3586637

Ekiert, M. (2005). Acquisition of the English article system by speakers of Polish in ESL and EFL settings. *Working Papers in TESOL & Applied Linguistics*, *4*(1), 1-23. https://doi.org/10.7916/salt.v4i1.1601

Ekiert, M. (2007). The acquisition of grammatical marking of indefiniteness with the indefinite article *a* in L2 English. *Working Papers in TESOL & Applied Linguistics*, *7*(1), 1-43. https://doi.org/10.7916/D879447M

Ekiert, M., Han, Z., & Alonso, R. (2016). L1-fraught difficulty: The case of L2 acquisition of English articles by Slavic speakers. *Crosslinguistic influence in second language acquisition, Clevedon, Multilingual Matters*, 147-172. https://doi.org/10.21832/9781783094837

Ellis, R. (2005). Measuring implicit and explicit knowledge of a second language: A psychometric study. *Studies in second language acquisition*, *27*(2), 141-172. https://doi.org/10.1017/S0272263105050096

El-Sayed, A. M. M. (1983). An investigation into the syntactic errors of Saudi freshmen's English compositions. (Doctoral dissertation) Retrieved from ProQuest Dissertations Publishing Database (UMI Number: 8305222). Indiana: University of Pennsylvania. https://www.proquest.com/docview/303089117?pq-origsite=gscholar&fromopenview=true

El Werfalli, I. (2013). *The acquisition of the English article system by Libyan learners of English: A comparison between deductive teaching and textual enhanced input strategies* (Doctoral dissertation) Retrieved from ProQuest Dissertations Publishing Database (UMI Number: 10075153). Newcastle:

University of Northumbria. https://www.proquest.com/docview/1779546617?pq-origsite=gscholar&fromopenview=true

Erlam, R. (2006). Elicited imitation as a measure of L2 implicit knowledge: An empirical validation study. *Applied linguistics, 27*(3), 464-491. https://doi.org/10.1093/applin/aml001

Farghal, M., & al-Zou'bi, I. (2004). The Qur'anic definite article in translation. *Contrastive rhetoric: Issues, Insights, and Pedagogy*, 61-67.

Fassi Fehri, A. (1993). *Issues in the structure of Arabic clauses and words*. Dordrecht: The Netherlands, Kluwer Academic Publishers.

Fearnley, S. (1997) MRC Psycholinguistic Database search program. Behavior Research Methods, Instruments, & Computers 29 (2), 291–295.

Fehri, A. F. (2012). *Key features and parameters in Arabic grammar* (Vol. 182). Amsterdam: John Benjamins.

Fen-Chuan Lu, C. (2001). The acquisition of English articles by Chinese learners. *University of Hawai'I Second Langauge Studies Paper 20 (1)*. http://hdl.handle.net/10125/40645

Flege, J. E., Schirru, C., & MacKay, I. R. (2003). Interaction between the native and second language phonetic subsystems. *Speech communication*, *40*(4), 467-491. https://doi.org/10.1016/S0167-6393(02)00128-0

Foroodi-Nejad, F., & Paradis, J. (2009). Crosslinguistic transfer in the acquisition of compound words in Persian–English bilinguals. *Bilingualism: Language and Cognition*, *12*(4), 411-427. https://doi.org/10.1017/S1366728909990241

Fraser, C., Bellugi, U., & Brown, R. (1963). Control of grammar in imitation, comprehension, and production. *Journal of verbal learning and verbal behavior*, *2*(2), 121-135. https://doi.org/10.1016/S0022-5371(63)80076-6

Fullana Rivera, N. (2005). Age-related effects on the acquisition of a foreign language phonology in a formal setting. http://hdl.handle.net/2445/35008

Gass, S. M., & Selinker, L. (Eds.). (1992). *Language transfer in language learning: Revised edition* (Vol. 5). John Benjamins Publishing.

Goad, H., & White, L. (2004). Ultimate attainment of L2 inflection: Effects of L1 prosodic structure. *EUROSLA yearbook*, *4*(1), 119-145.

Goldschneider, J. M., & DeKeyser, R. M. (2001). Explaining the "natural order of L2 morpheme acquisition" in English: A meta-analysis of multiple determinants. *Language learning*, *51*(1), 1-50. https://doi.org/10.1111/1467-9922.00147

Granena, G. (2014). Language aptitude and long-term achievement in early childhood L2 learners. *Applied Linguistics*, *35*(4), 483-503. https://doi.org/10.1093/applin/amu013

Grosjean, F. (1998). Transfer and language mode. *Bilingualism: Language and Cognition*, *1*(3), 175-176. https://doi.org/10.1017/S1366728998000285

Guion, S. G., Flege, J. E., Liu, S. H., & Yeni-Komshian, G. H. (2000). Age of learning effects on the duration of sentences produced in a second language. *Applied Psycholinguistics*, *21*(2), 205-228. https://doi.org/10.1017/S0142716400002034

Haiyan, L., & Lianrui, Y. (2010). An investigation of English articles' acquisition by Chinese learners of English. *Chinese Journal of Applied Linguistics (Foreign Language Teaching & Research Press)*, *33*(3), 15-31.

Hamadah, Z. (2018). *Acquisition of English Articles By Arabic-speaking Children*. [Unpublished dissertation], University of Reading, UK.

Hamayan, E., Saegert, J., & Larudee, P. (1977). Elicited imitation in second language learners. *Language and Speech*, *20*(1), 86-97. https://doi.org/10.1177/002383097702000109

Hawkins, J. (1978). *Definiteness and indefiniteness*. San Diego, CA: Academic Press.

Hawkins, J. A. (2004). *Efficiency and complexity in grammars*. OUP Oxford.

Hawkins, R., Al-Eid, S., Almahboob, I., Athanasopoulos, P., Chaengchenkit, R., Hu, J., Rezai, M. J., Jaensch, C., Jeon, Y., Jiang, A., Leung, Y-K. I., Matsunaga, K., Ortega, M., Sarko, G., Snape, N. & Velasco-Zárate, K. (2006). Accounting for English article interpretation by L2 speakers. *EUROSLA yearbook*, *6*(1), 7-25. https://doi.org/10.1075/eurosla.6.04haw

Hedges, L. V., & Olkin, I. (1985*). Statistical methods for meta-analysis*. Orlando, FL: Academic Press.

Hirata-Edds, T. (2011). Influence of second language Cherokee immersion on children's development of past tense in their first language, English. *Language Learning*, *61*(3), 700-733. https://doi.org/10.1111/j.1467-9922.2011.00655.x Hoff, E. (2013). *Language development*. Wadsworth: Cengage Learning.

Huang, Y. (2020). *Acquisition of English articles by Mandarin L1 learners of English.* [Unpublished dissertation], University of Reading, UK.

Huebner, T. (1983). *A longitudinal analysis of the acquisition of English*. Ann Arbor, MI: Karoma Press.

Hulk, A., & Müller, N. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: language and cognition*, *3*(3), 227-244. https://doi.org/10.1017/S1366728900000353

Ionin, T. (2003). *Article semantics in second language acquisition* (Doctoral dissertation, Massachusetts Institute of Technology). http://dspace.mit.edu/handle/1721.1/7963

Ionin, T. (2006). This is definitely specific: Specificity and definiteness in article systems. *Natural Language Semantics, 14*, 175-234. https://doi.org/10.1007/s11050-005-5255-9

Ionin, T., & Montrul, S. (2010). The role of L1 transfer in the interpretation of articles with definite plurals in L2 English. *Language Learning*, *60*(4), 877-925. https://doi.org/10.1111/j.1467-9922.2010.00577.x

Ionin, T., Montrul, S., & Crivos, M. (2013). A bidirectional study on the acquisition of plural noun phrase interpretation in English and Spanish. *Applied Psycholinguistics*, *34*(3), 483-518. https://doi.org/10.1017/S0142716411000841

Ionin, T., Ko, H., & Wexler, K. (2004). Article semantics in L2 acquisition: The role of specificity. *Language Acquisition, 12*(1), 3-69. https://doi.org/10.1207/s15327817la1201_2

Ionin, T., Zubizarreta, M. L., & Maldonado, S. B. (2008). Sources of linguistic knowledge in the second language acquisition of English articles. *Lingua*, *118*(4), 554-576. https://doi.org/10.1016/j.lingua.2006.11.012

Ionin, T., Zubizarreta, M. L., & Philippov, V. (2009). Acquisition of article semantics by child and adult L2-English learners. *Bilingualism: Language and cognition, 12*(3), 337-361. https://doi.org/10.1017/S1366728909990149

Ioup, G., Boustagui, E., El Tigi, M., & Moselle, M. (1994). Reexamining the critical period hypothesis: A case study of successful adult SLA in a naturalistic environment. *Studies in second language acquisition*, *16*(1), 73-98. https://doi.org/10.1017/S0272263100012596

Jarvis, S. (2000). Methodological rigor in the study of transfer: Identifying L1 influence in them interlanguage lexicon. *Language learning*, *50*(2), 245-309. https://doi.org/10.1111/0023-8333.00118

Jarvis, S. (2002). Topic continuity in L2 English article use. *Studies in second language acquisition, 24*(3), 387-418. https://doi.org/10.1017/S0272263102003029

Jarvis, S., & Odlin, T. (2000). Morphological type, spatial reference, and language transfer. *Studies in second language acquisition*, *22*(4), 535-556. https://doi.org/10.1017/S0272263100004034

Jarvis, S., & Pavlenko, A. (2008). *Crosslinguistic influence in language and cognition*. Routledge.

Jiang, N., Novokshanova, E., Masuda, K., & Wang, X. (2011). Morphological congruency and the acquisition of L2 morphemes. *Language Learning*, *61*(3), 940-967. https://doi.org/10.1111/j.1467-9922.2010.00627.x

Kecskes, I., & Papp, T. (2000). *Foreign language and mother tongue*. Mahwah, NJ: Erlbaum.

Keidel, J., Zevin, J., Kluender, K., & Seidenberg, M. (2003). Modeling the role of native language knowledge in perceiving nonnative speech contrasts. In M. Sale, D. Recasens, & J. Romero (Eds.), Proceedings of the 15th International Congress of Phonetic Sciences (pp. 2221–2224). Barcelona, Spain: Causal Productions.

