The bilingual advantage: a gender metalinguistic task in Arabic-English bilingual children

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Abstract

A finding that has not received much attention in the metalinguistic awareness literature is that bilingual children may be better at identifying gender mismatches between a subject and a predicate. This phenomenon is not well understood, nor has it been studied systematically. In the present study we present a systematic investigation of the phenomenon involving all three levels of metalinguistic awareness (identification of the mismatch, correction and explanation) in a language pair that has not been tested previously. We tested a group of six -year old Arabic-English bilingual children in comparison with two monolingual control groups. Results reveal that bilinguals performed better than monolinguals at the correction level. The study reveals a bilingual advantage in this population for the first time, while enhancing our knowledge of the development of metalinguistic awareness.

Introduction

Metalinguistic awareness as a cognitive process is the ability to think about the linguistic form and properties of one's language (Malakoff & Hakuta, 1991). This reflection component starts to develop in children at around age five (Gombert, 1992) and is central to the development of reading skills (Cairns, Waltzman, Schlisselberg, 2004; Tunmer, Nesdale, & Wright, 1987). Relevant studies have detected links between metalinguistic awareness and reading ability in children

(e.g. Cain, 2007; Zipke, 2007), suggesting that metalinguistic ability can be one of the predictors for reading comprehension (Siok & Fletcher, 2001; Tong et al., 2011).

Relevant research suggests that metalinguistic awareness is one of the cognitive processes that may be enhanced in bilinguals (Barac & Bialystok, 2012; Bialystok, 1987; Cromdal, 1999; Ricciardelli, 1992). Several studies, comparing bilingual children to their monolingual peers, have reported stronger metalinguistic skills in the bilingual groups in different language combinations (English-Cherokee, Hirata-Edds, 2011; Korean-English, Kang, 2012; Spanish-English, Barac & Bialystok, 2012, amongst many others). This is part of a large body of research that has documented positive effects of bilingualism on cognition (Barac et al., 2014); for example on creative thinking (Ricciardelli, 1992), on theory of mind/false belief tasks (Bialystok & Senman, 2004; Kovacs, 2009), and on executive function, i.e. processes including attention, inhibition, flexibility (see extensive work by Bialystok and colleagues, e.g. Bialystok et al., 2004; Bialystok & Martin, 2004, Bialystok & Viswanathan, 2009; also Carlson & Meltzoff, 2008). There is increasing consensus that learning more than one language presents cognitive benefits for the individual, although research on executive functions particular has recently received extensive criticism in terms of the validity of the findings and the methods followed (e.g. Paap, 2014).

Researchers have examined different types of metalinguistic awareness in relation to bilingualism. Phonological awareness in bilingual children has been studied more extensively than any other metalinguistic skill (Dodd, So, & Lam, 2008; Ibrahim, Eviatar, & Aharon-Peretz, 2007; Loizou & Stuart, 2003; amongst many others). It refers to one's ability to reflect on and manipulate the sound

patterns of language, and measures include the ability to provide rhymes or identify initial consonants, etc. Morphological awareness refers to one's understanding and manipulation of morphology, for example verb and nominal inflection, which can be measured using tasks such as the Wug test (Berko, 1958). Studies examining this skill in bilinguals include Barac & Bialystok (2012), Cheung et al. (2010), Hirata-Edds (2011), amongst others, which showed that the bilinguals had comparable or superior performance compared to the monolinguals. Syntactic or structural awareness is the skill through which an individual understands and controls the grammatical properties (structure) of her language (Chaney 1994). This is typically measured via tasks whereby the child is asked to judge whether sentences presented to her are grammatical or not (grammaticality judgment tasks). Overall results suggest that bilinguals have equivalent or stronger metalinguistic awareness than their monolingual peers, but note that there is emerging realisation that a number of interconnected factors such as language ability (Cromdal, 1999) can affect these skills in bilinguals as well as in monolinguals (see Adesope et al., 2010; Barac et al., 2014, for systematic and critical review respectively).

Syntactic awareness in bilingual and monolingual children

Although the prototypical level of syntactic awareness is that of judging whether a sentence is grammatical or not, there are two other, less explored levels: correcting an ungrammatical sentence (Folwer, 1988), and explaining why the sentence is ungrammatical (Galambos & Goldin-Meadow, 1990). For example, if a child is presented with the sentence: *I want home go* (example from Davidson et al., 2010), she may be asked to say whether the sentence sounds good or not

(judgment), to correct the sentence (correction), and to explain why the sentence is not good (explanation).

Research to date has shown that bilingual children tend to perform better than monolingual children when judging ungrammatical sentences (Davidson et al., 2010; Galambos & Goldin-Meadow, 1990), and when correcting ungrammatical sentences (Cromdal, 1999; Galambos & Goldin-Meadow, 1990), but not when explaining the ungrammaticality (Galambos & Goldin-Meadow, 1990). As there have only been few published studies on the topic, we will briefly summarise each of the above studies, in relation to the levels tested, below.

Galambos & Goldin-Meadow (1990) is the only study to our knowledge that systematically explored all three levels: judging, correcting and explaining. Researchers tested 32 Spanish-English monolinguals aged 4;5 to 8;0 as well as monolingual (English and Spanish) controls on a range of grammatical constructions. Results showed a bilingual advantage at the judgment and correction level, but not at the explanation level, when rates of grammar-oriented explanations were compared across groups. Explanations were considered to be grammar-oriented when they made reference to the structural properties of the sentence and not to the real-world content. For example, a hypothetical explanation that the sentence *I want home go* above is not good because the child does not want to go home, would have been coded as non-target (content-based). The bilinguals in Galambos & Goldin-Meadow's (1990) study did not give more grammar-based explanations than their monolingual peers.

