

RESEARCH NOTE

Subject realization in early Hebrew/English bilingual acquisition: The role of crosslinguistic influence*

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This study reports on the use of (c)overt subjects and subject–verb agreement in Hebrew in the spontaneous speech of a child, EK, acquiring Hebrew and English simultaneously from birth and of five slightly younger Hebrew monolingual controls. Analysis shows that EK's production of pragmatically inappropriate overt subjects is more than three times that of the controls, while she resembles the controls in terms of subject–verb agreement, a purely syntactic phenomenon. These results strongly suggest that influence from English is restricted to phenomena that involve the syntax/pragmatics interface, supporting Hulk and Müller's (2000) hypothesis that crosslinguistic influence in early bilingual acquisition is a predictable and systematic phenomenon.

1. Introduction

One of the earliest debates in the field of bilingual first language acquisition revolved around the question of whether bilingual children have one or two language systems. However, ongoing research on bilingual acquisition (e.g. Genesee, 1989; Meisel, 1989; Genesee, Nicoladis and Paradis, 1995) has, by now, established quite clearly that from very early on, bilingual children differentiate between the various grammatical systems they are exposed to. The idea that the two language systems are separate does not entail that there is no contact between the two systems. Indeed, it has been shown that crosslinguistic influence is prevalent in early bilingual speech. The interesting questions in this context, then, are what the nature of the influence is; in what direction it occurs; and whether it is predictable.

An important proposal regarding precisely these questions has been put forth by Hulk and Müller (2000). According to this proposal, cross-linguistic influence in early bilingual acquisition is predicted to occur if 1) the syntax/pragmatics interface is involved, and 2) there is a surface overlap between the two target languages. In order to test this hypothesis we looked at two phenomena in the Hebrew speech of a young Hebrew/English bilingual girl, EK: subject realization and subject–verb agreement. While the former is predicted to be subject to influence from English, the latter is not. Importantly,

the significance of this proposal is that it challenges the (rather prevalent) idea that cross-linguistic influence is merely the result of language dominance (e.g. Genesee, Boivin and Nicoladis 1996). According to this view, the dominant language in the bilingual grammar will always influence the weaker language, regardless of the linguistic domain or any other considerations involved.

The purpose of this present study is to test the predictions derived from Hulk and Müller's (2000) hypothesis. To this end, we first examined the production of pragmatically inappropriate overt subjects in Hebrew by a Hebrew/English bilingual child, relative to a group of Hebrew monolingual controls. In other words, we were interested in testing whether the bilingual child produced significantly more 'redundant' subjects than the Hebrew monolinguals. Second, we tested the same children's behavior with respect to subject–verb agreement to see whether the bilingual child produced more errors regarding this purely syntactic phenomenon than the controls.

Comparing spontaneous speech samples of the bilingual child (average age 3;1 and average MLU 4.46) to a control group of five typically developing Hebrew-speaking monolingual (average age 2;5 and average MLU 3.73) controls, our data show that the predictions were borne out: EK produced pragmatically inappropriate overt subjects at a rate more than three times higher than that of the monolingual controls. Conversely, the rate of subject–verb agreement errors in EK's sample was extremely low and virtually identical to that of the control group.

In the next section, we present Hulk and Müller's (2000) proposal in more detail. We also describe the phenomenon of subject realization in Hebrew and in

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English as well as the phenomenon of subject–verb agreement in the two languages. We conclude the section by reviewing previous studies that test Hulk and Müller’s hypothesis.

2. Background

2.1 Hulk and Müller

Hulk and Müller (2000) (henceforth H&M) proposed that we can predict what type of phenomena may be subject to cross-linguistic influence. In particular, their claim is that two conditions must be met in order for influence to occur. The phenomenon must involve:

- (1) a. The interface of two modules. Specifically, the C-domain, which is where syntax and pragmatics interact.
- b. A structure which has two different UNDERLYING analyses in each of the target languages, but that overlaps (at least partially) at the SURFACE level.

The idea that the C-domain is vulnerable has been shown for typically developing monolingual children (as H&M note, following Platzack, 1999), as well as for children with SLI, and Broca’s aphasics (e.g. Jakubowicz and Nash, 2001; Jakubowicz, 2003). This vulnerability of the C-domain is hypothesized to stem from the fact that, being at the periphery of the sentence, it constitutes an interface level, linking syntax to other grammatical domains, such as pragmatics, as well as other cognitive systems. It is therefore not surprising that this high functional level could pose a problem also for bilingual acquisition.

As for the second condition, the idea is that a given structure in the two input languages – while appearing similar at the surface level – has one or two possible analyses in each of these languages. Let’s assume that this construction in language A provides the child with analysis 1, while the corresponding construction in language B gives rise to analysis 1 AND analysis 2. In this case, the child is faced with what H&M would consider a partial overlap, since both languages provide evidence for analysis 1.¹ If the given structure also involves the syntax/pragmatics interface, the prediction is that the input data from language A, namely analysis 1, would affect the child’s choice, and cause her/him to prefer analysis 1 even for language B.

One linguistic phenomenon that is predicted to be subject to cross-linguistic influence under these conditions is the realization of subject arguments in the speech of bilingual children acquiring a *pro*-drop language and a non-*pro*-drop language simultaneously. We take H&M’s hypothesis to apply to subject realization in Hebrew

and English as follows: In English subjects must be phonetically realized.² Thus, English provides evidence for the underlying syntactic analysis that verbs require overt subjects. In contrast, Hebrew subjects may be either overt or null in certain parts of the verbal paradigm, giving rise to both the English analysis (verbs require their subjects to be overt) and to a second analysis, namely that verbs allow their subjects to be null (for a more elaborate explanation of the null subject phenomenon in Hebrew, see section 2.2). Thus, the English and the Hebrew surface phenomena regarding subject realization show partial overlap: in both languages there are overt subjects. This means that both languages provide evidence for analysis 1, the English analysis. Since the phenomenon of subject realization also involves the syntax/pragmatics interface, as is argued for in section 2.2, it is predicted that the bilingual child will initially choose analysis 1 for both English and Hebrew, i.e. English is predicted to influence Hebrew in terms of subject realization.