Kecskes, I., & Papp, T. (2003). How to demonstrate the conceptual effect of L2 on L1? Methods and techniques. *Effects of the Second Language on the First*, *3*, 247-265. https://doi.org/10.21832/9781853596346-015

Kim, H., Rah, Y., & Hwang, H. (2020). Testing Usage-Based Approaches to Assessing EFL Learners' Development of English Argument Structure Constructions. *English Teaching*, *75*(1), 55-78. https://doi.org/10.15858/engtea.75.s1.202006.55

Klein, D., Zatorre, R. J., Milner, B., Meyer, E., & Evans, A. C. (1994). Left putaminal activation when speaking a second language: Evidence from PET. *NeuroReport, 5*, 2295–2297. https://doi.org/10.1097/00001756-199411000-00022

Kuperman, V., Stadthagen-Gonzalez, H. & Brysbaert, M. Age-of-acquisition ratings for 30,000 English words. *Behav Res* **44,** 978–990 (2012). https://doi.org/10.3758/s13428-012-0210-4

Lardiere, D. (2004). Knowledge of definiteness despite variable article omission in second language acquisition. In *Proceedings of the 28th annual Boston University conference on language development* (pp. 328-339). Somerville, MA: Cascadilla Press.

Larsen-Freeman, D. E. (1975). The acquisition of grammatical morphemes by adult ESL students. *TESOL Quarterly, 9*, 409–419. https://doi.org/3585625

Larsen-Freeman, D. E. (1976). An explanation for the morpheme acquisition order of second language learners. *Language Learning*, 26, 125–134. https://doi.org/10.1111/j.1467-1770.1976.tb00264.x

Laufer, B. (2003). The Influence of L2 on l. LI collocational knowledge and on LI lexical. *In Effects of the Second Language on the First*, in V. Cook (Ed.). Multilingual Matters. pp. 19-31

Lee, R. R. (1972). A taxonomy of second language behaviors. *TESOL Quarterly*, 209-220. https://doi.org/3585845

Lenneberg, E. H. (1967). The biological foundations of language. *Hospital Practice, 2*(12), 59-67. https://doi.org/10.1080/21548331.1967.11707799

Leung, Y. K. I. (2001). The initial state of L3A: Full transfer and failed features. In *The past, present and future of second language research: Selected proceedings of the 2000 Second Language Research Forum* (Vol. 75, pp. 55-75).

Liang, J. (2002). Sentence comprehension by Chinese learners of English: Verb-centered or construction-based. Unpublished MA thesis, Guangdong University of Foreign Studies, Guangdong, China.

Liu, D., & Gleason, J. L. (2002). Acquisition of the article *the* by non-native speakers of English: An analysis of four non-generic uses. *Studies in Second Language Acquisition*, *24*(1), 1-26. https://doi.org/10.1017/S0272263102001018

Long, M. H. (1990) Maturational constraints on language development. *Studies in Second Language Acquisition, 12,* 251–86. https://doi.org/10.1017/S0272263100009165

Lopez, E. S. (2015). *The role of explicit instruction on article acquisition in L2 English* (Doctoral dissertation) Retrieved from ProQuest Dissertations Publishing Database (UMI Number: 10177286). York: University of York. https://etheses.whiterose.ac.uk/9738/

Lust, B. C. (2006). *Child language: Acquisition and growth*. Cambridge University Press.

Lyons, C. (1999). *Definiteness.* Cambridge, England: Cambridge University Press.

MacKay, I. R., & Flege, J. E. (2004). Effects of the age of second language learning on the duration of first and second language sentences: The role of suppression. *Applied Psycholinguistics*, *25*(3), 373-396 https://doi.org/10.1017/S0142716404001171

MacWhinney, B. (2000). *The CHILDES project. Tools for analyzing talk; Vol. I: Transcription format and programs. Vol. II: The database*. Mahwah, NJ: Erlbaum.

Major, R. C. (1992). Losing English as a first language. *The Modern Language Journal*, *76*(2), 190-208. https://doi.org/329772

Maratsos, M. (2000). More overregularizations after all: new data and discussion on Marcus, Pinker, Ullman, Hollander, Rosen & Xu. *Journal of Child Language*, *27*(1), 183-212. https://doi.org/10.1017/S0305000999004067

Marcus, G. F., Pinker, S., Ullman, M., Hollander, M., Rosen, T. J., Xu, F., & Clahsen, H. (1992). Overregularization in language acquisition. *Monographs of the society for research in child development*, i-178. https://doi.org/1166115

Marinis, T., & Armon-Lotem, S. (2015). Sentence repetition. *Assessing multilingual children: Disentangling bilingualism from language impairment*, 95-124.

Marinova-Todd, S. H., Marshall, D. B., & Snow, C. E. (2000). Three misconceptions about age and L2 learning. *TESOL quarterly*, *34*(1), 9-34. https://doi.org/10.2307/3588095

Master, P. (1997). The English articles: Acquisition, function, and pedagogy. *System, 25*(2), 215-232. https://doi.org/10.1016/S0346-251X(97)00010-9

Master, P. A. (1987). *A cross-linguistic interlanguage analysis of the acquisition of the English article system.* (Doctoral dissertation) Retrieved from ProQuest Dissertations Publishing Database (UMI Number: 8719963). Los Angeles: UCLA. https://www.proquest.com/docview/303546161?pq-origsite=gscholar&fromopenview=true

McDade, H. L., Simpson, M. A., & Lamb, D. E. (1982). The use of elicited imitation as a measure of expressive grammar: A question of validity. *Journal of Speech and Hearing disorders*, *47*(1), 19-24. https://doi.org/10.1044/jshd.4701.19

Mehrani, M. B., & Zabihi, R. (2017). A comparative study of shifting ability, inhibitory control and working memory in monolingual and bilingual children. *Psychological Studies, 62*(4), 421-427. v https://doi.org/10.1007/s12646-017-0432-8

Mei, Y. A. N. G. (2013). An empirical study of the conceptual transfer effect as reflected in the l2 acquisition of English articles. *Chinese Journal of Applied Linguistics*, *36*(3), 338-353. https://doi.org/10.1515/cjal-2013-0023

Mihaljević Djigunović, J. (2010). Starting age and L1 and L2 interaction. *International Journal of Bilingualism, 14*(3), 303-314. https://doi.org/10.1177/1367006910367847

Morales-Reyes, A., & Gómez Soler, I. (2016). Transfer and semantic universals in the L2 acquisition of the English article system by child L2 learners. *Language Acquisition*, *23*(1), 57-74. https://doi.org/10.1080/10489223.2015.1067318

Müller, N., & Hulk, A. (2001). Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Bilingualism: Language and cognition*, *4*(1), 1-21. https://doi.org/10.1017/S1366728901000116

Murakami, A., & Alexopoulou, T. (2016). L1 influence on the acquisition order of English grammatical morphemes: A learner corpus study. *Studies in Second Language Acquisition*, *38*(3), 365-401. https://doi.org/10.1017/S0272263115000352

Munnich, E., Flynn, S., & Martohardjono, G. (1994). Elicited imitation and grammaticality judgment tasks What they measure and how they relate to each other. In E. Tarone et al (eds) *Research Methodology in Second-Language Acquisition*. Routledge.

Muñoz, C. (2010). On how age affects foreign language learning. *Advances in research on language acquisition and teaching*, 39-49.

Odlin, T. (2005). 15 Cross-Linguistic Influence. In J. Catherine et al, (Eds.) *The Handbook of Second Language Acquisition*, *20*, 436. Blackwell.

Odlin, T. (1989). *Language transfer* (Vol. 27). Cambridge: Cambridge University Press.

Ortega, L. (2014). Age. In B. Comrie & G. Corbett (Eds.). *Understanding second language acquisition* (pp. 12-30). New York: Routledge.

Oshita, H. (2000). What is happened may not be what appears to be happening: a corpus study of 'passive'unaccusatives in L2 English. *Second Language Research*, *16*(4), 293-324. https://doi.org/10.1177/026765830001600401

Owens, J., Dodsworth, R., & Kohn, M. (2013). Subject expression and discourse embeddedness in Emirati Arabic. *Language Variation and Change*, *25*(3), 255-285. https://doi.org/10.1017/S0954394513000173

Park, S. (2013). Testing the interface hypothesis: acquisition of English articles by Korean L2 learners. In *Proceedings of the 12th Generative Approaches to Second Language Acquisition Conference* (pp. 155-161). Cascadilla Proceedings Project.

Parrish, B. (1987). A new look at methodologies in the study of article acquisition for learners of ESL. *Language learning*, *37*(3), 361-384. https://doi.org/10.1111/j.1467-1770.1987.tb00576.x

Pavlenko, A. (2000). L2 influence on L1 in late bilingualism. *Issues in Applied Linguistics, 11*(2). https://doi.org/10.5070/L4112005033

Pavlenko, A., & Jarvis, S. (2002). Bidirectional transfer. *Applied linguistics*, *23*(2), 190-214. https://doi.org/10.1093/applin/23.2.190

Penfield, W. (1959). The interpretive cortex: The stream of consciousness in the human brain can be electrically reactivated. *Science*, *129*(3365), 1719-1725. https://doi.org/10.1126/science.129.3365.1719

Pinker, S. (1989). *Learnability and cognition: the acquisition of argument structure*. Learning, Development, and Conceptual Change series.

Pongpairoj, N. & Trenkic, D. 2007. Are L2 English article choices UG-regulated? Paper presented at the Georgetown University Round Table, GURT 2007.

Ren, Y., Xu Rattanasone, N., Demuth, K., Andronos, F., & Wyver, S. (2018). Relationships between proficiency with grammatical morphemes and emotion regulation: a study of Mandarin–English preschoolers. *Early Child Development and Care*, *188*(8), 1055-1062. https://doi.org/10.1080/03004430.2016.1245189

Ringbom, H. (1992). On L1 transfer in L2 comprehension and L2 production. *Language learning*, *42*(1), 85-112. https://doi.org/10.1111/j.1467-1770.1992.tb00701.x

Ringbom, H. (2007). Actual, perceived and assumed cross-linguistic similarities in foreign language learning. *AFinLAn vuosikirja*.

Robertson, D. (2000). Variability in the use of the English article system by Chinese learners of English. *Second Language Research*, *16*(2), 135-172. https://doi.org/10.1191/026765800672262975

Ryding, K. (2005). *A reference grammar of modern standard Arabic*. Cambridge, UK: Cambridge University Press.

Sarko, G. (2008). Morphophonological or syntactic transfer in the acquisition of English articles by L1 speakers of Syrian Arabic. *Proceedings of the 9th Generative Approaches To Second Language Acquisition Conference (GASLA 2007)* (pp. 206-217).

Sarko, G. (2009). L2 English article production by Arabic and French speakers. In M. P. G. Mayo and R. Hawkins (Eds.), *Second language acquisition of articles: Empirical findings and theoretical implications* (pp. 37-66). Amsterdam: John Benjamins.

