

# Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages\*

NATASCHA MÜLLER

University of Hamburg

AAFKE HULK

University of Amsterdam

*In this paper we want to compare the results from monolingual children with object omissions in bilingual children who have acquired two languages simultaneously. Our longitudinal studies of bilingual Dutch–French, German–French, and German–Italian children show that the bilingual children behave like monolingual children regarding the type of object omissions in the Romance languages. They differ from monolingual children with respect to the extent to which object drop is used. At the same time, the children differentiate the two systems they are using. We want to claim that the difference between monolingual and bilingual children concerning object omissions in the Romance languages is due to crosslinguistic influence in bilingual children: the Germanic language influences the Romance language. Crosslinguistic influence occurs once a syntactic construction in language A allows for more than one grammatical analysis from the perspective of child grammar and language B contains positive evidence for one of these possible analyses. The bilingual child is not able to map the universal strategies onto language-specific rules as quickly as the monolinguals, since she is confronted with a much wider range of language-specific syntactic possibilities. One of the possibilities seems to be compatible with a universal strategy. We would like to argue for the existence of crosslinguistic influence, induced by the mapping of universal principles onto language-specific principles – in particular, pragmatic onto syntactic principles. This influence will be defined as mapping induced influence. We will account for the object omissions by postulating an empty discourse-connected PRO in pre-S position (Müller, Crysmann, and Kaiser, 1996; Hulk, 1997). Like monolingual children, bilingual children use this possibility until they show evidence of the C-system (the full clause) in its target form.*

## Introduction

Since the seminal works by Genesee (1989) and Meisel (1989), many empirical studies have criticized the dominant view of bilingual language acquisition at that time. That is, that children who are exposed to two languages from birth necessarily pass through a stage during which only one grammatical system is available. The languages are not separated at the level of syntax (cf. Taeschner, 1983, for example). Included in this new critical tradition are: Meisel (1986, 1990a, 1994b), Schlyter (1990a, 1994), Lanza (1992), Müller (1993, 1998), De Houwer (1995), Genesee, Nicoladis, and Paradis (1995), Köppe and Meisel (1995), Tracy (1995), Gawlitzek-Maiwald and Tracy (1996), Hulk and van der Linden (1996), Hulk

(1997) and Köppe (1997). All show that bilingual children are able to separate the two languages from early on. One argument in favor of the separate language hypothesis is that monolingual children use the same type of (target-deviant) constructions during language development as bilinguals. Research on bilingual children drew attention to these target-deviant constructions in monolingual children, since the latter show them much less frequently than bilingual children. This is the starting point of the present research. We would like to argue that the two languages are separated in bilingual children from early on, accounting for the observation that monolinguals show evidence of the same type of (target-deviant) constructions, but that they are in contact and may have some influence on each other (Hulk and van der Linden, 1996; Hulk, 1997, 1998a,b, 1999; Döpke, 1998; Müller, 1998). This would account for the observation that bilinguals seem to use the same type of (target-deviant) constructions to a higher degree and for a longer period than monolinguals. The problem is to determine which parts of grammar

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Address for correspondence

Institut für Romanistik, Universität Hamburg, Von-Melle-Park 6, D-20146 Hamburg, Germany

E-mail: nmueller@rz.uni-hamburg.de

are sensitive to crosslinguistic influence and why this should be so.