Importantly, the predicted influence is uni-directional – from English to Hebrew and not vice versa. One may entertain the possibility that the *pro*-drop language (Hebrew) influences the non-*pro*-drop language (English). After all, children acquiring non-*pro*-drop languages often produce null subjects with so-called Root, or Optional Infinitives (e.g. Rizzi, 1994; Wexler, 1994, 1996; Hyams, 1996).³ Yet, this possibility is not predicted by H&M’s hypothesis. In addition, it would be difficult to falsify: root null subjects are frequent even in the speech of monolingual children acquiring a non-*pro*-drop language, so we would never know if root null subjects in the non-*pro*-drop language of a bilingual child represent a typical phenomenon, or whether they occur because of influence from the *pro*-drop language. We suggest that root null subjects in the non-*pro*-drop language of a bilingual child stem from the same source as root null subjects in the speech of monolingual acquirers of non-*pro*-drop languages, e.g. some form of an underspecified I head, rendering both a non-finite verb and a null subject (cf. Wexler, 1994; Hyams, 1996).

Further support for H&M’s hypothesis would come from showing that a strictly syntactic phenomenon (one that does not involve the syntax/pragmatics interface) is not subject to cross-linguistic influence. Although H&M’s hypothesis does not pose any restrictions on the choice of syntactic phenomenon for this purpose, in our search for an appropriate phenomenon from ‘narrow syntax’ to compare with the syntax/pragmatics interface

¹ This account of H&M’s second condition is adopted from Unsworth (2003).

² Except for in special pragmatic contexts, including so-called “Diary Drop” (Haegeman, 1990, 1997). Since these pragmatic contexts do not systematically affect the syntactic requirement that in principle all English declarative verbs require an overt subject, we leave pragmatic subject-drop in English out of our discussion here (see also section 2.2).

³ We thank an anonymous reviewer for pointing this out to us.

phenomenon we tried to stay close to subjects, rather than choosing a syntactic phenomenon unrelated to subjects. Therefore, we picked subject–verb agreement, a syntactic phenomenon that is caused by subjects, yet, does not involve pragmatics.

In order to explain the rationale behind our predictions, let us first elaborate on the relevant phenomena and present some existing analyses for each language type.

2.2 Subject realization in adult Hebrew and adult English

As mentioned in the introduction, our language of investigation is Hebrew, in the Hebrew/English bilingual child. In order to discuss subject realization in Hebrew, it is essential to first describe the *pro*-drop paradigm in Hebrew, which is done in (2), taking the verb *la-asot* ‘to do’ as an example:

(2) INFINITIVE	PAST	PRESENT	FUTURE
SINGULAR			
la-asot	1m (ani) asiti	*(ani) ose	*(ani) e’ese/ya’ase
to do	1f (ani) asiti	*(ani) osa	*(ani) e’ese/ya’ase
	2m (ata) asita	*(ata) ose	*(ata) ta’ase
	2f (at) asit	*(at) osa	*(at) ta’asi
	3m *(hu) asa	*(hu) ose	*(hu) ya’ase
	3f *(hi) asta	*(hi) osa	*(hi) ta’ase
PLURAL			
	1m (anaxnu) asinu	*(anaxnu) osim	(anaxnu) na’ase
	1f (anaxnu) asinu	*(anaxnu) osot	(anaxnu) na’ase
	2m (atem) asitem	*(atem) osim	*(atem) ta’asu
	2f (aten) asiten	*(aten) osot	*(aten) ta’asu
	3m *(hem) asu	*(hem) osim	*(hem) ya’asu
	3f *(hen) asu	*(hen) osot	*(hen) ya’asu

It is important to note that the paradigm presented above illustrates the actual linguistic behavior of speakers of Israeli Hebrew in a colloquial register, as opposed to what can be found in prescriptive grammar textbooks of Hebrew.⁴ Some explanatory comments of the discrepancies between colloquial and prescriptive Hebrew are therefore in place.

First, the 1st person singular future is prescriptively part of the *pro*-drop paradigm; however, due to a phonological process taking place in colloquial Hebrew, the form of the 1st person singular in the future has become identical to the form of the 3rd person singular masculine. Since the 3rd person is not in the *pro*-drop part of the paradigm, it follows that speakers treat the 1st person singular in the same way, disallowing a null subject (cf. Horesh, 2003).

Secondly, similar to the 1st person, according to prescriptive grammar, the 2nd person singular and plural

⁴ Naturally, there are some speakers, mainly of older generations, who abide by the prescriptive grammar, but on the whole, contemporary speakers of colloquial register do behave according to the paradigm presented here.

future forms belong in the *pro*-drop part of the paradigm, while in colloquial Hebrew they require an overt subject, at least in declaratives. One possible reason for this may be that the future form of the verb has become increasingly productive as an imperative. The use of an overt subject with the 2nd person future form of the verb signals that the verb is not an imperative, and is therefore obligatory (cf. Horesh, 2003). This is not the case in 2nd person singular and plural questions, which are freely used with null subjects.

Finally, the feminine plural forms of the verb in the future (for all persons) are prescriptively different from those of the masculine. However, these have virtually disappeared from colloquial Hebrew (except in some teachers’ speech), and replaced by their masculine counterparts, as shown in the table.