Schafer, R., & de Villiers, J. G. (2000). Imagining articles: What a and the can tell us about the emergence of DP. In *Proceedings of the 24th annual Boston University conference on language development, 2*, 609-620.

Schaeffer, J., & Matthewson, L. (2005). Grammar and pragmatics in the acquisition of article systems. *Natural Language & Linguistic Theory*, *23*(1), 53-101. https://doi.org/10.1007/s11049-004-5540-1

Schneider, P., Dubé, R. V., & Hayward, D. (2005). The Edmonton Narrative Norms Instrument. Retrieved from University of Alberta Faculty of Rehabilitation Medicine website: www.rehabresearch.ualberta.ca/enni.

Schwartz, A. H., & Daly, D. A. (1976). Some explicit guidelines for constructing and scoring elicited imitation tasks. *Language, Speech, and Hearing Services in Schools*, *7*(1), 33-41. https://doi.org/10.1044/0161-1461.0701.33

Scott, M., & Tucker, G. (1974). Error analysis and English language strategies of Arabic students. *Language Learning, 24*(1), 67-76. https://doi.org/10.1111/j.1467-1770.1974.tb00236.x

Sebastián-Gallés, N., Echeverría, S., & Bosch, L. (2005). The influence of initial exposure on lexical representation: Comparing early and simultaneous bilinguals. *Journal of Memory and Language*, *52*(2), 240-255. https://doi.org/10.1016/j.jml.2004.11.001

Selinker, L. (1972). Interlanguage.

Selinker, L. (1983). Language transfer. *Language transfer in language learning*, *54*, 33-53.

Sethuraman, N., & Goodman, J. C. (2004). Children's mastery of the transitive construction. In Eve V. Clark (Ed.), Online Proceedings of the 32nd Session of the Child Language Research Forum (pp. 60-67). Stanford, CA: Stanford University, CSLI.

Shaalan, S. (2010). *Investigating grammatical complexity in Gulf Arabic speaking children with specific language impairment (SLI)* (Doctoral dissertation, UCL (University College London)). https://discovery.ucl.ac.uk/id/eprint/20472

Singleton, D. (2001). Age and second language acquisition. *Annual review of applied linguistics*, *21*, 77-89. https://doi.org/10.1017/S0267190501000058

Singleton, D. M., & Ryan, L. (2004). *Language acquisition: The age factor* (Vol. 9). Multilingual Matters.

Sinha, T. S. (2014). Acquisition of the non-generic uses of English definite article by the adult ESL Learners. *Language in India*, *14*(2).

Slobin, D. I. (1987). Thinking for speaking. In *Annual Meeting of the Berkeley Linguistics Society* (Vol. 13, pp. 435-445).

Slobin, D. I. (1993). Is spatial language a special case?. *Behavioral and Brain Sciences*, *16*(2), 249-251. https://doi.org/10.1017/S0140525X00029873

Slobin, D. I. (1996). From "thought and language" to "thinking for speaking". In J. J. Gumperz & S.C. Levinson (Eds.). *Rethinking Linguistic Relativity* (pp.70-96). Cambridge University Press. https://philarchive.org/archive/SLOFTA

Slobin, D. I. (2003). Language and thought online: Cognitive consequences of linguistic relativity. *Language in mind: Advances in the study of language and thought*, *157192*.

Smith, B. (2001). Arabic speakers. *Learner English: A Teacher's Guide to Interference and Other Problems,* Cambridge: Cambridge University Press.

Snape, N. (2006). *The acquisition of the English determiner phrase by Japanese and Spanish learners of English* (Doctoral dissertation, University of Essex).

Snow, C. E., & Hoefnagel-Höhle, M. (1977). Age differences in the pronunciation of foreign sounds. *Language and speech*, *20*(4), 357-365. https://doi.org/10.1177/002383097702000407

Stoehr, A., Benders, T., Van Hell, J. G., & Fikkert, P. (2017). Second language attainment and first language attrition: The case of VOT in immersed Dutch–German late bilinguals. *Second Language Research*, *33*(4), 483-518. https://doi.org/10.1177/0267658317704261

Tarone, E. E. (1985). Variability in interlanguage use: A study of style-shifting in morphology and syntax. *Language Learning*, *35*(3), 373-403. https://doi.org/10.1111/j.1467-1770.1985.tb01083.x

Tarone, E., & Parrish, B. (1988). Task-related variation in interlanguage: The case of articles. *Language learning*, *38*(1), 21-44. https://doi.org/10.1111/j.1467-1770.1988.tb00400.x

Thomas, M. (1989). The acquisition of English articles by first- and second-language learners. *Applied Psycholinguistics*, *10*, 335-355. https://doi.org/10.1017/S0142716400008663

Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.

Trenkic, D. (2009). Accounting for patterns of article omissions and substitutions in second language production. *Second language acquisition of articles: Empirical findings and theoretical implications*, *49*, 115-143.

Trenkic, D. (2002). Form–meaning connections in the acquisition of English articles. *EUROSLA yearbook*, *2*(1), 115-133. https://doi.org/10.1075/eurosla.2.09tre

Trenkic, D. (2008). The representation of English articles in second language grammars: Determiners or adjectives?. *Bilingualism: Language and cognition*, *11*(1), 1-18. https://doi.org/10.1017/S1366728907003185

Trenkic, D. (2007). Variability in second language article production: Beyond the representational deficit vs. processing constraints debate. *Second Language Research*, *23*(3), 289-327. https://doi.org/10.1177/0267658307077643

Van Hell, J. G., & Tokowicz, N. (2010). Event-related brain potentials and second language learning: Syntactic processing in late L2 learners at different L2 proficiency levels. *Second Language Research*, *26*(1), 43-74. https://doi.org/10.1177/0267658309337637

Van Hout, A., Harrigan, K., & de Villiers, J. (2010). Asymmetries in the acquisition of definite and indefinite NPs. *Lingua*, *120*(8), 1973-1990. https://doi.org/10.1016/j.lingua.2010.02.006

Vinther, T. (2002). Elicited imitation: A brief overview. *International journal of applied linguistics*, *12*(1), 54-73. https://doi.org/10.1111/1473-4192.00024

Warden, D. A. (1976). The influence of context on children's use of identifying expressions and references. *British Journal of Psychology*, *67*(1), 101-112. https://doi.org/10.1111/j.2044-8295.1976.tb01501.x

Weinreich, U. (1953). The Russification of Soviet minority languages. *Probs. Communism*, *2*, 46.

White, L. (2003). Fossilization in steady state L2 grammars: Persistent problems with inflectional morphology. *Bilingualism: language and cognition*, *6*(2), 129-141. https://doi.org/10.1017/S1366728903001081

Wolf, F.M.(1986).*Meta-analysis: Quantitative methods for research synthesis*. Beverly Hills, CA: Sage.

Yang, M., & Ionin, T. (2009). Specificity and speaker knowledge in the second language acquisition of English articles. *Ms., Guangdong University of Foreign Studies & University of Illinois at Urbana–Champaign*.

Yip, V., & Matthews, S. J. (2009). Cross-linguistic influence in bilingual and multilingual contexts. In *International Symposium on Bilingualism, ISB-7*.

Young, R. (1996). Form-function relations in articles in English interlanguage. In R. Bayley & D. R. Preston (Eds.), *Second language acquisition and linguistic variation* (pp. 135-175). Amsterdam: John Benjamins.

Zdorenko, T., & Paradis, J. (2008). The acquisition of articles in child second language English: Fluctuation, transfer or both? *Second Language Research, 24*(2), 227-250. https://doi.org/10.1177/0267658307086302

Zdorenko, T., & Paradis, J. (2012). Articles in child L2 English: When L1 and L2 acquisition meet at the interface. *First Language, 32*(1-2), 38-62. https://doi.org/10.1177/0142723710396797

Zehler, A. M., & Brewer, W. F. (1982). Sequence and principles in article system use: An examination of a, the, and null acquisition. *Child Development, 53*(5), 1268-1274. https://doi.org/1129016

Zughoul, M. R. (2002). Interlanguage syntax of Arabic-speaking learners of English: The noun phrase. https://eric.ed.gov/?id=ED479649

Appendices

Appendix 1: The linguistic and Social Background Questionnaire (Anderson et al., 2017):

1. **Sex:** male female
2. **Date of birth:** _____

3. **Please indicate the highest education and occupation for each parent:**

Mother	**Father**
1. _____ No high school diploma 2. _____ High school diploma 3. _____ Some post-secondary education post-secondary degree or 4. _____ diploma 5. _____ Graduate or professional degree **Occupation**:_____ **First language**:_____ **Second language**:_____ **Other languages**:_____	1. _____ No high school diploma 2. _____ High school diploma 3. _____ Some post-secondary education post-secondary degree or 4. _____ diploma 5. _____ Graduate or professional degree **Occupation**:_____ **First language**:_____ **Second language**:_____ **Other languages**:_____

4. **Was the child born in the Uk?** Yes No
   If not where was he/she born? _____
   When did he/she move to the UK? _____ (month / year)

5. **Have he/she live in a place where English is not the dominant communicating language?** Yes No

		From	To
If yes, where and for how long?	1. _____		
	2. _____		
	3. _____		
		Month/ year	Month/ year

Language Background

6. List all the language and dialects the child can speak and understand including English, in order of fluency.

Language	Where did he/she learn it?	At what age did the child learn it? (If learned from birth write age "0")	Were there any period in the child's life when he/she did not use this language? Indicate duration in months/years
1. _____	□ Home □School □Community □ Other: _____		
2. _____	□ Home □School □Community □ Other: _____		
3. _____	□ Home □School □Community □ Other: _____		
4. _____	□ Home □School □Community □ Other: _____		
5. _____	□ Home □School □Community □ Other: _____		

Relative to a highly proficient speaker's performance, rate your child's proficiency level on a scale of 0-10 for the following activities conducted in English and Arabic. (Put a tick √ in the box of the chosen answer

7.1. English

	0	1	2	3	4	5	6	7	8	9	10
Speaking											
Understanding											

Reading											
Writing											

(0= no proficiency, 10 high proficiency)

7.2. Of the time your child spend engaged in the following activities, how much of that time is carried out in English. (Put a tick √ in the box of the chosen answer)

	None	**Little**	**Some**	**Most**	**All**
Speaking					
Listening					
Reading					
Writing					

8.1. Arabic. (Put a tick √ in the box of the chosen answer)

	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Speaking											
Understanding											
Reading											
Writing											

(0= no proficiency, 10 high proficiency)

8.2. **Of the time your child spend engaged in the following activities, how much of that time is carried out in Arabic. (Put a tick √ in the box of the chosen answer)**