We will argue that crosslinguistic influence occurs in exactly those areas which are also problematic – to a lesser extent – for monolingual children. Recently, Platzack (1999) has suggested that the C-domain (the full clause) may be viewed as vulnerable, causing problems in different types of language acquisition. This hypothesis predicts correctly that monolingual and bilingual first language learners have difficulty with C-related constructions: V2 (verb second), complementizer insertion, and topicalization, among other phenomena (cf. Meisel, 1992). This vulnerability is attributed to the fact that the C-domain represents an interface level connecting syntax with other cognitive systems. Furthermore, the C-domain connects different levels of grammatical representation: pragmatic and syntactic information are exchanged at the C-level, as in the case of topicalization. We would like to show that it is the C-domain that defines the domain for crosslinguistic influence in bilinguals, due to its interface nature.<sup>1</sup> In addition to the C-domain marking the locus of crosslinguistic influence, we will show the importance of the particular properties of the syntactic construction likely to exhibit crosslinguistic influence. In particular, we will propose that if (the adult) language A allows for more than one grammatical analysis from the child's perspective<sup>2</sup> and language B contains a lot of positive evidence for one of those possible analyses, crosslinguistic influence is probable. Crosslinguistic influence creates confusion and delay in the acquisition process of the bilingual child. The bilingual child uses a grammatical analysis compatible with language A and strongly favored by language B, to a high degree and for a long period in language A. If our hypothesis is correct, namely that the C-domain (as an interface level) delimits crosslinguistic influence and that there must be a certain overlap of the two grammatical systems, then crosslinguistic influence is predictable and unidirectional. We will discuss data by bilingual French–Dutch, French–German, and Italian–German children showing influence of the Germanic language on the Romance language, the focus of the present study.

<sup>1</sup> We do not want to exclude other functional domains which represent interface levels where crosslinguistic influence may occur.

<sup>2</sup> In the same spirit although in a different framework, Döpke (1997, 1998) suggests that the bilingually raised children she studied are acquiring their languages incrementally on the basis of cue strength and cue cost. Partially overlapping structures in the input from German and English create structural saliences for the child before they are functionally accessible. Functional identification eventually leads to structural identification.

We will compare the bilingual children's development of the respective Romance language to that of monolingual children learning one of the Romance or one of the Germanic languages involved in the present study. The data show not a qualitative but a quantitative difference between the two types of language acquisition.

The grammatical domain we study is the phenomenon of object drop. In the acquisition processes involving this domain, not only do syntactic principles play a role, but pragmatic principles as well. If our hypothesis is correct that grammatical phenomena involving interface levels (C-domain) are susceptible to crosslinguistic influence, we expect this influence to emerge in the domain of object drop. Furthermore, for syntactic and other principles, universal strategies and language-specific rules interact in the domain of object drop. For example, in the early stages of language acquisition, we find universal pragmatic strategies, such as discourse licensing. At a later stage, these must be “translated” or mapped onto language specific syntactic rules. It is at this transition, that we would predict problems to arise, if, from the child's perspective, one language has a syntactic construction allowing for more than one grammatical analysis – one of which is compatible with universal strategies or, as Roeper (1999) refers to it, a Minimal Default Grammar.<sup>3</sup> Bilingual children confronted with input from two partially overlapping languages may tend to persist longer at a universal (pragmatic) stage. In other words, this type of crosslinguistic influence has the effect that the bilingual child is not able to map universal strategies onto language-specific rules as quickly as the monolinguals. S/he is confronted with a much wider range of language-specific syntactic possibilities and one of these seems to be compatible with a universal strategy. We would like to argue then for the existence of crosslinguistic influence induced by the mapping of universal principles onto language-specific principles, in particular pragmatic principles onto syntactic principles. We will define such influence as *mapping induced influence*. In order to strengthen our claim that the properties of the grammatical phenomenon involved determine crosslinguistic influence, we show that language dominance cannot explain the relevant observations. It is not the weaker language which is the target of crosslinguistic influence. During one particular period, crosslinguistic influence is observed for both languages in the bilingual child, depending upon the grammatical phenomenon involved.

<sup>3</sup> UG defines a set of default representations which all speakers possess. This set is called a Minimal Default Grammar.

The organization of the paper is as follows: the second section introduces the main earlier research results concerning object drop in monolingual children. It further introduces the adult systems of two Germanic languages, Dutch and German, and two Romance languages, Italian and French. In the third section, the results from the bilingual children are presented, focussing on the Romance languages. The fourth includes the analysis of object drop constructions from bilingual children and discusses the issue of language dominance as an explanatory concept. Section 5 contains a summary of the main findings.

### Object omissions in monolinguals

Previous research on the acquisition of French/Italian by monolingual children has shown that children omit objects very infrequently (Guasti, 1993/94; Jakubowicz, Müller, Riemer, and Rigaut, 1997; Tiedemann, 1999). In contrast, monolingual Dutch/German children omit objects frequently (Kraemer, 1995; Jakubowicz et al., 1997; Wijnen and Verrips, 1998). If we compare the results from child language with their respective adult systems, it is evident that monolingual children converge with the adult system early in development.