As can be seen in (2), Hebrew is not, strictly speaking, a *pro*-drop language, which allows null subjects across the paradigm, but rather it is a mixed *pro*-drop language. This complex mixed system, in which null subjects are licensed only for 1st and 2nd person and only when they occur in the context of the past or the future (for 1st person plural) tense, is accounted for by Vainikka and Levy (1995, 1999). Adopting Rizzi’s (1986) notion of identification and recoverability, Vainikka and Levy argued that it is the overtly marked person agreement features in the Hebrew past and future which allow the referent of the subject to be clearly identified and recovered, consequently licensing *pro*-drop. As Vainikka and Levy (1999, pp. 644f.) pointed out, these morphological endings are similar to the overt subject pronouns, i.e. *(ani) asiti* / *(ata) asita*. Since person agreement features are not overtly marked in the present tense, *pro*-drop is disallowed. Extending this line of reasoning, Vainikka and Levy claimed that the notion of recoverability can also explain why Hebrew null subjects are licensed in 1st and 2nd person past/future, but not in 3rd person. They argued that while the exact referent of the subject in 1st and 2nd person is easily identified using only the syntactic features affixes expressing person of the verb, such a referent is not easily identified based on the agreement features of the 3rd person alone, since the only thing this information indicates is that the referent is someone other than the speaker or the hearer, but it does not directly point to the referent.⁵

Thus, Vainikka and Levy claimed that it is the person agreement features that are key in the licensing of Hebrew null subjects. In this sense, Hebrew *pro* is referential and

⁵ In fact, the phonological process described above – in which the 1st person singular future form of the verb has essentially become identical to the 3rd person singular future form – together with the simultaneous morphosyntactic process that has “pushed” the 1st person singular future out of the *pro*-drop part of the paradigm, provide nice evidence in favor of the idea that licensing of Hebrew null subjects is regulated by person morphology.

patterns with *pro* in “classical” *pro*-drop languages, such as Spanish and Italian. In Shlonsky’s (1997) terms, it has the external syntax of the type ‘DP-*pro*’, which requires identification by agreement containing person features (cf. also Zushi, 2003).

Having laid out the mechanisms that control subject omission in Hebrew, we now turn to the discussion of subject realization. Like other *pro*-drop languages, such as Italian and Spanish, Hebrew allows subject arguments in its designated finite constructions to be either null or overt. It has been shown that the choice of using a lexical subject in *pro*-drop languages relies greatly (and perhaps exclusively) on pragmatic considerations, such as emphasis, contrast, and/or old vs. new information (e.g. Silva-Corvalán, 1994; Davidson, 1996). Greenfield and Smith (1976) proposed a Principle of Informativeness in order to account for early argument omissions in non-*pro*-drop languages. The less informative the subject is, the more likely it is to be omitted. Allen (1997, 2000), adopting the informativeness account of Greenfield and Smith (1976), reported interaction between overtness of arguments (subjects and objects) and informativeness features, such as newness, contrast, absence, etc. carried by these arguments: the more informativeness features the subject carries, the more likely it is to be overtly expressed. This principle was used by Serratrice, Sorace and Paoli (2004) to account for the subject–object asymmetry found in their English/Italian data. Similar to the monolingual controls, the bilingual child studied by Serratrice et al. did not omit objects in Italian. However, he did differ significantly from the monolinguals in his realization of subjects in Italian, producing overt subjects that were uninformative.

In (3) we provide some examples from adult Italian illustrating the role of the realized subject in expressing informativeness features:

(3) *Examples of overt subject realization in Italian*

a. Contrast

A: Hai dormito bene?
 Ø have-2SG slept well
 “Did you sleep well?”

B: Sì, io ho dormito bene, ma la bambina no
 yes I have slept well but the baby-F not
 “Yes, I slept well, but the baby didn’t.”

b. New information

A: Chi ha mangiato la torta?
 who has eaten the cake
 “Who ate the cake?”

B: L’ha mangiata lui.
 it has eaten he
 “He ate it.”

In (3a), the subject is expressed overtly to emphasize the contrast between the speaker and the baby. In (3b), the subject is realized in order to introduce new information regarding the eater of the cake.

Considering the key role of pragmatics in the realization of subjects in *pro*-drop languages, it follows that overt subjects should occupy a structural position which allows for the interaction between syntax and pragmatics. Rizzi (2000) argued that such a position is CP, or the Left Periphery (LP). According to Rizzi, LP functions as the interface of syntax and pragmatics, linking the clause to its matrix clause and the larger discourse. Under this view, LP is divided into two obligatory projections, ForceP (indicating the clause type) and FinitenessP (indicating, for example, whether the clause is tensed), as well as two optional projections, TopicP and FocusP, which are projected as part of LP when the clause contains either a focused element or a topicalized element. It is the TopicP that, according to Grinstead (2004), provides the landing site for realized subjects in *pro*-drop languages such as Spanish. Challenging the prevalent view, which assumes that overt subjects occupy the specifier position of IP (e.g. Belletti, 1990; Rizzi, 1990), Grinstead (citing Ordóñez, 1997) used Spanish data from ellipsis, negative quantifier extraction, and quantifier scope to argue that it is in fact the topic position which is the landing site for overt subjects in Spanish.

To our knowledge, no one has attempted to formally account for Hebrew overt subjects, but at least as far as native speaker judgments go, the use of overt subjects in the *pro*-drop part of the Hebrew paradigm parallels overt subject behavior in Italian and Spanish, and is clearly determined by pragmatic considerations such as emphasis and/or contrast, as the example in (4) illustrates.