Cromdal (1999) tested 38 English-Swedish bilinguals aged six to seven years, and monolingual (English and Swedish) controls on grammaticality judgment and correction, testing word order; *Peter gave this me new car*, and adjectival

comparison; *George's bike is fastest than Ben's* (examples from Cromdal, 1999). The bilingual group was further broken into a highly bilingual and a partly bilingual subgroup, depending on the balance between the child's two languages (the partly bilingual group was less proficient in Swedish). Children performed at ceiling on the grammaticality judgment task as the sentences were easy, so no group differences were detected there. At the correction task, highly proficient bilingual children performed better than the other groups.

More recently, Davidson, et al. (2010) set out to test Urdu-English bilingual children and English monolingual controls on their syntactic awareness. Two separate experiments were conducted, testing gender: *She is a good boy*, word order: *The rice ate the girl*, and tense/time: *He is leaving a few days ago* (examples from Davidson et al., 2010). In the first experiment, 10 bilingual children aged five to six years were compared to an equal number of monolinguals. In the second experiment, 36 bilingual children aged three to six years were compared to an equal number of bilinguals. Bilingual children were better at judging the grammaticality of ungrammatical sentences, although this advantage was only found in Urdu for the younger cohort. Authors also asked children for an explanation, however no quantitative results are given for the explanation level: in experiment 1, where only older children were tested, it is reported that 'very few, if any' children in either the bilingual or the monolingual group provided a grammar-oriented explanation. Similarly, in experiment 2, children across groups were not 'particularly good' at explaining the ungrammaticality.

Metalinguistic awareness and gender

Within the literature on syntactic awareness above, the attentive reader can identify stimuli that involve gender match or mismatch between a subject and a predicate, as in X is Y. *Galambos & Goldin-Meadow* (1990) *included the following stimulus in Spanish: El pescado es bien bonita 'the fish (m.) is very pretty (f.)'* while Davidson, et al. (2010) included the following stimulus as ungrammatical: *She is a good boy.* The latter, however, does not involve any syntactic violations, as no grammatical gender agreement is involved, between the subject (she) and the predicate (a good boy). It is unclear why, despite that, bilingual children identified those sentences as incorrect more than monolingual children. The authors speculate that the 'heavier gender load' in Urdu, the other language of the bilingual children tested, could enable children to better identify gender mismatch in the stimuli. Urdu involves grammatical gender, unlike English. As gender stimuli were administered and analysed alongside other types of stimuli in the Davidson et al. (2010) study, in this study we focus exclusively on gender, testing test children exposed to English alongside another language that involves grammatical gender, namely Arabic.

In Hockett's (1958: 231) classic definition [grammatical] '[g]enders are classes of nouns reflected in the behavior of associated words.' In other words, genders are categories into which the nouns of some languages are grouped. Those groupings may or may not manifest themselves onto the nouns, by means of overt gender marking, but are usually reflected onto other words, with which nouns establish (NP/DP-internal) concord or (clausal) agreement relations. (Corbett, 1991) So, in languages that have gender, the gender of a given noun may be

reflected onto agreeing adjectives, pronouns, participles (at the DP/NP-internal level), or even verbs, as is the case in Arabic.

Languages differ from one another as regards both the existence and the morphosyntactic manifestation of gender. Some (e.g. Turkish) do not manifest gender at all, while for others, such as English, gender is only morphologically realized on third person singular pronouns. All nouns in English are vacuously assigned one of three different gender categories, masculine, feminine, and neuter, by means of the respective sex of their denoted entities. As Comrie (1999: 458-459) aptly observes, 'in English, gender plays a rather small part in the grammar […] The rule of assignment of gender in English is basically very straightforward: nouns denoting male humans are masculine, nouns denoting female humans are feminine, other nouns are neuter.' No gender concord or agreement is manifested in the language, in other words, adjectives and participles do not come into gender-marked variants and φ-features on verbs do not subsume grammatical gender.

On the contrary, grammatical gender is an intrinsic property of Arabic nouns (both in the Modern Standard language and in the spoken varieties of Arabic) and gets reflected on both adjectives, in concord configurations, and verbs, which, at some persons, have distinct morphological variants for gender. Arabic has two genders, masculine and feminine. The classification of each noun to one of the two genders is, for the most part, arbitrary (Ryding, 2005: 110). As far as the morphological manifestation of the two genders is concerned, masculine nouns bear no gender morphology, while feminine nouns are usually, but not always, marked by the feminine suffix *-at*. Adjective follow suit, with masculine ones bearing no suffix and feminines ending in *-at*. So, in (1a) the feminine noun

qissatun gets modified by the feminine adjective *tawilatun*. In a simiar fashion, in (1b) the masculine noun *rajulun* gets modified by the masculine adjective *tawilun.*

(1a) qiss-at-u-n tawil-at-u-n /* tawil-u-n

story-fem.-nom.-indef. long-**fem**.-nom.-indef. long-nom.-indef.

'a long story'

Badawi et al. (2016: 121)

(1b) rajul-u-n tawil-u-n /*tawil-at-u-n

Man-nom.-indef. tall-nom.-indef. tall-**fem**.-nom.-indef.

'a tall man'

Kremers (2003: 97)

Equally interesting are the patterns of verbal gender agreement in Arabic. The Arabic verb, as can be seen from the following table from Ryding (2005: 443) is inflected for gender in the 2nd and 3rd person.