### Adult Dutch/German

Adult Dutch and German are V2 topic drop languages, i.e. the constituent in the first position (topicalized) of finite root clauses may be dropped (see the example in (1)).<sup>4</sup> The dropped constituent, for example the object, requires a discourse referent. Since Dutch and German are V2 languages, dropping of the first constituent results in a construction where the finite verb occupies first position, as in (1). In contrast to topic drop languages like Chinese, multiple argument drop is disallowed in Dutch and German.

(1) Q: *ga je mee naar de Titanic?!Kommst Du mit zur Titanic?*

“Will you come along to the Titanic?”

Ans: *0 heb ik al gezien / 0 hab*

have I already seen

*ich schon gesehen*

“I’ve already seen it.”

### Child Dutch/German

Longitudinal studies which take into account the phenomenon of object drop during early language

<sup>4</sup> Topic drop is a property of colloquial Dutch and German.

Table 1. *Monolingual German children (Jakubowicz et al., 1997)*

Name	Age	MLU	Base	SD
Group 1				
Kim	2;5,23	1.38	39	0.59
Baroudi	2;3,29	2.05	207	0.94
Clarissa	2;6,7	2.45	146	2.04
Valérie	2;5,7	2.57	7	0.79
Leonard	2;9,12	2.73	49	1.59
Marian	3;1,1	2.86	57	1.77
Caroline	2;5,0	3.19	80	1.71
Group 2				
Marlen S.	2;10,23	3.33	43	1.64
Bela	2;8,3	3.83	144	2.39
Christoph	2;3,9	4	4	1.63
Melina	2;6,25	4.4	151	5.65
Maximilian	2;9,12	4.7	162	7.15

development do not exist for early German.<sup>5</sup> Jakubowicz et al. (1997) investigated object omissions in monolingual German children (age 2;3–3;1) in an elicited production task<sup>6</sup> accompanied by 30 minutes of recording of spontaneous speech per child. In the present study, we only consider spontaneous interactions since the bilingual data represent recordings of spontaneous speech and the elicited production task affected the children’s behavior. Table 1 indicates the age of recording in years;months,days, the MLU value,<sup>7</sup> and the standard deviation for each child.<sup>8</sup>

Children were separated into two groups: in group 1 children, structures related to the adult C-system were missing, including subordinate clauses introduced by a lexical complementizer and V2 constructions where the first constituent is an object (*den*

<sup>5</sup> Hamann (1994) analyzes topic drop in two monolingual German children. However, the children are already three during the first recording session. Hamann also explicitly says that her subjects have acquired V2 and use subordinate clauses introduced by complementizers. The children show high percentages of target-like object drop constructions (about 30–40% from 3;1 to 3;7) and low percentages of target-deviant object omissions (about 2–3% from 3;1 to 3;7), suggesting that they have already acquired German topic drop. They may thus be compared to the group 2 children in Jakubowicz et al.’s (1997) study.

<sup>6</sup> Children were told a story accompanied by pictures. Subjects were asked to answer the questions of the interviewer. The German data were collected by one of the authors of the present study, Natascha Müller, the French data by Celia Jakubowicz.

<sup>7</sup> MLU values were counted on a word basis.

<sup>8</sup> In Jakubowicz et al. (1997), the spontaneous interactions and the elicited production data were discussed together. In the present study, we will present only the spontaneous data. This is the reason why the present tables differ from those in Jakubowicz et al. (1997).