	None	**Little**	**Some**	**Most**	**All**
Speaking					
Listening					
Reading					
Writing					

Community Language Behaviour

9. Please indicate which language(s) your child most frequently used in the following life stages, both inside and outside home. (Put a tick √ in the box of the chosen answer)

		All English	**Mostly English**	**Half English and half Arabic**	**Mostly Arabic**	**Only Arabic**
9.1	Infancy					
9.2	Preschool age					
9.3	Primary school age					

10. Please indicate which language(s) your child generally use when speaking to the other following people.

		All English	**Mostly English**	**Half English and half Arabic**	**Mostly Arabic**	**Only Arabic**
10.1	Parents					
10.2	Siblings					
10.3	Grandparents					
10.4	Other relatives					
10.5	Neighbours					
10.6	Friends					

11. Please indicate which language(s) your child generally use in the following situations:

		All English	**Mostly English**	**Half English and half Arabic**	**Mostly Arabic**	**Only Arabic**
11.1	Home					
11.2	School					
11.3	Other activities (e.g. hanging out with friends, movies)					
11.4	Religious activities					
11.5	Extracurricular activities (e.g. hobbies, sports volunteering, gaming)					
11.6	Shopping/ restaurants/ other commercial services					
11.7	Health care services/ Government/public offices/banks					

12. Please indicate which language(s) your child generally use for the following activities.

		All English	**Mostly English**	**Half English and half Arabic**	**Mostly Arabic**	**Only Arabic**
12.1	Reading					
12.2	Texting					
12.3	Emailing					
12.4	Social media (e.g. facebook, Twitter etc.)					
12.5	Writing shopping list, notes, etc.					
12.6	Watching TV, listening to radio					
12.7	Watching movies					
12.8	Browsing the internet					
12.9	Praying					

13. Some people switch between the languages they know within a single conversation (i.e. while using one language, they may use sentences or words from the other language). This is known as "language-switching". Please indicate how often you child engages in language-switching. (Put a tick √ in the box of the chosen answer)

		Never	**Rarely**	**Sometimes**	**Frequently**	**Always**
13.1	With parents and family					
13.2	With friends					
13.3	On Social media (e.g. facebook, Twitter etc.)					

The Arabic version of the questionnaire

إستبيان إستخدام اللغة على المستوى الإجتماعي
الإسم:_____

1_ النوع: أنثى ذكر

2_ تاريخ الميلاد: _____

3- أرجو تحديد المستوى التعليمي والوظيفي الأعلى لكل من الوالدين:

الأم	الأب:
1_ _____ أقل من الثانوي	1_ _____ أقل من الثانوي
2_ _____ ثانوي	2_ _____ ثانوي
3_ _____ جامعي	3_ _____ جامعي
4_ _____دراسات عليا	4_ _____دراسات عليا
الوظيفة:_____	**الوظيفة:_____**
اللغة الأولى:_____	**اللغة الأولى:_____**
اللغة الثانية:_____	**اللغة الثانية:_____**
لغات أخرى:_____	**لغات أخرى:_____**

4- مكان الولادة: _____

5- هل سبق أن عشت في مكان تكون اللغة الإنجليزية فيه هي اللغة المستخدمة؟ نعم لا

	المكان	**من (الشهر- السنة):**	**إلى (الشهر- السنة)**
في حال كانت الإجابة نعم أين كان ذلك وكم كانت المدة؟	**1_**		
	2_		
	3_		

الخلفية اللغوية

6- يرجى كتابة اللغات واللهجات التي تتحدثها بالترتيب من حيث الطلاقة:

اللغة	**أين تعلمتها؟**	**كم كان عمرك حين تعلمتها؟ (يرجى وضع "0" في حال تعلمتها منذ الولادة)**	**هل كان هناك فترة في حياتك لم تقم فيها بإستخدام هذه اللغة؟ (يرجى التحديد بكتابة الشهر والسنة)**
-1	□ المنزل □ المدرسة □ المجتمع □ وسائل أخرى: _____ _____		

-2	□المنزل □ المدرسة □ المجتمع □ وسائل أخرى: _____ _____		
-3	□المنزل □ المدرسة □ المجتمع □ وسائل أخرى: _____ _____		
-4	□المنزل □ المدرسة □ المجتمع □ وسائل أخرى: _____ _____		
-5	□المنزل □ المدرسة □ المجتمع □ وسائل أخرى: _____ _____		

7_إعتماداً على مستوى الأداء, قم بتقييم مستواك اللغوي من 0 إلى 10 في الانشطة التالية بكلٍ من اللغتين العربية والإنجليزية (قم بوضع إشارة صح في مربع الإجابة):

7.1. الإنجليزية

	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
التحدث											
الفهم											
القراءة											
الكتابة											

(0 أقل مستوى, 10 كأعلى مستوى)

7.2. خلال الأنشطة التالية, لكم من الوقت تستخدم فيها اللغة الإنجليزية(قم بوضع إشارة صح في مربع الإجابة):

	إطلاقاً	**نادراً**	**أحياناً**	**معظم الوقت**	دائماً
التحدث					
الإستماع					
القراءة					
الكتابة					

7.3. العربية (قم بوضع إشارة صح في مربع الإجابة):

	0	1	2	3	4	5	6	7	8	9	10
التحدث											
الفهم											
القراءة											
الكتابة											

(0 أقل مستوى, 10 كأعلى مستوى)

7.2. خلال الأنشطة التالية, كم من الوقت تستخدم فيها اللغة العربية (قم بوضع إشارة صح في مربع الإجابة):

	إطلاقاً	نادراً	أحياناً	معظم الوقت	دائماً
التحدث					
الإستماع					
القراءة					
الكتابة					

السلوك اللغوي الإجتماعي

9_ يرجى تحديد اللغة (أو اللغات) المستخدمة عامةً في المراحل الحياتية التالية, سواء داخل أو خارج المنزل (قم بوضع إشارة صح في مربع الإجابة):

	المرحلة	الإنجليزية دائماً	الإنجليزية غالباً	الإنجليزية والعربية بشكل متساوي	العربية غالباً	العربية دائماً
9.1	الطفولة المبكرة					
9.2	ماقبل المدرسة					
9.3	المرحلة الإبتدائية					
9.4	المرحلة المتوسطة والثانوية					
9.5	المرحلة الجامعية					
9.6	مابعد الجامعي					

10_ يرجى تحديد اللغة المستخدمة عامةً للتحدث مع الأشخاص التاليين (قم بوضع إشارة صح في مربع الإجابة)::

	الأشخاص	الإنجليزية دائماً	الإنجليزية غالباً	الإنجليزية والعربية بشكل متساوي	العربية غالباً	العربية دائماً
10.1	الأبويين					
10.2	الأخوة					

10.3	الجدين					
10.4	الأقارب الآخرين					
10.5	الجيران					
10.6	الأصدقاء					
10.7	الأبناء					

11_ يرجى تحديد اللغة المستخدمة عامةً في الأوضاع/ الأماكن التالية (قم بوضع إشارة صح في مربع الإجابة):

	المكان/الوضع	الإنجليزية دائماً	الإنجليزية غالباً	الإنجليزية والعربية بشكل متساوي	العربية غالباً	العربية دائماً
11.1	المنزل					
11.2	المدرسة/العمل					
11.3	الأنشطة الأخرى (مثل التحدث مع الأصدقاء, مشاهدة السينما)					
11.4	الانشطة الدينية					
11.5	الانشطة اللامنهجية (مثل الهوايات, الرياضة, الأنشطة التطوعية, اللعب)					
11.6	التسوق/ المطاعم/ الأنشطة أو الأماكن المشابهة لذلك					
11.7	الخدمات الصحية/ المؤسسات الحكومية/ المكاتب العامة/ البنوك					

12_ يرجى تحديد اللغة المستخدمة عامةً في الأنشطة التالية (قم بوضع إشارة صح في مربع الإجابة) :

	النشاط	الإنجليزية دائماً	الإنجليزية غالباً	الإنجليزية والعربية	العربية غالباً	العربية دائماً

					بشكل متساوي		
12.1	**القراءة**					
12.2	**الرسائل النصية**					
12.3	**البريد الإلكتروني**					
12.4	**مواقع التواصل الإجتماعي (مثل الفيس بوك, تويتر)**					
12.5	**كتابة قائمة التسوق, الملاحظات ..إلخ**					
12.6	**مشاهدة التلفاز, الإستماع إلى الراديو**					
12.7	**مشاهدة الأفلام**					
12.8	**تصفح الإنترنت**					
12.9	**الأنشطة الدينية (الصلاة, الدعاء)**					

13_ في بعض الأحيان يقوم بعض الأشخاص بإستخدام أكثر من لغة في سياق واحد أو محادثة واحدة (كأن يتحدث بلغة ما ويستعير بعض الجمل, العبارات, أو الكلمات من لغة أخرى), يطلق على هذه الظاهرة التناوب اللغوي, إلى أي مدى تقوم بذلك فيما يتعلق بإستخدام اللغة الإنجليزية والعربية:

	إطلاقاً	**نادراً**	**أحياناً**	**معظم الوقت**	دائماً
مع الوالدين والأقارب					
مع الأصدقاء					
في نطاق وسائل التواصل الإجتماعي					

Appendix 2: Ethics of the Narrative Pilot Study

University of Reading

Department of English Language and Applied Linguistics

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INFORMATION SHEET (Children)

The purpose of this study is to examine inter-language development of morphology and grammar in oral speech production of Arabic- English bilingual children in comparison to Arabic- English bilingual adults and native English speakers. For this purpose, a narrative- elicitation task will be used in addition to a short questionnaire to be answered by the child's parent.

Prior to performing the task, the child's parent will be given a short questionnaire to answer in relation to how often Arabic and English are used in the home environment.

The child will be asked to perform one task consisting of three parts. For each part, he/she will be presented with pictures and will be asked to narrate a story based on what is presented in these pictures. These narrations will be audio-recorded.

The collected data will be securely kept on a password-protected computer or in a locked drawer. Only the researcher and the supervisors will have an access to the data. The data will be used for academic purposes only. The participant's privacy and confidentiality will be carefully observed and the child has the right to withdraw from the study at any time he/she wishes to.

This project has been subject to ethical review by the School Ethics and Research Committee, and has been allowed to proceed under the exceptions procedure as outlined in paragraph 6 of the University's *Notes for Guidance* on research ethics.