Table 1 (from Ryding 2005: 443)

Past tense stem katab- 'wrote'			
	Singular	Dual	Plural
First person	katab-tu		katab-naa
Second person Masculine	katab-ta	katab-tumaa	katab-tun
Second person Feminine	katab-ti	katab-tumaa	katab-tunna
Third person	katab-a	katab-aa	katab-uu

Masculine			
Third person Feminine	katab-at	katab-ataa	katab-na

So, the feminine subject *ʔanti* in (2) triggers feminine verbal morphology on the agreeing verb *tadrusi:na*.

(2) ʔanti t-adrus-i:na
you.sing.**fem.** **2.fem.**-study-**fem.**
'You (fem) are studying.'

Bahloul (2006: 44)

Finally, gender agreement is also reflected on predicative constructions, with nominal and adjectival predicates agreeing with their subjects:

(3) ʔal qa:ʔim-at-u tawil-at-u-n /*tawil-u-n
DET list-fem.-nom. long-**fem.**-nom.-indef. long-fem.-nom.-indef.
'The list is long.'

Ryding (2005: 240)

In sum, agreement is morphologically and syntactically manifested in almost all relations nouns establish with other words in Arabic, while in English it is reflected only onto certain pronouns and has no overt syntactic effect. Research into the acquisition of gender forms in Arabic indicates that full mastery of the gender system occurs around the ages of 8-10 (Moawad, 2006).

Language interdependence

Although Davidson et al (2010) do not explore the possible role of the presence versus absence of grammatical gender in the two languages of the bilingual group in their results, we suggest that these may be placed within the linguistic transfer literature basis.

It has been well established in the last few decades that the linguistic systems of bilingual children interact with each other, in an interdependence relation that may involve delay, acceleration or transfer of features from one language to the other (Paradis & Genesee 1996). Numerous studies have shown interdependence in the phonological (e.g. Fabiano-Smith and Barlow 2010; Paradis, 2001) and the morphosyntactic domain (e.g. Müller, 1998; Serratrice, Sorace, & Paoli, 2004; Sorace, Serratrice, Filiaci, & Baldo, 2009). Amongst those, some studies have reported on more advanced linguistic skills in bilingual children compared to monolingual children, i.e. acceleration (e.g. Fabiano-Smith & Goldstein, 2010). Acceleration is thought to be conditional to the attainment of more advanced levels of linguistic complexity in one of the two languages (Paradis & Genesee,1996).

In the case of gender, superior performance of the bilingual children compared to the monolingual children, i.e. acceleration may be due to the complexity of the grammatical gender system in one of their two languages; that would account for the Davidson, et al, (2010) Urdu-English results and would lead us to expect similar superior performance in Arabic-English bilingual children compared to their monolingual peers.

The present study

The goal of the current study was to examine metalinguistic awareness in bilingual children compared to their monolingual peers, focussing on gender mismatch between the subject and the predicate in two typologically unrelated languages, Arabic and English. We aimed to explore gender in a systematic way, as a previous study has suggested that children may be better at identifying gender mismatch between the subject and the predicate when one of the languages has grammatical gender while the other does not (Urdu vs. English, Davidson et al., 2010). We aimed to recruit highly proficient bilingual children, as previous research has highlighted the role of proficiency in metalinguistic awareness (see references above, also Cummins, 1993). To our knowledge, this is the first study examining metalinguistic awareness differences between bilingual Arabic–English bilingual children and their monolingual peers.

Method

Participants

Thirty typically developing six-year old children participated in this experiment, comprising three equal sized groups, matched on age, receptive grammar and receptive vocabulary. One group of simultaneous Arabic-English bilingual children (nine female, one male, aged 5;08 to 6;01, two months standard deviation), one group of English monolingual children (three female, seven male, aged 5;09 to 6;00, one month standard deviation) and one group of Arabic monolingual children (10 female, aged 5;08 to 6;00, one month standard deviation). The three groups had the same mean age (5;10). Children in the

bilingual group were balanced bilinguals (to the extent that this is possible, see more information below), with equal abilities in the two languages as measured by language tests, and equal home exposure and use as reported by parents (see information on language tests administered and parental questionnaires below). One further (Arabic monolingual) child was excluded from the study and replaced with another child as she did not understand the task.

The three groups were also matched on receptive grammar, as measured by the sentence structure subtest of the Clinical Evaluation of Language Fundamentals-4 (CELF-4, Semel, Wiig, & Sexord, 2003). The English monolingual group was given the standardised English version. The test was adapted into Arabic with the help of qualified Arabic-English translators, as no standardised Arabic version was available (see also Bialystok 1988; Davidson et al., 2010, for such examples). The Arabic version was administered to the children in the Arabic monolingual group, following successful piloting. The bilingual group was given both versions, which were administered one week apart (see procedure). To be included in the study, children in the bilingual group had to perform equally well in the two versions (+/-2 points, raw score). A paired samples t-test confirmed that there was no statistically significant difference between the English and Arabic versions in the performance of the bilingual group, $t(9) = 1.309$, $p = .223$. We also explored potential differences across groups: no statistically significant group differences were found for the English version (English monolingual versus bilingual children, $t(18) = 1.162$, $p = .062$) or for the Arabic version (Arabic monolingual versus bilingual children, $t(18) = 1.395$, $p = .18$).

Table 2. Means and standard deviations (SD) of participants' raw scores for the sentence structure subtest of the Clinical Evaluation of Language Fundamentals-4 (CELF-4, Semel, Wiig, & Secord, 2003) and for the British Picture Vocabulary Scale (BPVS III; Dunn et al., 2009) for each participant group.