Table 2. Absolute figures of subordinate clauses in monolingual German children (Jakubowicz et al. 1997)

	Comp – realized	Comp +realized
Group 1	5	2
Group 2	1	37

Table 3. Finite verb placement in monolingual German children (absolute numbers) (Jakubowicz et al. 1997)

	SVX	XSV(Y)	XVS, X≠Obj.	XVS, X=Obj.	SXV	VSX
Group 1	103	6	43	10	5	21
Group 2	334	1	252	97	7	149

Table 4. Object omissions in monolingual German children

	– Obj. in %	target-deviant in %
Group 1	45.9	24.3
Group 2	37.8	1.8

*Tiger habe ich* ‘‘The tiger I have (it)’’, i.e. not the subject (*ich habe den Tiger* ‘‘I have the tiger’’) or a so-called ‘‘light adverbial’’ (*da habe ich den Tiger* ‘‘There I have the tiger’’) (cf. Tables 2 and 3).<sup>9</sup> In group 2 children, these structures are being used productively.<sup>10</sup>

Both groups of children often omitted objects (40–50%) (cf. Table 4). Object omissions gave rise to target-deviant constructions in both groups. In group 1, target-deviant constructions appeared at a much higher rate than in group 2. Target-deviant object drop decreases as a function of age. Two types of target-deviant constructions occur: the finite verb is

<sup>9</sup> Group 1 children frequently use V2 in constructions with a ‘‘light adverbial’’ in first position (*da, jetzt, so, hier* (there, now, like-this, here) (Müller and Penner, 1996)).

<sup>10</sup> In addition, Jakubowicz et al. (1997) use MLU values as a criterion for separation into different groups of children. This was mainly due to the observation that length of the VP has been proposed to explain the subject omissions in French. Since the present study looks at object omissions and the length of the VP does not seem to be relevant for the analysis of object omissions, we did not rely on quantitative, but on qualitative properties of child language in order to separate the children into groups. The German children were recorded a second time, about six months after the first recording. We will not present the results here. Suffice it to say that group 1 children in the second recording behaved similarly to group 2 children in the first recording, i.e. they used lexical complementizers and V2 in a near-adult-like fashion, and they evidenced fewer target-deviant object omissions as compared to the first recording.

Table 5. Target-like and target-deviant (=non V1) object omissions in Hein’s speech (2;4–3;1) (Kraemer 1995)

Age	– OBJ in %
2;4	45
;25	29
2;6	34
2;7	33
2;8	22
2;9	32
2;10	36
2;11	21
3;0	29
3;1	22

not clause-initial (as in (2a)) or more than one argument is being dropped (as in (2b)).

- (2) a. B:<sup>11</sup> *Da reißt roudi ab*  
there tears Baroudi off  
‘‘Baroudi tears it off there.’’ (Baroudi)
- b. A: *Was machst du, wenn dein Papa dich nicht sehen soll?*  
‘‘What do you do when your daddy shouldn’t see you?’’
- V: *Auch mach*  
also make  
‘‘I make it too.’’ (Valerie)

Kraemer (1995) and Wijnen and Verrips (1998) find about 20–30% object omissions in the seven monolingual Dutch children investigated in a longitudinal study (ages 1;8–3;1). As in German, null objects do not always occur sentence-initially and they cooccur with empty subjects. Some examples of target-deviant object drop are given in (3); cf. Table 5.<sup>12</sup>

- (3) a. *Joost heeft getrokken*  
Joost has pulled  
‘‘Joost has pulled it.’’ (Gijs:1;10)
- b. *Mag niet doe*  
may not do  
‘‘You may not do it.’’ (Gijs:2;7,19)

<sup>11</sup> Baroudi takes a car and puts his hand onto it.

<sup>12</sup> Unfortunately, no MLU values are available except for Hein, where the age span from 2;4,11 to 3;1,24 corresponds to an MLU on a word basis of 1.67 to 3.32. Furthermore, Kraemer (1995) and Wijnen and Verrips (1998) do not give examples for multiple argument drop and they do not distinguish between licit and illicit object drop in the quantitative analysis. We want to thank Erica Thrift for providing example (3b).

Target-deviant object drop is reported to decrease as a function of age. At the age of 1;10, the rate of object omissions may be as high as 75%.

### Adult French/Italian

Adult French and Italian are not topic-drop languages. A small class of verbs, including *savoir/sapere* ‘know’ in (4), are exceptional.<sup>13</sup>

(4) Q: Tu sais pourquoi il n'est pas venu?/Sai perché non è venuto?

‘Do you know why he did not come?’