(4) Speaker A: ma asit etmol
 what Ø did-2SG.F yesterday
 baerev?
 in-the-evening
 “What did you do yesterday evening?”

Speaker B: halaxti lishon
 Ø went-1SG sleep-INF
 “I went to bed.”

Speaker A: lo ratsit lir’ot seret?
 no Ø wanted-2SG.F see-INF movie
 “Didn’t you want to see a movie?”

Speaker B: ani ratsiti aval orit lo ratsta
 I wanted-1SG but Orit no wanted-SG.F
 “I did but Orit didn’t.”

This example illustrates the pragmatic considerations involved in the realization of the subject (in this case the 1st person singular, *ani*): speaker B uses the overt subject in order to emphasize the contrast between her and Orit.

Given that the Hebrew *pro* is of the same type as the Spanish *pro*, namely DP-*pro* (see above), we believe that it is safe to assume that the analysis proposed here for the realization of subjects in Spanish also applies to Hebrew overt subjects. Thus, we adopt Grinstead’s (2004) analysis

for Spanish and propose that the landing site of the realized subject in Hebrew is within CP.⁶

In contrast, as noted earlier in footnote 2, overt subject realization in adult English is a syntactic requirement rather than a pragmatic one. Subjects are claimed to originate in spec VP, and are subsequently raised into spec IP for checking purposes (e.g. Speas, 1986; Rosen, 1990; Burton and Grimshaw, 1992). In principle, the subject argument in English must be realized overtly and although there are certain pragmatic contexts in which null subjects are licensed, for example, “Diary Drop” (Haegeman, 1990; 1997), those are highly restricted.

In the next section we consider subject–verb agreement, a purely syntactic phenomenon, which is therefore predicted not to be susceptible to cross-linguistic influence.

2.3 Subject–verb agreement in adult Hebrew and in adult English

Hebrew and English differ considerably regarding their respective agreement paradigms. While agreement morphology in English is severely impoverished, Hebrew has a rich agreement system. English has very few agreement morphemes, namely the 3rd person singular *-s* and the inflected forms of copular/auxiliary *be*. As the paradigm in (2) above already showed, Hebrew, on the other hand, exhibits a rich morphological system, which is again illustrated in (5).

(5)		INFINITIVE	PAST	PRESENT	FUTURE
SINGULAR					
la-asot	1m	asiti	ose	e’ese/ya’ase	
to do	1f	asiti	osa	e’ese/ya’ase	
	2m	asita	ose	ta’ase	
	2f	asit	osa	ta’asi	
	3m	asa	ose	ya’ase	
	3f	asta	osa	ta’ase	
PLURAL					
	1m	asinu	osim	na’ase	
	1f	asinu	osot	na’ase ⁷	
	2m	asitem	osim	ta’asu	
	2f	asiten	osot	ta’asu	
	3m	asu	osim	ya’asu	
	3f	asu	osot	ya’asu	

⁶ Although Grinstead (2004) clearly argues for TopicP as the landing site for realized subjects, he does acknowledge the controversy surrounding this suggestion, pointing to other views which suggest a different landing site (within the Left Periphery) for this constituent (e.g. Rizzi, 2000). For us, the specific position, be it the TopicP or the FocusP, is less important. The crucial idea is that the landing site of realized subjects is the Left Periphery, or CP.

⁷ Recall from section 2.2 that in colloquial Hebrew the prescriptive feminine plural forms of the verb have virtually given way to their masculine counterparts and are very rarely productive.

Subject–verb agreement is a strictly (morpho)syntactic phenomenon, which does not involve pragmatics. All finite verbs in Hebrew must agree with their subject.

In the next section we provide a brief survey of findings on the acquisition of subject realization and subject–verb agreement in monolingual L1 Hebrew and monolingual L1 English, as well as a summary of studies testing H&M’s hypothesis with respect to subject realization in various language combinations.

2.4 Previous studies

Null subjects in L1 Hebrew and L1 English

As described in section 2.2, adult Hebrew has a mixed paradigm of subject omission. Data from monolingual Hebrew-speaking children show that Hebrew monolinguals acquire the adult paradigm at a very early age. Levy and Vainnika (1999/2000) found that even before the age of 2;0 children displayed adult-like knowledge of the omission patterns of the Hebrew verbal paradigm.

English syntax, on the other hand, requires lexically overt subjects throughout its verbal paradigm. Studies of English acquiring monolingual children show that children up to age 3;0 drop subjects at substantial rates (Bloom, 1970; Brown, 1973; Hyams, 1986; Valian, 1991, among many others). Around the age of 3;6 English-speaking monolinguals converge on the target grammar.

Agreement in L1 Hebrew and L1 English

As for subject–verb agreement, it has been argued that Hebrew-speaking children have adult-like knowledge of the verbs’ inflectional paradigm by 3;0 at the latest (Berman and Dromi 1984; Berman 1985; Armon-Lotem 1997). In the earliest stages of verb production, during the one-word stage (before age 2;0), children generate mainly stem-like forms that do not show overt marking of tense or agreement inflections (Armon-Lotem and Berman, 2003). Initial use of agreement morphemes is restricted to gender and number morphemes. It is formulaic in nature, and does not show agreement with the subject. Productive use of verbal morphology subsequently emerges (around age 2;0), showing agreement with the gender/number of the subject as well as marking of person agreement (Armon-Lotem and Berman, 2003). Monolingual acquisition of subject–verb agreement in Hebrew, then, is relatively early and error-free.