Groups	N	CELF English	CELF Arabic	BPVS English	BPVS Arabic
English monolinguals	10	20.2 (0.92)	--	87.7 (3.74)	--
Arabic-English Bilinguals	10	19.6 (1.35)	20 (1.41)	86.3 (4.47)	87.3 (4.03)
Arabic monolinguals	10	--	19.2 (1.14)	--	86.9 (3.35)

The three groups were also matched on receptive vocabulary. The British Picture Vocabulary Scale, 3rd edition (BPVS III; Dunn et al, 2009) was administered. The same procedures as with CELF were followed, whereby the standardised English version was adapted into Arabic, administered to adults and piloted on children prior to testing our participants. Although there was a significant difference between the English and Arabic versions in the bilingual group ($t(9) = -3$, $p = .015$), performance of the bilingual children was in line with that of their monolingual peers in each of their languages. Specifically, there was no significant difference between the monolingual Arabic-speaking children and the bilingual group, $t(18) = 0.241$, $p = .812$, or the monolingual English-speaking children and the bilingual children $t(18) = 0.759$, $p = .458$. Performance scores for

the three groups on the sentence structure subtest of the CELF (Semel, Wiig, & Secord, 2003) as well as for BPVS are given in table 2.

Institutional ethical research approval was obtained for this study and informed written consent was obtained by children's parents/guardians prior to the testing. Parents/guardians filled in a questionnaire regarding their child's language use and other background information. The bilingual children and the English monolingual group were recruited and tested in schools in the UK, while the Arabic monolingual children were tested in schools in Saudi Arabia. All children were reported as exhibiting typical linguistic and cognitive development and had no history of hearing difficulties or learning disabilities. Children in the English monolingual and the bilingual group attended English-medium schools (having attended English-medium nurseries), while the Arabic group attended Arabic-medium schools. According to parental reports, children in the monolingual groups only spoke one language at home with their family (English or Arabic). Children in the bilingual group were simultaneous bilinguals (i.e. exposed to both languages from birth) and were as balanced as possible: in addition to administering the language tests reported above, we collected information on language exposure and use using a Likert scale. According to parents, children were exposed to both Arabic and English at home: all parents reported that they spoke sometimes English and sometimes Arabic with their children. Similarly, their siblings spoke both languages to them, and the children watched English and Arabic television programmes. In addition, the children were reported as communicating in both languages with equal frequency (i.e. sometimes) at home. None of the children spoke or had significant exposure to additional languages. Information about parents' education and occupation was

also collected as indicators of (and in order to control for) socioeconomic status: according to self-report, parents held bachelor's degrees or higher, and were employed in professional occupations. Information on children's proficiency was collected using

Materials

A metalinguistic awareness task was designed in two versions: English and Arabic. The task was designed to test the children's ability to judge the sentences, to provide an explanation and to correct the sentences that involved gender mismatch. Stimuli consisted of ten sentences involving gender (adapted from Davidson et al., 2010), five of which were matched (control condition) and five mismatched (test condition). For example: *She is a pretty son* (mismatch). Sentence length was six words maximum, in order to minimise memory load. The list of English stimuli can be found in the appendix. The experiment included further conditions testing other elements which are not reported in this manuscript. Order of presentation was pseudorandomised.

The Arabic version of the task consisted in an adaptation of the English material. This adaptation involved, among other things, replacing English proper nouns (e.g. John) with Arabic ones (e.g. Omar).

(4) hi ʔumu jayidah

She mother good

'She is a good mother.'

Versions of the task were administered to seven English speaking and seven Arabic speaking adults to ensure our target responses were adult-like and the task was piloted on eight children. Adults performed at ceiling. Data from these children were not included in the analysis.

Procedure and coding

Each child was tested individually in a quiet room in their school. Participation was voluntary and the experimenter ensured that children felt comfortable at all times. All bilingual children were given the English and Arabic standardised tests. Half of the bilingual children were given the English version of the metalinguistic awareness task, while the other half the Arabic version. The two languages were tested in sessions that were one week apart. Each session was conducted in one language only, so as to place participants as close to a monolingual mode as possible (Grosejan, 2001). Half of the bilingual children had the English session first, and the Arabic session a week later, while the other half were tested in Arabic first, and in English a week later.

The standardised tests were administered first. The metalinguistic awareness task was administered in a separate session, following a break. The experimenter said to the children: 'Now, I am going to say some sentences, and you have to tell me if these sentences sound okay or not'. The experimenter then read out the sentences one by one using neutral prosody. Whenever the child said 'No, it doesn't sound ok', the experimenter asked the child: 'Can you tell me what is wrong with the sentence?' and then 'Can you correct it?'

Children's responses were coded as target or non-target. For the explanation and correction part, only responses related to the gender mismatch were

considered. Explanations were coded as target if they were grammar-oriented (see Galambos & Goldin-Meadow, 1990). For example: for the sentence *'He is a tall daughter'* a grammar-based explanation might be that *he* is for boys, not girls. Corrections were coded as target if they presented a matched version of the mismatched sentence. For example, both *'She is a tall daughter'* and *'He is a tall son'* would be coded as target corrections of the stimulus sentence above. Responses that altered the sentence in other ways, repeated the explanation, or repeated the entire sentence or part of it were coded as non-target.