Ans: *Sais pas / Non so*

know not / Not know

‘I don't know.’

French and Italian do not license object drop in general. However, they allow the canonical object position to be empty once an object clitic is present, as in the examples *Jean le voit/Giulio lo vede* (John 3sg.masc. clitic sees) ‘John sees him/it’, which have the representation in (5).<sup>14</sup>

(5) *Jean le<sub>i</sub> voit ec<sub>i</sub> / Giulio lo<sub>i</sub> vede ec<sub>i</sub>*

### Child French/Italian

Jakubowicz et al. (1997) tested 12 monolingual French children in the study mentioned above with respect to object omissions. For each child, Table 6 indicates the age of recording, the MLU value,<sup>15</sup> and the standard deviation. For the purpose of the present study, we consider only spontaneous interactions since the elicited production task had an effect on object omissions in the French children.<sup>16</sup> Again, two groups were distinguished. The first group did not produce constructions related to the adult C-system (cf. Table 7), whereas the second group showed productive usage of the relevant constructions.

Monolingual French children omitted objects infrequently. Both groups (group 2 to a much lesser extent than group 1) exhibited target-deviant object

Table 6. *Monolingual French children (Jakubowicz et al. 1997)*

Name	Age	MLU	Basis	SD
Group 1				
Valentin	2;5,0	2.92	201	1.87
Raphael	2;5,17	2.93	95	1.54
Gaetan	2;3,20	2.97	87	1.53
Jérémie	2;7,3	3.05	125	1.66
Claire	2;0,13	3.15	195	1.84
Group 2				
Louise	2;5,23	3.22	113	1.68
Sylvio	2;5,0	3.47	189	1.87
Leo	2;3,22	3.78	137	1.88
Flora	2;4,23	3.80	155	1.81
Pierre	2;4,15	4.06	105	2.39
Hélène	2;5,29	4.82	142	2.62
Elisa	2;7,0	4.95	351	2.92

Table 7. *Absolute figures of subordinate clauses in monolingual French children (Jakubowicz et al. 1997)*

	Comp – realized	Comp + realized
Group 1	5	0
Group 2	2	28

Table 8. *Target-deviant object omissions in monolingual French children (Jakubowicz et al. 1997)*

	– Obj. in %
Group 1	11.8
Group 2	4.2

omissions (cf. Table 8).<sup>17</sup> They produced constructions where the object is not lexically realized, as an NP or clitic, as in (6a), and constructions where the subject has been dropped simultaneously, as in (6b).

- (6) a. *Il met dans le bain*  
 he puts in the bathroom  
 ‘He puts it into the bathroom.’ (Lou)
- b. *Habille*  
 dresses  
 ‘He puts his clothes on.’ (Rap)

As for French, results from longitudinal studies are available for the relevant age span. During the period when constructions related to the C-system are rare (from 2;1–2;3), the monolingual child Philippe (MacWhinney and Snow, 1985; Mac-

<sup>13</sup> On the basis of work by Fónagy (1985) and Lambrecht and Lemoine (1996), Jakubowicz and Rigaut (2000) and Tuller (2000) discuss the possibility that adult French licenses object drop under specific lexical and discourse conditions. We may conclude that French is not a generalized topic drop language, as German and Dutch are, but licenses null objects only under very specific conditions which involve the type of lexical verb and the type of complement.

<sup>14</sup> We will not discuss the exact grammatical status of Romance clitics here since it is not important for our argument; cf. Müller et al. (1996) for morphological and syntactic approaches to object clitics.

<sup>15</sup> MLU values have been counted on a word basis.

<sup>16</sup> The number of (target-deviant) omissions was five times as high as in the spontaneous interaction data.

<sup>17</sup> Unfortunately, target-like object omissions were not considered.