If you have any queries or wish to clarify anything about the study, please feel free to contact my supervisor at the address above or by email at f.aveledo@reading.ac.uk

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School of Literature and Languages
Department of English Language and Applied Linguistics

University of Reading

ETHICS COMMITTEE

Consent Form (children)

Project title: **Inter-language Development of English morphemes**

I understand the purpose of this research and understand what is required of my child.

I have read and understood the Information Sheet relating to this project, which has been explained to me by Zahra Hamadah. I agree to the arrangements described in the Information Sheet so far as they relate to my child's participation.

I understand that my child's participation is entirely voluntary and that I have the right to let my child withdraw from the project at any time.

I have received a copy of this Consent Form and of the accompanying Information Sheet.

Name:

Signed:

Date:

4

School of Literature and Languages
Department of English Language and Applied Linguistics

University of Reading

ETHICS COMMITTEE

Consent Form (adult participants)

Project title: **Inter-language Development of English morphemes**

I understand the purpose of this research and understand what is required of me.

I have read and understood the Information Sheet relating to this project, which has been explained to me by Zahra Hamadah. I agree to the arrangements described in the Information Sheet so far as they relate to my participation.

I understand that my participation is entirely voluntary and that I have the right to withdraw from the project at any time.

I have received a copy of this Consent Form and of the accompanying Information Sheet.

Name:

Signed:

Date:

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INFORMATION SHEET

The purpose of this study is to examine inter-language development of morphology and grammar in oral speech production of Arabic- English bilingual children in comparison to Arabic- English bilingual adults and native English speakers. For this purpose, a narrative- elicitation task will be used.

You will be asked to perform one task consisting of three parts. For each part you will be presented with pictures and will be asked to narrate a story based on what is presented in these pictures. Your narration will be audio-recorded.

The collected data will be securely kept on a password-protected computer or in a locked drawer. Only the researcher and the supervisors will have an access to the data. Your privacy and confidentiality will be carefully observed and you have the right to withdraw from the study at any time you wish to.

This project has been subject to ethical review by the School Ethics and Research Committee, and has been allowed to proceed under the exceptions procedure as outlined in paragraph 6 of the University's *Notes for Guidance* on research ethics.

If you have any queries or wish to clarify anything about the study, please feel free to contact my supervisor at the address above or by email at f.aveledo@reading.ac.uk

Signed

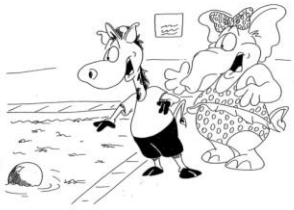
Appendix 3: The Narrative-Elicitation Task

T:

T

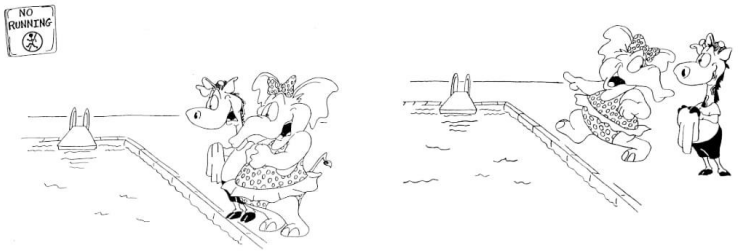
Set A: A1

A1



A2:

A2

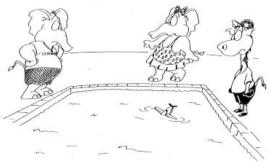


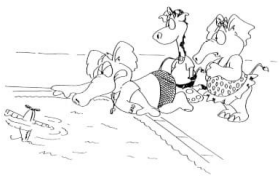
A3:

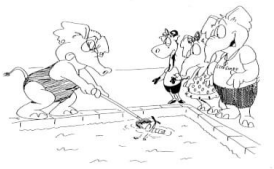
A3








Set B: B1:

B1

B2:

B2

B3:

Appendix 4: Indefinite and Definite Nouns the Stories Used in the Narrative-Elicitation Task

A2 (used in the main narrative study)

The story consists of 8 pictures illustrating a situation of a giraffe and an elephant, as they were in the swimming pool. In *page.1* in the story, the character *elephant* and *giraffe* are first introduced in a *swimming pool* where there is a *sign* with the word *no running* in the context. In the first picture both of the characters along with the *no running* sign present new items which are supposed to be introduced with the indefinite article *a/an* in English and *zero* article in Arabic. However, for the phrase "*swimming pool*", both definite and indefinite treatment are accepted as *the swimming pool* can be treated as a phrase indicated common knowledge. In page.3-4, the story progress with the same characters without any newly mentioned items. In this case, the definite articles (*the* in English and *al-* in Arabic) should be used as the characters are repeated. As the story progresses (page.5-6), a new character, a *lifeguard* appears applying a *bandage*, representing another new item, on the elephant's knee. In this case, the word *bandage* is indefinite and an indefinite article (*a/an* in English and *zero* in Arabic) should be use. The word "*lifeguard*" is also indefinite and an indefinite article should be used unless it is introduced in association with *the pool* (*the lifeguard appears*), then a definite article (*the or al-*) is used. In page. 7-8, the story continues with no newly introduced items. Accordingly, as all the items in these pages are previously introduced items, the definite articles should be used.

A3 (used in the main narrative study)

The story includes the same characters in A2, the *giraffe* and the *elephant* in the same context (i.e. the swimming pool). In page.1, the story starts with the *giraffe* playing with an *airplane* , which is a newly introduced item, in front of the other character, the *elephant*, around the *swimming pool*. The two characters and the toy here all express indefiniteness with singular nouns and accordingly, indefinite articles (*a/an* in English and *zero* in Arabic) are used with the nouns. In page.2-3-4-5, the events are carried on with no introduction of new items or characters. In these events (page.2-3-4-5), since all the items have been previously introduced, and the definite articles are used. Moving to page. 6, a new character, the l*ifeguard* from the previous story appears. The story then processes in page. 7-8-9, with no new items. Similar to A2, the lifeguard, in page.6, presents a new character and an indefinite article is used accordingly unless it is presented in association with *the pool*. In page. 10, another character, a *lady elephant* currying a *net* on a long stick, then appears in the story. The *lady elephant* and the *net* are both new singular items which requires the use the indefinite articles. For all the rest of the events (page. 11-12-13), the story carries on no new items presented, and therefore, definite articles should be used with the nouns.

B1 (used in the pilot narrative study)

The story consists of five pictures introducing a story between a *rabbit* and a *dog* beside a *sand area*. The nouns and the events in the story are presented as follow:

- Picture 1: a *rabbit* arriving to a *sand area* where a *female dog* has sat next to a *sand castle*; both characters are currying *shovels*
- Picture 2: the two starts to play together in which the *rabbit* seems to take some *sand* from a *bucket* of sand with the *shovel.*
- Picture 3: the *rabbit* pours the whole amount of *sand* in the bucket over the *castle*.

- Picture 4: the *rabbit*'s action apparently led to destroy the *castle* leaving both of the *rabbit* and the *dog* in shock
- Picture 5: the *dog* starts to cry over his *castle* while the *rabbit* is standing next to her.

Indefinite nouns include the words *rabbit*, *dog* and *castle*, *shovels* (picture 1) and the word *bucket* (picture 2) which are all marked by *a/an* except for *shovels* which is marked by *zero*. For the word/phrase *sand/ sand area* (picture 1), both definite and indefinite marking are possible depending on how they are introduced in the story. All other nouns following that are treated as definite nouns and marked by the definite article *the.*

B2 (used in both the pilot and the main narrative study)

The story tells a story about the same character in B1 with different events. The nouns and the events are presented as follow:

- Picture 1: a small male *rabbit* and a small female *dog* meet in a park for a *picnic* currying *baskets.*
- Picture 2: the *rabbit* and the *dog* sit and start eating.
- Picture 3: the *rabbit* is full and the *dog* is eating a *sandwich* and holding a *box of juice.*
- Picture 4: the *rabbit* is dizzy and the *dog* is looking.
- Picture 5: the *dog* runs to a *rabbit doctor* which appears in the *street.*
- Picture 6: the *dog* pulls the *doctor's sleeve*
- Picture 7: the *doctor* examines the sick *rabbit*
- Picture 8: the sick *rabbit* is well and walking away with the *doctor* and the *dog* is standing behind

In picture 1, all the new items *rabbit*, *dog*, *baskets* and *picnic* are newly introduced nouns and should be marked by indefinite articles. Similarly, in picture 2, the food items

presented are newly introduced nouns, the word (*carrot, sandwiches, cheese, pickles, cake*) should all be introduced with the use of the indefinite articles: *a/an* for singular noun and *zero,* for the plural and uncountable nouns. In picture 5, the doctor also presents another singular indefinite noun which requires the use of the indefinite article *a/an*. For all other items, the definite articles should be used with the nouns as they are all second mentioned nouns. For Arabic, all the indefinite nouns are marked by *zero* despite their countability while *al-* is used to mark definite nouns.

B3 (used in the main narrative study)

This story includes the same characters as B2, a *rabbit* and a *dog* in a *park*. In page.1, the story starts when the *dog*" meets the "*rabbit*" appears to grab a "*carriage*" which has a "*balloon*" attached to it. Both of the characters *dog* and "rabbit" and the objects "carriage" and the "balloon" are newly mentioned items in the story in form of singular indefinite nouns which require the use of singular indefinite articles. As the story continues, page.2-3-4-5, the events carry on with the same characters and objects. As all the nouns these pages, are repeated and the use of the definite articles is required. Moving to page.6, a new character, a "male rabbit" selling "balloons" appear in the story. The "male rabbit "and the "balloons" are both newly introduced and the use of the indefinite articles, singular in the case of the seller and plural for the balloons, is required. In page.7, the small rabbit appears to be approaching the "balloon seller" asking for a "balloon" (page.7). The man then appears to ask for the price of the balloon (i.e. "money") which is, as written in the balloon, is 5 dollars (page.8). In the same page, the rabbit grabs his pockets out to show he has no money. In page 7-8, although there is no particular new items are, the words "balloon" and "money" are both indefinite nonspecific nouns in this case and should be marked with indefinite articles accordingly. Moving to page.10, a new

character, a “female rabbit”, appears. The noun referring to the new “ female rabbit” also requires the use of the singular indefinite articles. The story then progresses, in page.11, with the same items which requires the use of definite articles. Then in page.12, the female rabbit appears to approach the man (rabbit) who has the balloons and hands him some “money” ; the word “money” can be marked as either definite or indefinite based on whether it was linked with the word “money” in page. 10 or not. At the end, in page. 13, the female rabbit gives a “balloon” to each of the dog and the small rabbit. All the nouns here are definite apart from the word “balloon” which is indefinite and requires the use of indefinite articles.