Results

Statistical testing comparing the two bilingual subgroups confirmed that there were no significant differences in performance between the subgroup that completed the English version of the task and the subgroup that had the Arabic version of the task (no group effect $F(1,8) = .531$, $p = .487$, partial eta squared = .062), and no interactions involving subgroup. Task data from the two versions administered to the bilingual group were collapsed in subsequent analyses. All children performed at ceiling when judging match sentences. Mean target responses for conditions involving mismatch are shown in table 3.

Table 3. Means and standard deviations (SD) of target responses (Max= 5) on mismatch conditions for each participant group.

Groups	Judgment	Explanation	Correction
Arabic-English Bilinguals	4.8 (0.4)	4.2 (1.2)	4.6 (0.7)

English monolinguals	4.2 (1.3)	4 (1.4)	0.8 (0.8)
Arabic monolinguals	4.4 (1)	3.7 (1.7)	1.3 (0.5)

A repeated measures ANOVA was performed, with function (four levels, judgment of match sentences, judgment of mismatch sentences, explanation and correction for mismatch sentences) as independent variables as well as a grouping variable (English monolingual, Arabic monolingual and Arabic English bilingual). Results revealed a main effect of function $F(1.694, 45.735) = 77.277$, $p < .001$, partial eta squared = .741, a group effect $F(2, 27) = 8.398$, $p = .001$, partial eta squared = 0.383 and a function X group interaction $F(3.388, 45.735) = 16.501$ partial eta squared = 0.553 (Greenhouse-Geisser corrected, due to sphericity violations).

Subsequent comparisons revealed statistically significant differences in the gender correction condition, indicating that the bilingual group was significantly better at correcting mismatch gender sentences than each of the two monolingual groups (bilingual versus English monolingual $t(18) = -11.4$ $p < .001$, bilingual versus Arabic monolingual $t(18) = 12.27$ $p < .001$). All other group comparisons remained below significance (alpha level adjusted for multiple comparisons). Within group comparisons showed no significant differences in bilingual children's performance across conditions $F(1.388, 12.498) = 3.706$, $p = .067$, partial eta squared = 0.152. In contrast, monolingual children were less able to correct ungrammatical gender sentences than to detect grammatical gender

sentences (monolingual Arabic t(9) = 24.222 p<.001, monolingual English t(9) = 16.837, p<.001), while remaining comparisons did not reach significance.

Group results can be seen in figure 1.

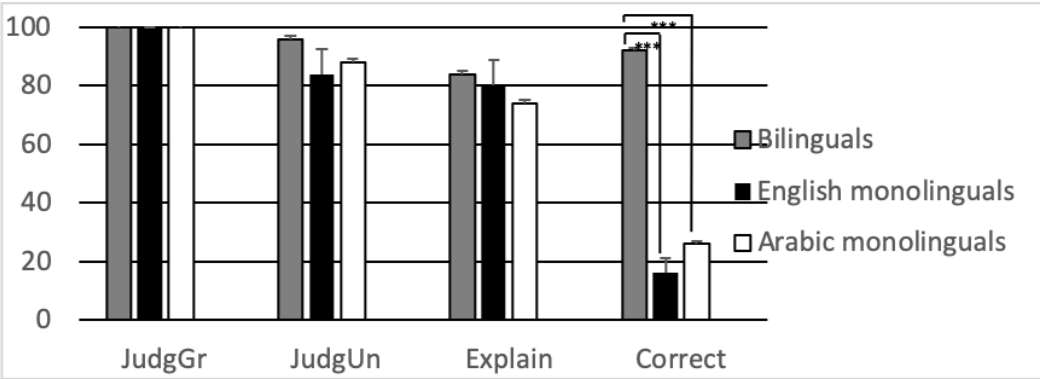

Figure 1. Percentage of target responses for each participant group. Error bars indicate standard error. Three asterisks indicate significance at p<.001

Overall, statistical analysis showed that the bilingual group was better at correcting sentences containing gender mismatch than the monolingual controls. The monolingual groups had difficulties correcting sentences containing gender mismatch while the bilingual group did not.

Discussion

The study set out to add to the limited literature on metalinguistic gender awareness in bilingualism, by comparing Arabic-English bilingual children to their monolingual peers. Results revealed that bilingual children were better able to correct sentences involving gender mismatch compared to their monolingual peers. A second language pair can thus be added to the cases where a bilingual

advantage in metalinguistic awareness is detected in relation to gender: Urdu-English (Davidson et al., 2010) and Arabic-English here.

In our data, no group difference was detected in children's ability to identify gender mismatch, unlike what was found by Davidson et al. (2010). This was because our stimuli were easy for this age group; all our groups scored above 80% target when judging mismatch sentences, and at ceiling when judging match ones. More complex stimuli were included in the previous study, along with other conditions, which could explain this discrepancy. Our data follow the same pattern as Davidson et al (2010) in that there is a numerical difference, with higher scores for bilingual children than monolingual children at the judgment level (96% for the bilingual group, versus 84% for the English monolingual group and 88% for the Arabic monolingual group), although the comparison did not reach significance.

The overall pattern that emerges when comparing our bilingual children to their monolingual peers is therefore fully in line with the view proposed by Galambos & Goldin-Meadow (1990) that the bilingual experience does not enhance higher-level metalinguistic skills in children, i.e. conscious understanding of the patterns and regularities of one's language; the skills that would enable children to explain why a certain sentence is incorrect. The bilingual boost in metalinguistic awareness may only be detected at lower levels, i.e. the ability to note and correct irregularities.