Child English, on the other hand, shows a relatively long period in which verbs are not inflected. Starting with the seminal work of Roger Brown (1973), it has been widely attested that English-speaking children go through a stage in which they frequently omit agreement morphemes (3rd person singular *-s*, copular/auxiliary *be*, etc.) in obligatory contexts, producing non-adult-like infinitival forms long after the age of 2;0 (Radford, 1986; Wexler, 1994; Harris and Wexler, 1996; Rice and Wexler,

1996; Hoekstra and Hyams, 1998 among others). As also mentioned in section 2.1, this stage is known as the Root, or Optional Infinitive stage (Rizzi, 1994; Wexler, 1994).

Studies testing Hulk and Müller's hypothesis

Several interesting studies have been designed to test H&M's hypothesis. In what follows, we survey a number of studies that are most relevant for us, in that they tested the hypothesis in the context of subject realization.

Paradis and Navarro (2003) examined spontaneous speech samples from one Spanish/English bilingual child between the ages 1;9 and 2;6, as well as production from two monolingual Spanish controls, ages 1;8 and 1;11 and 1;8 and 2;7. Following H&M, the authors predicted that the bilingual child's English would quantitatively influence the distribution of overt subjects in Spanish. The rationale for this is as follows: English, being a non-*pro*-drop language, provides the child with a lot of evidence in favor of overt, rather than null, subjects (giving rise to "analysis 1"). In contrast, Spanish provides evidence for both overt and null subjects (giving rise to "analysis 1 and 2"), as is characteristic for *pro*-drop languages. Recall from section 2.1 that in this case, the child is faced with what H&M would consider a partial overlap, since both languages provide evidence for analysis 1. If the given structure also involves the syntax/pragmatics interface, the prediction is that the input data from language A, or analysis 1, in this case English, would affect the child's choice, and cause her/him to prefer analysis 1 even for language B, in this case Spanish. Given that the decision between using overt or null subjects involves the syntax/pragmatic interface, i.e. the C-domain, it follows that a Spanish/English bilingual child is predicted to produce more overt subjects in Spanish than her/his monolingual peers.

The data collected by Paradis and Navarro showed that the bilingual child produced overt subjects in Spanish at a higher rate than the two monolingual Spanish speakers (more than twice as many). Furthermore, the developmental trend of the bilingual child also patterned differently than those of the monolinguals, i.e. even at the last data point, age 2;6, the bilingual child produced significantly more redundant overt subjects than her monolingual age mates. Thus, the predictions of this study were borne out.

Similar results were obtained by Serratrice et al. (2004) (see also Serratrice and Sorace, 2003). In this study, the authors examined spontaneous data from one Italian/English bilingual boy, Carlo, between the ages 1;10 and 4;6, as well as six monolingual Italian controls between the ages 1;7 and 3;3. The predictions for this study with respect to subject-argument realization were the same as in Paradis and Navarro's study, and so were the

results.⁸ The data showed that Carlo's use of inappropriate overt subjects in Italian was significantly higher than that of the Italian monolinguals. This finding contrasted with the child's use of objects, which was identical to the pattern of use exhibited by the monolingual group. These findings provide support for H&M's hypothesis since they show that while the use of overt subjects – which takes place at the syntax/pragmatics interface in Italian – is affected by cross-linguistic influence, the use of overt objects – a purely morphosyntactic phenomenon – remains unaffected.

A recent study by Pinto (2006) further supports the findings by Paradis and Navarro and Serratrice and colleagues. Examining longitudinal spontaneous speech samples of two Dutch/Italian bilingual children (one girl, aged 1;9–4;1 and one boy aged 2;9–3;9), Pinto reported that these children produced infelicitous overt subjects at a rate that was higher than the Italian monolingual controls.

Additional corroboration for H&M's model is provided, from a slightly different perspective, by work on adult language attrition. Using various comprehension, judgment, and production tasks, Tsimplici, Sorace, Heycock and Filiaci (2004) tested the domain of subjects in L1 Italian and Greek of near-native speakers of English. Effects of attrition were found in those conditions that involved the syntax/pragmatics interface, but not in those that were concerned with purely morphosyntactic phenomena in the domain of subjects.

3. Predictions for Hebrew/English bilinguals

Since the phenomenon of subject realization involves the syntax/pragmatics interface, and taken together with the observation that at the surface level the two languages partially overlap in that the English option (obligatorily realizing the subject argument, giving rise to "analysis 1") is a subset of the Hebrew options (either an overt or a null subject, giving rise to "analysis 1 or 2"), it follows that investigating the Hebrew speech of Hebrew/English bilingual children provides another excellent testing ground for H&M's hypothesis. We predict that for Hebrew/English bilingual children English influences Hebrew when it concerns subject realization. More precisely, the prediction for Hebrew/English bilinguals is as in (6).

- (6) A child acquiring Hebrew and English as first languages simultaneously produces overt subjects in Hebrew more frequently than her/his monolingual peers.

On the other hand, subject-verb agreement being purely syntactic, it violates H&M's first condition, and thus we

⁸ Since Italian and Spanish are extremely similar regarding the *pro*-drop parameter.

do not predict any cross-linguistic influence with respect to this phenomenon. This prediction is formulated in (7).

- (7) Subject–verb agreement errors in the Hebrew speech of a child acquiring Hebrew and English as a first language simultaneously are NOT more frequent than in the speech of her/his monolingual peers.

Testing subject–verb agreement in the same samples and showing that the prediction in (7) is borne out would provide strong evidence against the argument that the attested influence is simply the result of the dominance of English. In other words, if both predictions are borne out, this would lend strong support to the idea that dominance alone cannot account for cross-linguistic influence. As for our bilingual subject EK, given her biographical information, provided below, it is not clear which language, if any, is dominant in her case.