Appendix 5: The Syntactic, Morphological and Morph-syntactic Structures Examined in the Arabic Sentence Comprehension Test

Grammar Category	Item Number in the test	Total
Negative	14, 23	2
Modification	12,13, 24	3
Prepositional Phrase	2, 3,29,39	4
Indirect Object	8,21,31	3
Verb Phrase	1,5,18,26	4
present		
past	6,4,	2
future	16,40,34	3
Relative Clause	10,22, 25,28	4
Subordinate Clause	7,17,30,35,36,37	6
interrogative	11,38	2
Passive	20,33	2
Indirect Request	32	1
Coordinated sentence	9,27	2
Imperative	15	1
Topicalisation	19	1
Total number of items	40	

Appendix 6: Ethics of the Main Studies

School of Literature and Languages
Department of English Language and Applied Linguistics

University of Reading

ETHICS COMMITTEE

Consent Form (children)

Project title: **Inter-language Development of English morphemes**

I understand the purpose of this research and understand what is required of my child.

I have read and understood the Information Sheet relating to this project, which has been explained to me by Zahra Hamadah. I agree to the arrangements described in the Information Sheet so far as they relate to my child's participation.

I understand that my child's participation is entirely voluntary and that I have the right to let my child withdraw from the project at any time.

I have received a copy of this Consent Form and of the accompanying Information Sheet.

Name:

Signed:

Date:

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INFORMATION SHEET (Children)

The purpose of this study is to explore the development of some aspects of grammar in oral speech production of Arabic- English bilingual children in comparison to Arabic- English bilingual adults, native English speakers and monolingual Arabic speakers. For this purpose, a number of tools will be used: a short questionnaire, simple language proficiency tests, a story-telling task and a sentence-repetition task. These tasks will be performed in two sessions separated by a week time gap.

Prior to performing the tasks, the parents will be given a short questionnaire to answer in relation to how often Arabic and English are used. In addition, to the questionnaire, simple English and Arabic proficiency test will be performed to measure the child's competence of using each language. The questionnaire and the English proficiency test will be presented in the first session while the Arabic proficiency test will be presented in the later session.

For the remaining tasks, the child will be asked to perform two versions: an English version and an Arabic version. The English versions of the task will be presented in the first session while the Arabic versions will be presented in the second session. For each version of the story-telling task, five parts will be used. For each part the child will be presented with pictures and will be asked to narrate a story based on what is presented in these pictures. The task takes between ten to fifteen minutes; the child's narration will be audio-recorded. In the sentence-repetition task, however, the child will listen to a number of sentences through headphones while looking at pictures on a computer screen which you will be asked to repeat. Similar to the story-telling task, the responses will be audio recorded. The duration of this task will last for approximately 20 minutes.

The collected data will be securely kept on a password-protected computer or in a locked drawer. Only the researcher and the supervisors will have an access to the data. The data will be used for academic purposes only. The participant's privacy and confidentiality will be carefully observed and the child has the right to withdraw from the study at any time you wish to.

This project has been subject to ethical review by the School Ethics and Research Committee, and has been allowed to proceed under the exceptions procedure as outlined in paragraph 6 of the University's *Notes for Guidance* on research ethics.

If you have any queries or wish to clarify anything about the study, please feel free to contact my supervisor at the address above or by email at f.aveledo@reading.ac.uk

Signed

School of Literature and Languages
Department of English Language and Applied Linguistics

University of Reading

ETHICS COMMITTEE

Consent Form (adult participants)

Project title: **Inter-language Development of English morphemes**

I understand the purpose of this research and understand what is required of me.

I have read and understood the Information Sheet relating to this project, which has been explained to me by Zahra Hamadah. I agree to the arrangements described in the Information Sheet so far as they relate to my participation.

I understand that my participation is entirely voluntary and that I have the right to withdraw from the project at any time.

I have received a copy of this Consent Form and of the accompanying Information Sheet.

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INFORMATION SHEET (bilingual adults)

The purpose of this study is to explore the development of some aspects of grammar in oral speech production of Arabic- English bilingual children in comparison to Arabic- English bilingual adults, native English speakers and monolingual Arabic speakers. For this purpose, a number of tools will be used: a short questionnaire, a simple English proficiency test, a story-telling task and a sentence-repetition task. These tasks will be performed in two sessions separated by a week time gap.

Prior to performing the tasks, you will be given a short questionnaire to answer in relation to how often Arabic and English are used. In addition, to the questionnaire, a simple English proficiency task will be performed to measure your competence of using English. Both of these tools will be presented in the first session.

For the remaining tasks, you will be asked to perform two versions: an English version and an Arabic version. The English versions of the task will be presented in the first session while the Arabic versions will be presented in the second session. For each version of the story-telling task, five parts will be used. For each part you will be presented with pictures and will be asked to narrate a story based on what is presented in these pictures. The task takes between ten to fifteen minutes; your narration will be audio-recorded. In the sentence-repetition task, however, you will listen to a number of sentences through headphones while looking at pictures on a computer screen which you will be asked to repeat. Similar to the story-telling task, the responses will be audio recorded. The duration of each version of the task will last for approximately 20 minutes.

The collected data will be securely kept on a password-protected computer or in a locked drawer. Only the researcher and the supervisors will have an access to the data. Your privacy and confidentiality will be carefully observed and you have the right to withdraw from the study at any time you wish to.

This project has been subject to ethical review by the School Ethics and Research Committee, and has been allowed to proceed under the exceptions procedure as outlined in paragraph 6 of the University's *Notes for Guidance* on research ethics.

If you have any queries or wish to clarify anything about the study, please feel free to contact my supervisor at the address above or by email at f.aveledo@reading.ac.uk

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INFORMATION SHEET (English native speakers)

The purpose of this study is to explore the development of some aspects of grammar in oral speech production of Arabic- English bilingual children in comparison to Arabic- English bilingual adults, native English speakers, and monolingual Arabic speakers. For this purpose, two tasks will be used: a story-telling task and a sentence-repetition task.

For the story-telling task, five parts will be used. For each part you will be presented with pictures and will be asked to narrate a story in English based on what is presented in these pictures. The task takes between ten to fifteen minutes; your narration will be audio-recorded. In the sentence-repetition task, however, you will listen to a number of English sentences through headphones while looking at pictures on a computer screen which you will be asked to repeat. Similar to the story-telling task, the responses will be audio recorded. The duration of the task will last for approximately 20 minutes.

The collected data will be securely kept on a password-protected computer or in a locked drawer. Only the researcher and the supervisors will have an access to the data. Your privacy and confidentiality will be carefully observed and you have the right to withdraw from the study at any time you wish to.

This project has been subject to ethical review by the School Ethics and Research Committee, and has been allowed to proceed under the exceptions procedure as outlined in paragraph 6 of the University's *Notes for Guidance* on research ethics.

If you have any queries or wish to clarify anything about the study, please feel free to contact my supervisor at the address above or by email at f.aveledo@reading.ac.uk

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INFORMATION SHEET (Arabic monolingual participants)

The purpose of this study is to explore the development of some aspects of grammar in oral speech production of Arabic- English bilingual children in comparison to Arabic- English bilingual adults, native English speakers, and monolingual Arabic speakers. For this purpose, a number of tools will be used: a short questionnaire, a story-telling task and a sentence-repetition task.

Prior to performing the tasks, you will be given a short questionnaire to answer in relation to how often Arabic and English are used. For the story-telling task, five parts will be used. For each part you will be presented with pictures and will be asked to narrate a story in Arabic based on what is presented in these pictures. The task takes between ten to fifteen minutes; your narration will be audio-recorded. In the sentence-repetition task, however, you will listen to a number of Arabic sentences through headphones while looking at pictures on a computer screen which you will be asked to repeat. Similar to the story-telling task, the responses will be audio recorded. The duration of the task will last for approximately 20 minutes.

The collected data will be securely kept on a password-protected computer or in a locked drawer. Only the researcher and the supervisors will have an access to the data. Your privacy and confidentiality will be carefully observed and you have the right to withdraw from the study at any time you wish to.

This project has been subject to ethical review by the School Ethics and Research Committee, and has been allowed to proceed under the exceptions procedure as outlined in paragraph 6 of the University's *Notes for Guidance* on research ethics.

If you have any queries or wish to clarify anything about the study, please feel free to contact my supervisor at the address above or by email at f.aveledo@reading.ac.uk

Signed

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Consent form in Arabic (monolingual Arabic speakers)

عنوان الرسالة: تطور اللغة في التراكيب النحوية للغة الإنجليزية

أقر بفهم الهدف من هذه الرسالة وفهم ماهو متطلب مني.

لقد قمت بقراءة وفهم مرفق ورقة المعلومات الخاصة بهذا البحث, والتي تم توضيحها من قبل زهراء حماده. وعليه أوافق على الإجراءات المذكورة بورقة المعلومات والمتعلقة بمشاركتي في هذه الدراسة.

أقر بأن مشاركتي هذه تطوعية وأني أملك خيار الإنسحاب من المشاركة بأي وقت.

أقر بحصولي على نسخة من نموذج الموافقة وورقة المعلومات الخاصة بهذا البحث.

الإسم:

التوقيع:

التاريخ:

INFORMATION SHEET In Arabic (monolingual Arabic speakers)

تهدف هذه الدارسة إلى إستكشاف بناء بعض الجوانب النحوية المستخدمة في التحدث عند ثنائيي اللغة من المتحدثين باللغة العربية (كلغة أولى) والإنجليزية (كلغة ثانية) من الأطفال مقارنة بأمثالهم من ثنائيي اللغة (العربية- الإنجليزية) من البالغين, وأحاديي اللغة من المتحدثين بالإنجليزية فقط, و أحاديي اللغة المتحدثين بالعربية فقط. من أجل هذا الهدف, سنقوم بإستخدام عدة أدوات: إستبيان قصير, نشاط إلقاء قصصي, ونشاط تكرار للجمل.

قبل القيام بالأنشطة المذكورة سيتم إعطاء إستبيان قصير للإستعلام عن مدى إستخدام المشارك لكلٍ من العربية والإنجليزية. فيما يتعلق بالنشاط القصصي, سيشمل ذلك خمسة أجزاء قصيرة. لكل من هذه الأجزاء,سيتم عرض بعض الصور على المشارك والتي يقوم بناءً عليها بسرد القصة. يستغرق هذا النشاط مايقارب العشر دقائق وسيتم تسجيل السرد تسجيلاً صوتياً.