Table 9. *Target-deviant object omissions in Victor's and Chloé's speech (van der Velde 1998)*

Child	Age	MLU	–OBJ in %
Victor	1;11,10	3.16	14.3
	2;0,14	2.95	8.3
	2;1	3.18	19.4
	2;3	3.18	4.2
	2;4,4	3.72	10.8
	2;4,25	3.66	8.4
	2;5,29	3.93	17
Chloé	1;11,19	3.0	9.7
	2;0,10	2.73	15.8
	2;1,8	3.15	3.2
	2;2,4	3.57	12.7
	2;3,4	3.57	4.3
	2;4,1	3.79	5.6
	2;5,14	3.90	2.7

Whinney, 1995) exhibits 11% of target-deviant object omissions (Hulk, 1997). Van der Velde (1998) studies two monolingual French children, Victor and Chloé, and shows that object omissions are infrequent (cf. Table 9).<sup>18</sup> Victor first uses finite subordinate clauses introduced by a lexical element at age 2;1 (at age 2;3, more than once per recording), Chloé at age 2;2,4 (at age 2;5,14, more than once per recording).

With respect to monolingual Italian children, Tiedemann (1999) has conducted the elicited production task mentioned above. The recording situation in a kindergarten did not allow a clear separation of a session containing only spontaneous interactions and a test session, as in the German and French corpora. Since the elicited production task had an effect on the children's behavior in German and French (cf. Table 13), the Italian data have to be interpreted cautiously. For the present study, we will consider only spontaneous interactions, i.e. utterances which are not responses to the test pictures. Table 10 gives the age, the MLU value,<sup>19</sup> and the standard deviation for 13 of the children tested. Again, it is possible to divide the children into two groups: group 1 children did not produce subordinate clauses introduced by a complementizer. Group 2 children show evidence of lexically introduced subordinate clauses; cf. Table 11.

Both groups exhibit target-deviant object omissions, group 1 about 23% (cf. Table 12<sup>20</sup> and the examples in (7)). The relatively high number of

<sup>18</sup> Van der Velde (1998) does not mention examples with multiple argument drop.

<sup>19</sup> MLU values have been counted on a word basis.

<sup>20</sup> The number of all (licit and illicit) object omissions in spontaneous interactions amounts to 25.3% in group 1 and 3.9% in group 2.

Table 10. *Monolingual Italian children (Tiedemann 1999)*

Name	Age	MLU	Basis	SD
Group 1				
Mattia	3;0,6	2.47	141	1.25
Désirée	2;5,15	2.86	87	1.38
Matteo	2;9,26	3.05	58	1.33
Marco	2;4,2	3.09	246	1.54
Margherita I	2;9,17	3.08	78	1.17
Diego	2;9,17	3.36	216	1.49
Group 2				
Chiara	2;7,0	3.4	81	1.5
Iacopo	2;7,12	3.6	186	1.94
Sara	2;7,2	3.66	230	1.93
Carlotta	2;9,20	4.23	119	2.08
Ludovica	2;7,20	4.31	54	2.51
Margherita II	2;7,12	6.25	320	4.68
Giulia	2;6,27	5.02	135	2.68

Table 11. *Absolute figures of subordinate clauses in monolingual Italian children*

	Comp – realized	Comp + realized
Group 1	4	2
Group 2	0	164

Table 12. *Target-deviant object omissions in monolingual Italian children*

	– Obj. in %
Group 1	22.8
Group 2	3.2

omissions in Italian may be due to the fact that there was no separate session in the experimental procedure containing only spontaneous interactions.

- (7) a. *Dopo fa*  
 afterwards makes  
 “Afterwards he makes it.” (Mattia)
- b. *Taglia*  
 cuts  
 “She cuts it.” (Diego)
- c. *Anche lui ha*  
 also him has  
 “He also has it.” (Marco)

The elicited production task had an effect on the behavior of the French and German monolingual children as well (cf. Table 13): omissions were also more frequent in elicited production, mostly visible in

Table 13. *Target-deviant object omissions in monolingual French, Italian and German children, elicited production*

Group	–Obj. in %
1. French	50
2. French	14.1
1. German	42
2. German	11.9
1. Italian	45
2. Italian	13

Table 14. *Target-deviant object omissions in Martina's, Diana's and Guglielmo's speech, Guasti 1993/94*

Child	Age	MLU	–OBJ in %
Martina	1;8	below 2	27
	1;9	below 2	0
	1;10	below 2	38
	1;11	2.1	39
	2;1	2.1	21
	2;3	2.6	13
	2;4	2.6	11
	2;5	2.6	3
	2;7	2.6	4
	Diana	1;10	2.6
1;11		2.6	33
2;0		2.6	14
2;1		4.1	15
2;5		4.1	3
2;6		above 5	3
Guglielmo	2;2	2.7	20
	2;3	2.3	12
	2;4	2.6	5
	2;5	2.6	0
	2;7	above 2.6	6

the first French group, and in group 2 children of both languages. Table 13 also shows that the test had a negative effect on the number of omissions in the Italian children.