4 Methods

4.1 Subjects

For the bilingual data in this study, we examined spontaneous speech samples of one Hebrew/English bilingual girl between the ages 2;10 and 3;4. These samples are part of a larger data base at Ben-Gurion University of the Negev, Israel. The audio recordings were transcribed by native Hebrew speakers according to the CHILDES guidelines (MacWhinney and Snow, 1990). Each recording was transcribed once by two native speakers and then checked independently by the first author, who is a native speaker of Hebrew.

The child, EK, was born in Israel and at the time of recording was being raised there by her American mother and her Israeli father. Both parents are university professors at Ben-Gurion University in Beer Sheva, and the family lives in a nearby village of a high socioeconomic status. The mother's native tongue is American English and her Hebrew was at a beginner's level at the time of recording. The father's native language is Hebrew, but his English is near-native. Both parents speak English to EK and to each other. Despite the fact that English was the language spoken at home by her parents, growing up in Israel, EK was exposed to Hebrew from the very beginning of her life through frequent contact with her father's family and other family friends. Starting at the age of seven months she had Hebrew-speaking caretakers coming to the house every day. This went on for about eight months, after which EK started going to a Hebrew-speaking day-care center (around the age of 1;6). At the time of recording she was attending a Hebrew-speaking kindergarten. Importantly, throughout her life, the adult Hebrew that EK was exposed to had always been that of

Table 1. *Subject information.*

	EK (bilingual)		Hebrew monolingual controls		
	Age	MLU	Name	Age	MLU
	2;10	4.04	Bar	2;4	3.44
	2;11	3.50	Eran	2;6	4.78
	3;0	4.34	Hay	2;6	3.16
	3;1	3.78	Naama	2;4	3.67
	3;2	6.21	Zohar	2;6	3.62
	3;3	4.47			
	3;4	4.92			
Mean	3;1	4.46		2;5	3.73

native speakers; in other words, EK's Hebrew input was no different from that of monolingual children.

EK is an extremely friendly and outgoing person, and she was, in most cases, very cooperative and happy during the recordings, which took place at her home. The recordings were made by one or two adult interlocutors who interacted with EK through playing games, drawing, and natural conversation. The recordings were all conducted in Hebrew, and lasted on average about one hour each time.⁹ A total of 983 utterances were transcribed and coded.

The monolingual data was obtained from CHILDES (MacWhinney and Snow, 1990).¹⁰ We chose controls of a slightly younger age and MLU than EK to ensure that the children would not have simply outgrown the phenomena under investigation. The data were cross-sectional samples of five monolingual Hebrew-speaking children growing up in Israel. The recordings were mostly made at the children's homes; except for one child, who was recorded at her nursery school. The sessions were similar to those of EK, in that they involved an adult interlocutor or two (and in some cases one or two of the parents were also involved), who freely interacted with the child.¹¹ MLU (morpheme) of both the monolingual and the bilingual subjects was calculated according to the guidelines provided in Dromi and Berman (1982) for Hebrew. Analysis for this study was conducted on 544 utterances (around 100 utterances per child). The children's ages and MLU's are given in Table 1.

⁹ EK was recorded in both Hebrew and English during the same period.

¹⁰ Eran, Hay, and Zohar: data from BSF corpus (Berman & Dromi, 1984; Berman, 1985); Naama: data from Naama corpus (Berman & Dromi, 1984; Berman, 1985); Bar: data from Levy corpus.

¹¹ In the original transcripts it is noted that for one of the children, Zohar, the interview was conducted following a semi-structured questionnaire.

4.2 Coding

Subject realization

In order to test the prediction regarding null subjects, we examined child utterances in the Hebrew transcripts that contained possible environments for subject-drop in Hebrew, but not in English. In particular, we looked at utterances consisting of verb forms that belong to the *pro*-drop part of the Hebrew verbal paradigm, namely past tense 1st/2nd person singular, past tense 1st/2nd person plural, and future tense plural 1st person. The rationale behind coding these utterances is directly related to H&M's second condition for cross-linguistic influence. It is precisely these contexts which provide the partial surface overlap that is a necessary condition for influence from English to Hebrew when it comes to subject-argument realization, because for this type of utterances adult Hebrew has two possibilities, namely dropping the subject argument or realizing it, while adult English provides evidence for only one of these options, namely overt subjects. In other words, while Hebrew grammar allows the subject of such utterances to be either overt or null, depending on pragmatic considerations, English grammar only allows the former.

It is important to note that we were very conservative in our coding. That is, we only included REAL *pro*-drop contexts. So, for example, we excluded 1st person singular and 2nd person singular/plural verbs in the future, although traditionally (and prescriptively) they are considered a *pro*-drop context. The reason we did not include these forms is that in modern, colloquial Hebrew they require an overt subject.¹²

Furthermore, recall that the purpose of this study is the relative comparison between the language of monolingual Hebrew acquiring children and the Hebrew of bilingual Hebrew/English acquiring children with respect to the frequency of overt subjects in contexts where a lexically realized subject does not serve any clear pragmatic function, such as contrast, emphasis, or introduction of new information. That is, what we are interested in is whether there is a discrepancy between the bilingual child and her monolingual peers regarding the use of "superfluous" overt subjects. Deciding whether a realized subject is redundant in a given context is based on native Hebrew intuitions, which, we believe, are sufficient for our purposes. It is possible that the overt subjects counted as "pragmatically inappropriate" are not necessarily completely redundant, and that there may be semantic reasons, or other grammatical reasons, for their realization, nevertheless, they all displayed what Paradis and Navarro (2003) call "low informativeness".

Examples of utterances containing subjects with low informativeness are given in (8) (examples (8a, b) are from the bilingual transcripts and examples (8c, d) are from the monolingual transcripts).