بالنسبة لنشاط تكرار الجمل, سيستمع المشارك لعدد من الجمل عن طريق سماعات موصولة بجهاز الحاسب بينما يتم عرض صور على الشاشة ويقوم المشارك بترديد هذه الجمل. كما هو الحال في نشاط السرد القصصي, سيتم تسجيل الإجابات تسجيلاً صوتياً. يستغرق هذا النشاط حدود العشرين دقيقة.

سيتم الإحتفاظ بالبيانات المجمعة في جهاز حاسب بكلمة مرور أو في خزانة مغلقة حيث يمكن للباحث ومشرفيه فقط الإطلاع عليها. سيتم مراعاة الخصوصية بشكل تام ويحق للمشارك طلب الإنسحاب من البحث في أي وقتٍ شاء.

تمت مراجعة هذا المشروع من قبل لجنة البحث ومدرسة أخلاقيات البحث العلمي وتمت الموافقة على إتمام البحث بإستثناء الإجراءات الموضحة في الفقرة السادسة من كتيب الجامعة لدليل أخلاقيات البحث العلمي.

في حال كانت لديكم أي إستفسارات أخرى, بإمكانكم التواصل مع مشرفتي تحت العنوان البريدي التالي:

f.aveledo@reading.ac.uk

التوقيع:

Appendix 7: Adjustments in the Sentence-Repetition Task

Item number in the task	**Old sentences:**	**New/adjusted sentences**	**Reason for the changes**
2 Generic ***zero (with an adj)***	**Context sentence**: Sea food is really common in Wales. **Target sentence:** For instance, fried prawns is really popular there.	**Context sentence**: A lot of people are interested in art in America **Target sentence:** For example, comic books are really popular there.	The underlined words were assumed to be difficult for children to repeat
9 Generic ***the (with an adj)***	**Target sentence:** **For instance,** the black tiger lives in the jungles of India.	**Target sentence:** **For example**, the black tiger lives in the jungles of India.	The phrase "for instance" were assumed to be difficult for children to repeat
24 (indefinite, specific: ***a/an***)	**Context sentence:** Mona is sitting in the library. **Target sentence:** She is reading a book about castles and dragons	**Context sentence:** Sara and Nada are not here **Target sentence:** They went to a party with their friends in school.	The NP "a book", which comes as an object in the sentence, was dropped from by two participants. Therefore, a sentence with a transitive verb that **must** take an object was used.
27 (indefinite, specific: ***Zero***)	**Target sentence:** In the picnic, they **ate** biscuits and sat on the grass.	**Target sentence:** In the picnic, they **had** biscuits and sat on the grass.	**The target NP was dropped:** "had", unlike "ate", is a transitive verb that must be followed by an object. Therefore, it is unlikely that the participant would drop the NP with "had"
31(indefinite, nonspecific: ***Zero***)	**Target sentence:** My sister loves baking cakes for us on the weekends.	My sister loves collecting cards from different countries.	**The target NP was dropped:** the verb "collect", unlike "bake", cannot stand on its own without an object.

			Therefore, the new NP that follows the verb “collect” is unlikely to be dropped by the participants.

Appendix 8: Errors in the English Sentence-Repetition Task in Each Semantic Context by the Bilingual Adults and Children

The generic context:

	a/an omission	*the* omission	*the* for *a/an*	*the* for *zero*	*a/an* for *the*	*a/an* for *zero*	pluralisation errors	pluralisation and article error	Other
BA	7	3	20	14	22	4	20	14	12
	4.22%	1.81%	12.05%	8.43%	13.25%	2.41%	12.05%	8.43%	7.23%
BC	0	0	10	5	4	0	3	5	2
	0%	0%	34.48%	17.24%	13.79%	0%	10.34%	17.24%	6.90%

The [definite, specific] context:

	a/an omission	*the* omission	*the* for *a/an*	*the* for *zero*	*a/an* for *the*	*a/an* for *zero*	pluralisation errors	pluralisation and article error	Other
BA	0	10	0	0	15	0	10	2	7
	N/A	22.72%	0%	N/A	34.09%	N/A	22.73%	4.55%	15.91%
BC	0	1	0	0	1	0	5	0	7
	N/A	7.14%	0%	N/A	7.14%	N/A	35.71%	0%	50%

The [indefinite, specific] context:

	a/an omission	*the* omission	*the* for *a/an*	*the* for *zero*	*a/an* for *the*	*a/an* for *zero*	pluralisation errors	pluralisation and article error	Other
BA	4	0	12	1	0	4	42	28	17
	3.70%	N/A	11.11%	0.93%	N/A	3.70%	38.89%	25.93%	15.74%
BC	0	0	2	0	0	1	6	7	5
	0%	N/A	9.52%	0%	N/A	4.76%	28.57%	33.33%	23.81%

The [indefinite, nonspecific] context:

	a/an omission	*the* omission	*the* for *a/an*	*the* for *zero*	*a/an* for *the*	*a/an* for *zero*	pluralisation errors	pluralisation and article error	Other
BA	7	0	3	3	0	12	14	7	14
	11.67%	N/A	5%	5%	N/A	20%	23.33%	11.67%	23.33%
BC	0	0	2	0	0	1	4	1	11
	0%	N/A	10.53%	0%	N/A	5.26%	21.05%	5.26%	57.89%

Appendix 9: Selection of words in the English Sentence Repetition Task Based on Age of onset of Acquisition

Word	Alternative.spelling	Freq_pm	Dom_PoS_SUBTLEX	Nletters	Nphon	Nsyll	Lemma_highest_PoS	AoA_Kup	Perc_known	AoA_Kup_lem	Perc_known_lem	AoA_Bird_lem	AoA_Bristol_lem	AoA_Cort_lem	AoA_Schock
say	say	1639.78	Verb	3	2	1	say	3.42	1.00	3.42	1.00	4.99		4.01	
scary	scary	26.20	Adjective	5	5	2	scary	4.26	1.00	4.26	1.00				
film	film	65.25	Noun	4	4	1	film	6.95	1.00	6.95	1.00		5.50	6.20	
fun	fun	235.49	Noun	3	3	1	fun	3.67	1.00	3.67	1.00			3.75	
interesting	interesting	86.69	Adjective	11	9	3	interesting	6.95	1.00	6.95	1.00				
think	think	2691.39	Verb	5	4	1	think	4.75	1.00	4.75	1.00	5.61		5.06	
flower	flower	22.76	Noun	6	4	2	flower	3.11	1.00	3.11	1.00	3.86			4.33
colorful	colourful	3.20	Adjective	8	7	3	colorful	4.89	1.00	4.89	1.00				
bring	bring	327.16	Verb	5	4	1	bring	4.42	1.00	4.42	1.00	4.74		4.60	
joy	joy	28.55	Noun	3	2	1	joy	6.74	1.00	6.74	1.00		6.88	5.34	
place	place	602.67	Noun	5	4	1	place	4.95	1.00	4.95	1.00	6.04	5.50	5.27	
children	children	175.10	Noun	8	7	2	children	4.10	1.00	4.10	1.00	4.44			5.31
often	often	57.35	Adverb	5	4	2	often	6.53	1.00	6.53	1.00	6.04			
good	good	2610.14	Adjective	4	3	1	good	3.55	1.00	3.55	1.00	3.89		3.25	
riding	riding	32.00	Verb	6	5	2	ride			4.67	1.00	4.68	4.64	4.99	
bike	bike	25.88	Noun	4	3	1	bike	4.79	1.00	4.79	1.00		4.18	4.25	
small	small	124.96	Adjective	5	4	1	small	3.22	1.00	3.22	1.00	4.31		4.01	
water	water	225.06	Noun	5	4	2	water	2.37	1.00	2.37	1.00	3.83	3.31		3.69
bottle	bottle	50.75	Noun	6	5	2	bottle	3.56	1.00	3.56	1.00				4.33
important	important	207.59	Adjective	9	9	3	important	5.79	1.00	5.79	1.00				
example	example	29.94	Noun	7	8	3	example	7.39	1.00	7.39	1.00				
red	red	148.06	Adjective	3	3	1	red	3.68	1.00	3.68	1.00	4.26		2.86	
rose	rose	53.02	Noun	4	3	1	rose	6.11	1.00	6.11	1.00	5.57		4.99	
can	can	5247.45	Verb	3	3	1	can	4.32	1.00	4.32	1.00	4.05		3.85	
give	give	1167.82	Verb	4	3	1	give	4.28	1.00	4.28	1.00	4.68		3.82	
meaning	meaning	37.33	Noun	7	5	2	meaning	6.10	1.00	6.10	1.00	7.18			
love	love	1114.98	Verb	4	3	1	love	5.17	1.00	5.17	1.00	4.80	6.15	3.65	
dog	dog	192.84	Noun	3	3	1	dog	2.80	1.00	2.80	1.00		3.62	3.37	
friendly	friendly	26.04	Adjective	8	7	2	friendly	4.50	1.00	4.50	1.00				