However, an aspect of our results can be found in within group comparisons which appears to contradict previous data. Previous studies have found that correcting incorrect sentences was easier for children than explaining why they were incorrect (Davidson et al., 2010; see also Galambos & Goldin-Meadow,

1990); in the present study, the reverse was found for the monolingual groups, while there was no difference between correction and explanation for our bilingual group. While this finding may appear puzzling at first, recall that our study followed a different testing protocol, which may be the reason behind this discrepancy. Unlike the format of the previous studies cited above (e.g. Davidson et al., 2010; Galambos & Goldin-Meadow, 1990), children were asked to explain first, and to correct the sentence later. What the comparison between our data and the familiar data from other studies seems to show is an interplay between the different levels of metalinguistic awareness.

Results consistently show that all children, monolingual or bilingual, seem to have difficulties with higher level skills. Slower development of these skills compared to lower level skills (judgment) can account for the lower performance in conditions where children are asked to explain why the sentences are incorrect. Galambos & Goldin-Meadow (1990) test this difference between levels using inferential statistics, while Davidson et al. (2010) report a similar overall picture, albeit without giving specific numbers. In our case, performance in the explanation condition was numerically lower for all groups, in line with previous studies. No significant difference was detected, possibly due to the fact that our stimuli were easy for our age group, as discussed above.

At the same time, and if Galambos & Goldin-Meadow (1990) are correct in matching the different tasks to different levels of metalinguistic awareness (correction-low, explanation-high), our results suggest that while bilingual children perform well at low levels after they have been asked to consider higher levels, monolingual children do not. The performance of monolingual children at

the lower level (correction) is worse than at the higher level, supposedly more challenging, condition (explanation).

This potential task effect may be interpreted in at least two ways. It is possible that while bilingual children do not have an enhanced linguistic 'mind' (Galambos & Goldin-Meadow, 1990) that would allow better explanations, they are better able than monolingual children to utilise their linguistic mind in order to correct errors after they have been asked to offer explanations. In effect, this would be an advantage at the most abstract level, but manifest in an indirect way, i.e. not at the explanation level itself, but in the following condition. A second possible explanation would be that bilingual children are better able than monolingual children to switch from a demanding higher level task (explanation), to a lower level task (correction). The second explanation would mean that the difference is due to abilities related to flexibility of thought and switching between different tasks. Under this explanation, our bilingual children were better able to switch back to the less challenging lower level than the monolingual children.

While our data by themselves do not offer any answer as to which of the two explanations one should pursue, other research findings and debates can weigh into our discussion. Our first explanation (enhanced use of linguistic 'mind' in bilingualism) implies that children can use higher level linguistic skills to perform a lower level correction task. This is not necessarily incompatible with earlier suggestions that children reply more automatically in correction tasks, without accessing the higher level metalinguistic skills. It could be that higher skills can only be accessed when they have fully developed and when these are activated. Both these conditions were met here: first, we have already established that the children in our study had sophisticated metalinguistic ability, as evidenced by their

general high performance. Second, children were encouraged to access their higher level metalinguistic skills via our experimental protocol, as they were asked to explain the mismatch first. It is therefore possible that bilingual children were better able to use their linguistic mind than the monolingual children, which enabled them to perform better at correcting the incorrect sentences. The second explanation, i.e. that the difference is linked to the ability to switch from a higher level task to a lower level task is in line with a body of research outside linguistics which has shown bilingual advantages in cognitive flexibility and switching (e.g. Barac & Bialystok, 2012; Bialystok, 2010). This explanation would perhaps be the less parsimonious one, as it would involve an advantage outside the linguistic domain (executive function) which would be caused by linguistic experience (bilingualism) and would affect performance in a linguistic task (Friesen & Bialystok, 2012). Moreover, discussion is complicated by the fact that there is currently no consensus as to how the executive system is structured, and the nature of its relationship with the linguistic abilities. This is part of a larger debate, and further theoretical and empirical investigation would be required before these questions are answered. The present study can hopefully serve to start a discussion and act as an incentive for further research and experimental manipulations.

A final point concerns the role of the relationship between the two languages in relation to the bilingual advantage. Uncertainty remains on where any benefits to metalinguistic abilities, where these exist, stem from. In this study, we hypothesised that superior performance in metalinguistic ability in relation to gender mismatch a la cross-linguistic acceleration stems from the presence of grammatical gender in one of the two languages. This accounts for familiar data (Davidson et al., 2010) and led us to expect results in the present study. While

further research is clearly required, including larger scale studies and different language combinations, the fact that only the bilingual group showed this superior ability supports our linguistic interdependence analysis. Specifically, it is not the presence of a grammatical feature (gender) in itself that enhances children's abilities, and more specifically the ability to recognise or correct irregularities; if that was the case, then our Arabic monolingual group would also show enhanced performance. Instead, the performance of both monolingual groups was significantly lower than that of the bilingual group. Benefits seem to stem from the presence of two languages and the interaction between the two.

Conclusion

This was the first study, to our knowledge, to test and detect a difference in metalinguistic awareness between Arabic-English bilingual children and their monolingual peers. These bilingual children were better able to correct sentences that involve mismatch in gender between the subject and the predicate. Although a lot of our discussion is language-independent, results contribute to our knowledge on language development in this particular population in relation to monolingual controls. The detection of this positive difference in this population is encouraging, given that findings of studies that explore language or general cognition in bilingualism are not always consistent, sometimes revealing no positive differences or weaker skills, even in large scale studies to date (e.g. Welsh-English bilingual children, Gathercole et al., 2014). Ultimately, we hope that this small scale study makes a small contribution to the body of research, since the seminal Peal & Lambert (1962) study, that has been finding positive

differences in the skills of bilinguals compared to monolinguals and may thus help dispel negative perceptions of bilingualism across languages and cultures.