- (8) a. Experimenter: ma at mecayeret?
 what you-SG.F draw-SG.F
 "What are you drawing?"
 Child: ani rak mecayeret mashehu
 I just draw-SG.F something
 leima
 to-mother
 "I'm just drawing something for
 mommy."
 Child: ani amarti lax
 I told-SG.F to-you-F
 "I told you."
- b. Experimenter: ma asu?
 what did-3PL
 "What did they do?"
 Child: em lakxu oto labetxolim
 they took-3PL him to-the-hospital
 "They took him to the hospital."
- c. Experimenter: eize searot yesh lebar?
 which hairs there-is to-Bar
 "What kind of hair does Bar have?"
 Child: ktanot
 small-PL.F
 "Small."
 Child: ani histaparti
 I cut-hair-1SG.RFLX
 "I got a hair cut."
- d. Experimenter: vema hem asu?
 and-what they did-3PL
 "And what did they do?"
 Child: hem hipilu et hashemen
 they dropped-3PL ET the-oil
 "They dropped the oil."

The subjects in the utterances above all exhibit so called "low informativeness" in the sense that they do not introduce new information, provide emphasis, or establish contrast. Given that the realization of subjects in the *pro*-drop part of the Hebrew paradigm serves precisely these pragmatic purposes, it follows that when overt subjects do not serve these purposes, they are pragmatically inappropriate. It is exactly those subjects, which do not seem to add any necessary missing information or signal contrast/emphasis, that are predicted to occur more often in the bilingual speech.

Subject-verb agreement

In order to test the prediction regarding subject-verb agreement, we examined child utterances in the Hebrew transcripts containing finite verbs with an overt subject.

¹² See section 2.2 for the description of the *pro*-drop paradigm in colloquial Hebrew.

Table 2. Proportions of (c)overt subjects in Hebrew transcripts.

	EK	Monolinguals
NULL	69% (58/84)	76% (41/54)
OVERT	31% (26/84)	24% (13/54)

We coded as errors those utterances in which the verb did not agree with the subject. Examples of agreement errors are given below (examples (a) and (b) are from EK and example (c) is from the monolingual sample):

- (9) a. Child: ani lo hayiti # sheatem lo # bau
I no were-1SG when that you-PL not came-3PL
“I wasn’t there when you didn’t come.”
- b. Child: aregel sheli koev
the-foot-SG.F of-mine hurt-SG.M
“My foot hurts.”
- c. Child: pit’om ba anashim ra’im
suddenly came-3SG.M people bad-PL.M
“Suddenly bad people came.”

As mentioned, we predict that EK’s rate of subject–verb agreement errors will be similar to that of her monolingual peers.

Importantly, the language samples used for this analysis were exactly the same samples used in the investigation of subject realization both for the bilingual child and for the monolingual control children.

5 Results and discussion

First, we calculated the percentage of overt and null subjects, out of the total number of subject-drop contexts found in the speech samples (84 and 54 in the bilingual and monolingual transcripts, respectively), and the results are given in Table 2.

At first glance, these data suggest that our prediction regarding subject realization is disconfirmed. The rates of null vs. overt subjects in the bilingual samples resembled those of the control group. However, if we break up the use of overt subjects according to pragmatic contribution, we get a completely different picture. As we can see in Table 3, the monolingual children hardly used any pragmatically inappropriate overt subjects (7%), while EK used them 23% of the time. These proportions are significantly different ($p = .02$, Fisher’s exact test).

Note that the frequency of obligatory contexts for subject drop in EK’s and the monolingual transcripts is relatively low (84 and 54 respectively). One could raise the question as to whether this reflects the rareness of such contexts in adult speech, making it difficult for the bilingual child to acquire the pragmatics of the *pro*-drop system.¹³ In order to exclude this possibility, we examined

Table 3. Proportions of appropriate and inappropriate overt subjects in Hebrew transcripts.

		EK	Monolinguals
NULL		69% (58/84)	76% (41/54)
SUBJECT			
OVERT	Pragmatic	8% (7/84)	17% (9/54)
SUBJECT	contribution		
	No pragmatic	23% (19/84)	7% (4/54)
	contribution		

a sample of adult utterances from our transcripts.¹⁴ Out of a total of the 254 verbal utterances we examined, we found 74 utterances that provided obligatory contexts for *pro*-drop (29%). Thus, *pro*-drop contexts comprise a reasonably substantial part of verbal utterances in adult Hebrew and it is therefore highly implausible to assume that the difficulty of the bilingual child is the result of the adult input. If anything, adult Hebrew should facilitate the acquisition of the pragmatics of the *pro*-drop system. We suggest that the rarity of obligatory contexts in the child data is a consequence of the fact that Hebrew *pro*-drop is allowed only in non-present-tense contexts. Since early child language tends to be restricted to the here and now, i.e. present tense, it follows that child transcripts will contain fewer contexts for *pro*-drop (recall from section 2.2 that the present-tense paradigm in Hebrew is non-*pro*-drop).

It is also worth noting that the inappropriate null subjects were of different persons (both 1st and 2nd) as well as different number (both singular and plural).¹⁵ In other words, it is not the case that the inappropriately realized subjects in EK’s samples were restricted to a specific type in terms of phi-features.

Furthermore, the samples we tested clearly showed a developmental pattern. The graph in Figure 1 illustrates EK’s use of inappropriate subjects over time. As can be seen, a clear developmental pattern emerges.

At the end of the recordings, EK’s use of inappropriate subjects reached the level of the monolingual data. A comparison of EK’s last data point with the monolingual data is given in Figure 2. Although EK’s subject realization at age 3;4 was similar to that of her monolingual controls, both EK and the monolinguals still produced a small number of inappropriate overt subjects (around 9%) and were thus not completely adult-like yet.