animal	animal	45.49	Noun	6	6	3	animal	2.89	1.00	2.89	1.00		4.62		
book	book	176.98	Noun	4	3	1	book	3.68	1.00	3.68	1.00	3.75	4.47	4.53	
always	always	655.25	Adverb	6	5	2	always	6.26	1.00	6.26	1.00	5.16			5.68
choice	choice	97.55	Noun	6	3	1	choice	5.17	1.00	5.17	1.00	6.93		6.40	
gift	gift	64.51	Noun	4	4	1	gift	5.05	1.00	5.05	1.00		5.24	4.79	
black	black	167.94	Adjective	5	4	1	black	3.56	1.00	3.56	1.00	4.19		4.12	
tiger	tiger	18.53	Noun	5	4	2	tiger	4.00	1.00	4.00	1.00	6.08			4.00
live	live	344.59	Verb	4	3	1	live	6.10	1.00	6.10	1.00	5.51		5.39	
jungles	jungles	0.71	Noun	7	7	2	jungle			5.26	1.00				5.43
female	female	31.61	Adjective	6	5	2	female	5.89	1.00	5.89	1.00	6.20			5.62
lion	lion	15.35	Noun	4	4	2	lion	4.42	1.00	4.42	1.00		5.03		4.43
hunt	hunt	25.86	Verb	4	4	1	hunt	6.06	1.00	6.06	1.00	6.70		6.17	
food	food	154.43	Noun	4	3	1	food	3.25	1.00	3.25	1.00			3.05	
city	city	169.10	Noun	4	4	2	city	6.56	1.00	6.56	1.00				5.25
better	better	794.00	Adverb	6	4	2	better	5.02	1.00	5.02	1.00	4.57			5.43
bear	bear	57.41	Noun	4	3	1	bear	3.58	1.00	3.58	1.00	4.36		4.40	
dangerous	dangerous	74.84	Adjective	9	7	3	dangerous	5.60	1.00	5.60	1.00				
visit	visit	58.69	Verb	5	5	2	visit	5.79	1.00	5.79	1.00	5.51	4.75		
big	big	682.82	Adjective	3	3	1	big	2.89	1.00	2.89	1.00	3.52		3.24	
tower	tower	22.84	Noun	5	3	2	tower	6.33	1.00	6.33	1.00		7.09		6.26
look	look	1947.27	Verb	4	3	1	look	4.05	1.00	4.05	1.00	4.61	4.67	4.01	
have	have	6161.41	Verb	4	3	1	have	3.72	1.00	3.72	1.00	4.83		4.29	
barbecue	barbecue	8.94	Noun	8	8	3	barbecue	7.83	1.00	7.83	1.00				
pass	pass	108.12	Verb	4	3	1	pass	5.39	1.00	5.39	1.00			5.46	
spoon	spoon	7.61	Noun	5	4	1	spoon	2.50	1.00	2.50	1.00		3.94	3.75	
coach	coach	47.63	Noun	5	3	1	coach	6.89	1.00	6.89	1.00	6.34	6.09	5.93	
asked	asked	216.25	Verb	5	4	1	ask			2.89	1.00	4.02		4.02	
pick	pick	198.39	Verb	4	3	1	pick	5.26	1.00	5.26	1.00	5.13	5.26	5.13	
ball	ball	104.96	Noun	4	3	1	ball	2.90	1.00	2.90	1.00		3.26	3.25	
leaving	leaving	141.39	Verb	7	5	2	leave			5.58	1.00			5.66	
girl	girl	557.12	Noun	4	3	1	girl	4.00	1.00	4.00	1.00		3.88	3.25	
bicycle	bicycle	6.61	Noun	7	7	3	bicycle	4.26	1.00	4.26	1.00				
use	use	343.84	Verb	3	3	1	use	4.50	1.00	4.50	1.00	5.94			
go	go	3793.04	Verb	2	2	1	go	3.37	1.00	3.37	1.00	4.37		3.05	
school	school	333.12	Noun	6	4	1	school	3.89	1.00	3.89	1.00		4.73	4.27	
day	day	801.82	Noun	3	2	1	day	3.50	1.00	3.50	1.00	4.14		3.85	

saw	saw	402.49	Verb	3	2	1	saw	5.36	1.00	5.36	1.00	6.16	5.50	4.59	
new	new	723.78	Adjective	3	2	1	new	4.72	1.00	4.72	1.00	4.62		4.12	
student	student	43.04	Noun	7	7	2	student	5.94	1.00	5.94	1.00		9.51		5.74
going	going	2123.29	Verb	5	4	2	going	5.41	1.00	5.41	1.00				4.97
other	other	735.39	Adjective	5	3	2	other	5.33	1.00	5.33	1.00	5.97	5.88		5.81
day	day	801.82	Noun	3	2	1	day	3.50	1.00	3.50	1.00	4.14		3.85	
blonde	blonde	13.92	Adjective	6	5	1	blonde	6.06	1.00	6.06	1.00		5.88	5.79	
doll	doll	24.76	Noun	4	3	1	doll	3.68	1.00	3.68	1.00		3.46	3.82	
next	next	452.75	Number	4	5	1	next	4.35	1.00	4.35	1.00	5.07		5.40	
car	car	483.06	Noun	3	3	1	car	3.37	1.00	3.37	1.00		4.14	3.75	
right	right	4008.39	Adverb	5	3	1	right	4.35	1.00	4.35	1.00	4.87		4.60	
playing	playing	147.35	Verb	7	5	2	play			4.10	1.00	4.02	4.05	3.50	
tall	tall	32.33	Adjective	4	3	1	tall	4.95	1.00	4.95	1.00	5.02	4.47	4.67	
man	man	1845.75	Noun	3	3	1	man	3.11	1.00	3.11	1.00	3.78		3.63	
yesterday	yesterday	96.76	Adverb	9	7	3	yesterday	4.58	1.00	4.58	1.00	4.99			
cat	cat	66.33	Noun	3	3	1	cat	3.68	1.00	3.68	1.00			2.78	
brought	brought	172.27	Verb	7	4	1	bring			4.42	1.00	4.74		4.60	
apartment	apartment	83.04	Noun	9	9	3	apartment	7.80	1.00	7.80	1.00		10.28		
gave	gave	243.69	Verb	4	3	1	give			4.28	1.00	4.68		3.82	
wife	wife	348.92	Noun	4	3	1	wife	5.67	1.00	5.67	1.00	5.79		5.75	
beautiful	beautiful	279.73	Adjective	9	8	3	beautiful	5.72	1.00	5.72	1.00	5.22			
ring	ring	92.75	Noun	4	3	1	ring	4.53	1.00	4.53	1.00	6.08	4.35	4.79	
birthday	birthday	97.22	Noun	8	5	2	birthday	2.85	1.00	2.85	1.00				3.49
lesson	lesson	32.24	Noun	6	5	2	lesson	7.80	1.00	7.80	1.00		5.56		6.33
life	life	796.65	Noun	4	3	1	life	5.89	1.00	5.89	1.00	6.14		4.99	
went	went	411.51	Verb	4	4	1	go			3.37	1.00	4.37		3.05	
party	party	233.14	Noun	5	5	2	party	4.58	1.00	4.58	1.00	4.78			4.97
friends	friends	305.45	Noun	7	6	1	friend			3.57	1.00	4.58		3.85	
waiter	waiter	13.20	Noun	6	4	2	waiter	8.28	1.00	8.28	1.00	7.66			6.20
served	served	19.75	Verb	6	4	1	serve			7.17	1.00		6.94	6.87	
roast	roast	9.78	Adjective	5	4	1	roast	8.50	1.00	8.50	1.00	6.43		7.43	
potatoes	potatoes	11.10	Noun	8	7	3	potato			4.84	1.00		4.82		
family	family	354.25	Noun	6	6	3	family	3.38	1.00	3.38	1.00		5.71		
long	long	675.16	Adverb	4	3	1	long	4.24	1.00	4.24	1.00	5.19		5.13	

skirt	skirt	9.96	Noun	5	4	1	skirt	5.67	1.00	5.67	1.00		5.30	5.14	
gold	gold	78.94	Noun	4	4	1	gold	7.10	1.00	7.10	1.00	5.64	5.64	5.27	
button	button	28.25	Noun	6	5	2	button	4.78	1.00	4.78	1.00		4.05		5.25
waist	waist	5.14	Noun	5	4	1	waist	6.42	1.00	6.42	1.00		6.56	6.87	
picnic	picnic	11.69	Noun	6	6	2	picnic	5.53	1.00	5.53	1.00				5.37
biscuits	biscuits	3.27	Noun	8	7	2	biscuit			4.63	1.00				6.00
sat	sat	28.61	Verb	3	3	1	sit			3.47	1.00			3.56	
grass	grass	16.78	Noun	5	4	1	grass	3.94	1.00	3.94	1.00		4.01	4.18	
class	class	117.35	Noun	5	4	1	class	4.95	1.00	4.95	1.00	4.87		5.13	
drew	drew	25.04	Name	4	3	1	drew	5.41	1.00	5.41	1.00		5.64	6.20	
pictures	pictures	68.18	Noun	8	6	2	pictures	5.11	1.00	5.11	1.00				
parents	parents	140.73	Noun	7	7	2	parent			4.22	1.00	5.71			4.38
need	need	1294.90	Verb	4	3	1	need	3.56	1.00	3.56	1.00	6.04		4.38	
take	take	1891.04	Verb	4	3	1	take	4.37	1.00	4.37	1.00	5.19		4.57	
difficult	difficult	60.16	Adjective	9	8	3	difficult	5.85	1.00	5.85	1.00				
exams	exams	2.84	Noun	5	6	2	exam			8.21	1.00		8.11		8.45
during	during	75.92	Preposition	6	5	2	during	6.80	1.00	6.80	1.00	6.92			6.82
year	year	277.92	Noun	4	3	1	year	5.24	1.00	5.24	1.00		5.50	5.86	
buy	buy	192.43	Verb	3	2	1	buy	5.56	1.00	5.56	1.00	4.60		5.27	
balloons	balloons	4.69	Noun	8	6	2	balloon			4.37	1.00				3.91
eat	eat	251.88	Verb	3	2	1	eat	2.78	1.00	2.78	1.00	3.67		3.31	
icecream	ice cream	#N/A	#N/A	8	6	2	icecream	3.33	1.00	3.33	1.00				
sister	sister	180.53	Noun	6	5	2	sister	3.68	1.00	3.68	1.00	4.19			3.65
love	love	1114.98	Verb	4	3	1	love	5.17	1.00	5.17	1.00	4.80	6.15	3.65	
collecting	collecting	6.84	Verb	10	8	3	collect			5.61	1.00	6.34	6.50		7.34
cards	cards	48.02	Noun	5	5	1	card			6.20	1.00		5.05	5.40	
different	different	209.53	Adjective	9	7	3	different	5.50	1.00	5.50	1.00	5.79			
countries	countries	10.53	Noun	9	7	2	country			7.05	1.00	5.79	6.64		6.26
company	company	147.20	Noun	7	7	3	company	6.84	1.00	6.84	1.00		8.66		
build	build	48.08	Verb	5	4	1	build	4.45	1.00	4.45	1.00	4.80	4.96	4.72	
house	house	514.00	Noun	5	3	1	house	3.16	1.00	3.16	1.00	3.94			
way	way	1424.73	Noun	3	2	1	way	5.39	0.97	5.39	0.97	5.16		5.13	

homeless	homeless	10.65	Adjective	8	6	2	homeless	7.45	1.00	7.45	1.00				
write	write	126.80	Verb	5	3	1	write	4.89	1.00	4.89	1.00			5.39	
letter	letter	82.61	Noun	6	4	2	letter	4.74	1.00	4.74	1.00		5.26		6.00
mom	mom	430.39	Noun	3	3	1	mom	2.22	1.00	2.22	1.00				
teacher	teacher	55.73	Noun	7	4	2	teacher	4.55	1.00	4.55	1.00		5.09		4.28
doctor	doctor	263.94	Noun	6	5	2	doctor	4.60	1.00	4.60	1.00	4.65			4.64
grow	grow	59.49	Verb	4	3	1	grow	4.79	1.00	4.79	1.00		5.62	4.99	
comic	comic	10.82	Adjective	5	5	2	comic	7.00	1.00	7.00	1.00				6.61
popular	popular	23.08	Adjective	7	7	3	popular	6.61	1.00	6.61	1.00				