Appendix. List of stimuli for the metalinguistic awareness task (English version).

1. She is a good mum.

2. She is a pretty son.

3. The boy is a good sister.

4. He is a good brother.

5. He is a strong boy.

6. He is a tall daughter.

7. My sister is a pretty girl.

8. He is a nice son.

9. She is a good son.

10. She is a good dad.

References

Adesope, O. O., Lavin, T., Thompson, T., & Ungerleider, C. (2010). Systematic Review And Meta-analysis On The Cognitive Benefits Of Bilingualism. *Review Of Educational Research* 80, 207–245.

Baauw, S., Zuckerman, S., Ruigendijk, E., & Avrutin, S.(2011). Principle B Delays As A Processing Problem: Evidence From Task Effects. In A. Grimm, A. Muller, C. Hamann & E. Ruigendijk (Eds.) Production-comprehension Asymmetries In Child Language, 247-272. Berlin: Mouton De Gruyter.

Badawi, E., Carter, M. G., & Gully, A. (2016). *Modern Written Arabic: A Comprehensive Grammar*, Rev. Edition. London: Routledge.

Bahloul, M.(2006). Agreement. In K. Vesteegh (Ed.), *Encyclopaedia Of Arabic Language And Linguistics*, Vol. 1, 43-48. Leiden: Brill.

Barac, R., & Bialystok, E. (2012). Bilingual Effects On Cognitive And Linguistic Development: Role Of Language, Cultural Background, And Education. *Child Development* 83, 413–422.

Barac, R., Bialystok, E., Castro, D. C., & Sanchez, M.(2014). The Cognitive Development Of Young Dual Language Learners: A Critical Review. *Early Childhood Research Quarterly* 29, 699–714.

Berko, J. (1958). The Child's Learning Of English Morphology. *Word* 14, 150–177.

Bialystok, E.(1987). Words As Things: Development Of Word Concept By Bilingual Children. *Studies In Second Language Acquisition* 9, 133-140.

Bialystok, E. (1988). Levels Of Bilingualism And Levels Of Linguistic Awareness. *Developmental Psychology* 24, 560–567.

Bialystok, E. (2001). Metalinguistic Aspects Of Bilingual Processing. Annual *Review Of Applied Linguistics* 21, 169-181.

Bialystok, E. (2010). Global-local And Trail-making Tasks By Monolingual And Bilingual Children: Beyond Inhibition. *Developmental Psychology* 46, 93–105.

Bialystok, E., Craik, F. I.M., Klein, R., & Viswanathan, M. (2004). Bilingualism, Aging, And Cognitive Control: Evidence From The Simon Task. *Psychology And Aging* 19, 290–303.

Bialystok, E., & Martin, M. M. (2004). Attention And Inhibition In Bilingual Children: Evidence From The Dimensional Change Card Sort Task. *Developmental Science* 7, 325–339.

Bialystok, E., & Senman, L. (2004). Executive Processes In Appearance-reality Tasks: The Role Of Inhibition Of Attention And Symbolic Representation. *Child Development* 75, 562–579.

Bialystok, El., & Viswanathan M.(2009) Components Of Executive Control With Advantages For Bilingual Children In Two Cultures. *Cognition* 112: 494–500.

Cain, K. (2007). Syntactic Awareness And Reading Ability: Is There Any Evidence For A Special Relationship? *Applied Psycholinguistics* 28, 679-694.

Cairns, H. S., Waltzman, D., & Schlisselberg, G. (2004). Detecting The Ambiguity Of Sentences: Relationship To Early Reading Skill. *Communication Disorders Quarterly* 25, 68-78

Carlson, S, M., & Meltzoff, A. N. (2008) Bilingual Experience And Executive Functioning In Young Children. *Developmental Science* 11, 282–298.

Chaney, C. (1994). Language Development, Metalinguistic Awareness, And Emergent Literacy Skills Of 3-year-old Children In Relation To Social Class. *Applied Psycholinguistics* 15, 371-394.

Cheung, H., Chung, K.K.H., Wong, S.W.L., Mcbride-chang, C., Penney, T. B., & Ho, C. S. H. (2010). Speech Perception, Metalinguistic Awareness, Reading, And Vocabulary In Chinese-English Bilingual Children. *Journal Of Educational Psychology* 102, 367–380.

Comrie, B. (1999). Grammatical Gender Systems: A Linguist's Assessment. *Journal Of Psycholinguistic Research* 28, 457-466.

Conroy, A., Takahashi, E., Lidz, J., & Phillips, C. (2009). Equal Treatment For All Antecedents: How Children Succeed With Principle B. *Linguistic Inquiry* 40, 446-486.

Corbett, G. (1991) *Gender*. Cambridge: Cambridge University Press.

Cromdal, J. (1999). Childhood Bilingualism And Metalinguistic Skills: Analysis And Control In Young Swedish-English Bilinguals. *Applied Psycholinguistics* 20, 1–20.

Cummins, J. (1993). Bilingualism And Second Language Learning. Annual *Review Of Applied Linguistics* 13, 51–70.

Davidson, D., Raschke, V. R., & Pervez, J. (2010). Syntactic Awareness In Young Monolingual And Bilingual (Urdu–English) Children. *Cognitive Development* 25, 166-182.

Dodd B. J., So L.K.H., & Lam K.K.C. (2008) Bilingualism And Learning: The Effect Of Language Pair On Phonological Awareness Abilities. *Australian Journal Of Learning Difficulties* 13, 99–113.