¹⁴ In the three transcripts examined, EK’s age was 2;11, 3;2 and 3;3, respectively.

¹⁵ In terms of gender, given that the interlocutor and the child were both female and given that only 1st and 2nd person allow *pro*-drop, it follows that only feminine forms were used.

¹³ Thanks to an anonymous reviewer who pointed this out to us.

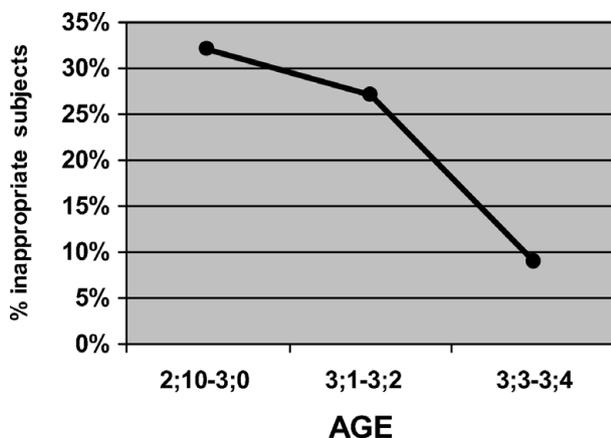


Figure 1. EK's inappropriate subject use over time.

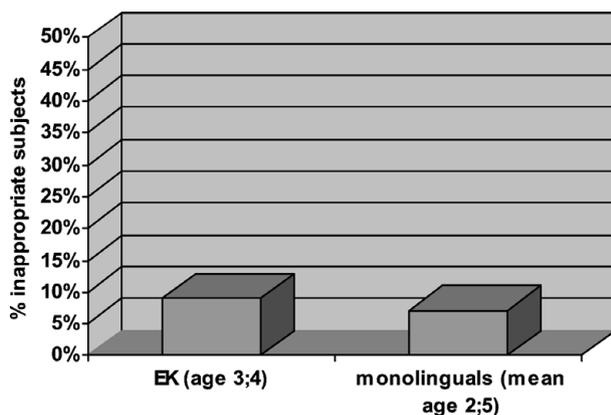


Figure 2. Inappropriate overt subjects at EK's last data point compared to the monolingual controls.

The data presented above are in clear contrast with the agreement data. As can be seen from Table 4, the rate of agreement errors for EK is extremely low, and comparable with the one found for the control group.¹⁶ Our findings reveal that the predictions formulated in section 3 are borne out. The bilingual child we studied indeed produced far more inappropriate overt subjects than the monolingual children used in this study. By contrast, the rate of agreement errors was very low and comparable to that of the monolinguals. Furthermore, EK's use of redundant subjects decreased over time and by the last point of recording her behavior with respect to this phenomenon was similar to that of the control group and was close to (but not completely) adult-like.

The inappropriate use of overt subjects in the Hebrew of our bilingual Hebrew/English child EK is comparable

¹⁶ In keeping with general norms that allow for a 10% error rate in spontaneous speech (e.g. Brown 1973) we take both the 1% agreement errors made by the monolingual children and the 3% agreement errors made by EK as non-significant, essentially noise in the data.

Table 4. Percentage of subject-verb agreement errors.

EK	Monolinguals
3% (4/238)	1% (1/105)

to the results reported by Paradis and Navarro (2003), who found that the Spanish/English bilingual child they examined used redundant overt subjects at a rate that was more than twice as high as that of the monolinguals (26% vs. 10%).¹⁷ Note, however, that unlike EK, this child's performance on subject realization still differed from her monolingual controls at her last data point, and was far from being adult-like. We believe that this discrepancy is explained by the age difference: while the last data point for Paradis and Navarro's bilingual child was at age 2;6, EK was 3;4 at her last data point. It is plausible to assume that later data of Paradis and Navarro's Spanish/English bilingual child would have revealed percentages of redundant overt subjects similar to her monolingual controls and to EK.

Our results are also in line with the reports of Serratrice and Sorace (2003) and Serratrice et al. (2004) who showed that the Italian/English bilingual child they studied had a significantly higher rate of inappropriately realized subjects than the Italian monolingual controls. In addition, their bilingual child as well as at least one of the Italian monolingual controls still produced a small number of redundant overt subjects at the bilingual child's final data point. This number is comparable to EK's final redundant overt subjects, namely 9%.

6 Conclusions

In this study we tested the hypothesis introduced by Hulk and Müller (2000) regarding cross-linguistic influence in bilingual first language acquisition. In order to do this, we examined two linguistic phenomena in the Hebrew speech of one Hebrew/English bilingual child. The first was subject realization, which, following the hypothesis, was predicted to be vulnerable in Hebrew/English bilingual acquisition since it involves both the syntax/pragmatic interface and a partial overlap at the surface level of the two target languages. The second phenomenon we tested was subject-verb agreement, which was predicted

¹⁷ In fact, the 10% reported is only for one of the monolingual children. The other child examined in the study used virtually no overt subjects. Unfortunately, P&N do not provide the absolute number of relevant contexts observed for the three children, so it is impossible to accurately calculate the average rate for the two monolinguals. However, it seems plausible to assume that it would be somewhere around 5%.

to be unaffected by cross-linguistic influence because it does not concern the syntax/pragmatic interface. The data showed that this was indeed the case: the speech samples we investigated showed that with respect to subject realization the bilingual child had quite a different profile from that of her monolingual peers. Conversely, the rate of agreement errors was the same for EK and her peers. Thus, this study, together with Paradis and Navarro (2003), Serratrice et al. (2004), Pinto (2006), and Tsimpli et al. (2004), provides convincing evidence in favor of Hulk and Müller's (2000) proposal regarding cross-linguistic influence in bilingual children.

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