Dunn, L. M., Dunn, D. M. & Styles, B. (2009). *The British Picture Vocabulary Scale*. Gl Assessment Limited.

Fabiano-Smith, L., & Barlow, J. A. (2010). Interaction in bilingual phonological acquisition: Evidence from phonetic inventories. *International journal of bilingual education and bilingualism*, 13, 81–97.

Fowler, A. E. (1988). "Grammaticality Judgments And Reading Skill In Grade 2. *Annals Of Dyslexia* 38, 73-94.

Friesen, D. C. & Bialystok, E. (2012). Metalinguistic Ability In Bilingual Children: The Role Of Executive Control. *Riv. Psicolinguist*. Appl. 12, 47–56.

Galambos, S. J. & Goldin-Meadow, S.(1990). The Effects Of Learning Two Languages On Levels Of Metalinguistic Awareness. *Cognition* 34, 1-56.

Galambos, S. J., & Hakuta, K. (1988). Subject-specific And Task-specific Characteristics Of Metalinguistic Awareness In Bilingual Children. *Applied Psycholinguistics* 9, 141-162.

Gathercole, V. C. Mueller, Thomas, E. M., Kennedy, I., Prys, C., Young, N., Viñas Guasch, N., Roberts, E. J., Hughes, E. K. & Jones, L.(2014). Does Language Dominance Affect Cognitive Performance In Bilinguals? Lifespan Evidence From Preschoolers Through Older Adults On Card Sorting, Simon, And Metalinguistic Tasks. *Frontiers In Psychology* 5, 11.

Grosjean, F. (2001). The Bilingual's Language Modes. In Janet L. Nicol (Ed.), Explaining Linguistics. One Mind, Two Languages: Bilingual Language Processing, 1-22. Malden: Blackwell Publishing.

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, 700–733.

Hockett, C. F. (1958). *A Course In Modern Linguistics*. New York: Macmillan.

Ibrahim, R., Eviatar, Z., & Aharon-Peretz, J. (2007). Metalinguistic Awareness And Reading Performance: A Cross Language Comparison. *Journal Of Psycholinguistic Research* 36, 297–317.

Kang, J. Y. (2012). Do Bilingual Children Possess Better Phonological Awareness? Investigation Of Korean Monolingual And Korean-English Bilingual Children. *Reading And Writing* 25, 411–431.

Kovács, Á.M. (2008). Early Bilingualism Enhances Mechanisms Of False-belief Reasoning. *Developmental Science* 12, 48–54.

Kremers, J.M. (2003). The Arabic Noun Phrase: A Minimalist Approach. Doctoral Dissertation: LOT.

Loizou, M., & Stuart, M. (2003) Phonological Awareness In Monolingual And Bilingual English And Greek Five-year-olds. *Journal Of Research In Reading* 26, 3–18.

Moawad, R. (2006) The acquisition of the Arabic gender and number systems, PhD dissertation, Bangor University.

Müller, N. (1998). Transfer in bilingual first language acquisition. *Bilingualism: Language and Cognition*, 1, 151–171.

Paap, K. R. (2014). The Role Of Componential Analysis, Categorical Hypothesising, Replicability And Confirmation Bias In Testing For Bilingual Advantages In Executive Functioning. *Journal Of Cognitive Psychology* 26, 242–255.

Paradis, J., & Genesee, F. (1996). Syntactic acquisition in bilingual children. *Studies in second language acquisition*, 18, 1–25.

Paradis, J. (2001). Do bilingual two-year-olds have separate phonological systems? *International Journal of Bilingualism*, 5, 19–38.

Peal, E. & Lambert, W. E. (1962). *The Relation Of Bilingualism To Intelligence*. Washington: American Psychological Association.

Ricciardelli, L. A. (1992). Bilingualism And Cognitive Development In Relation To Threshold Theory. *Journal Of Psycholinguistic Research* 21, 301–316.

Ryding, K. C. (2005). *A Reference Grammar Of Modern Standard Arabic*. Cambridge: Cambridge University Press.

Semel, E., Wiig, E. H. & Secord, W. A. (2003). *Clinical Evaluation Of Language Fundamentals*, Fourth Edition (Celf-4). Toronto, Canada: The Psychological Corporation/A Harcourt Assessment Company.

Siok, W.T., & Fletcher, P. (2001). The Role Of Phonological Awareness And Visual-orthographic Skills In Chinese Reading Acquisition. *Developmental Psychology* 37. 886–899.

Serratrice, L., Sorace, A., & Paoli, S. (2004). Crosslinguistic influence at the syntax–pragmatics interface: Subjects and objects in English–Italian bilingual and monolingual acquisition. *Bilingualism: Language and Cognition*, 7(3), 183-205.

Sorace, A., Serratrice, L., Filiaci, F., & Baldo, M. (2009). Discourse conditions on subject pronoun realization: Testing the linguistic intuitions of older bilingual children. *Lingua*, 119, 460–477.

Tong, X., Deacon, S. H., Kirby, J. R., Cain, K., & Parrila, R. (2011). Morphological Awareness: A Key To Understanding Poor Reading

Comprehension In English. *Journal Of Educational Psychology* 103, 523–534.

Tunmer, W.E., Nesdale, A. R., & Wright, A. D. (1987). Syntactic Awareness And Reading Acquisition. *British Journal Of Developmental Psychology* 5, 25-34.

Zipke, M.(2007). The Role Of Metalinguistic Awareness In The Reading Comprehension Of Sixth And Seventh Graders. *Reading Psychology* 28, 375-396.