Guasti (1993/94) analyzes three monolingual Italian children from the CHILDES database. Unfortunately, no MLU values are given for the children. Matching the ages mentioned in Guasti (1993/94) with the MLU values<sup>21</sup> given in Cipriani, Chilosi, Bottari, and Pfanner (1993)<sup>22</sup> gives the results in table 14 for object omissions in Italian.

The children studied by Guasti (1993/94) are much

younger (with respect to MLU) than the Italian children studied by Tiedemann (1999) and the monolingual French children reported here. They are comparable (with respect to MLU) to the monolingual German children of Jakubowicz et al.'s (1997) study. Table 14 gives the impression that object omissions decrease dramatically with an MLU of about 2.6. Before then, Italian children display object omissions at an average of 20%. We may hypothesize that the higher number of object omissions in the Italian children studied by Tiedemann (1999) is an artifact of the test situation. Interestingly, the number of object omissions decreases below 10% in Guasti's (1993/94) children with an MLU above 2.6.

Guasti (1993/94) does not mention the use of complementizers in subordinate clauses in the children studied. Kupisch (1997) analyzed Martina's subordinate clauses and concludes that lexically introduced embedded clauses are first evidenced at 2;3. Examples are: *no perché non c'è nulla* (2;3) 'no because there is nothing', *no qui qui no pecché poi chiude* (2;3) 'no here no because then closes', *e ora io efono a babbo che potti i pane* (2;4) 'now I call Daddy in order that he brings the bread along', *tenta, senno ti brucia!* (2;5) 'Watch out, if not you will burn yourself'. In other words, we may conclude that there is evidence for the lexical instantiation of the C-system from the age of 2;3/2;4 onwards in Martina. This age corresponds to a decrease of target-deviant object omissions.

The Italian data raise two questions: the first is whether the Italian children are similar to the German children who, as shown above, display about 24.3% target-deviant object omissions. The second question concerns the relation between Italian and French. To answer the first question, an individual analysis of the German children is required. Table 15, compared with the individual MLU values in table 1, shows that in German the number of target-deviant object omissions does not decrease when an MLU of 2.6 is reached. Furthermore, German children omit objects twice as often as Italian children with the same MLU values.

Let us turn to the second question, namely the difference or similarity of Italian and French children. All French children we found in the literature have an MLU above 2.6. In other words, it is quite possible that object omissions also amount to more than 11% at an MLU below 2.6 in French. The study of object omissions in younger French children is a matter of future research.

### Object drop in monolinguals: a grammatical analysis

Before we discuss a grammatical analysis underlying early child object drop, we would like to summarize

<sup>21</sup> MLU values have been counted on a word basis.

<sup>22</sup> The MLU values are represented in figure format; therefore we cannot always give the exact value.

Table 15. *Objects in spontaneous interaction: German*

Child	Age	Lexical/ Pronominal NP	Omissions	
			+target	–target
Kim	2;5,23	2	0	4 (66.7%)
Baroudi	2;3,29	9	6 (31.6%)	4 (21.1%)
Clarissa	2;6,7	11	12 (48%)	2 (8%)
Valérie	2;5,7	15	5 (17.3%)	9 (31%)
Leonard	2;9,12	15	4 (16.7%)	5 (20.8%)
Marian	3;1,1	14	2 (9.1%)	6 (27.3%)
Caroline	2;5,0	14	3 (13.1%)	6 (26.1%)
Total		80	32 (21.6%)	36 (24.3%)
Marlen S.	2;10,23	67	38 (35.2%)	3 (2.8%)
Bela	2;8,3	53	38 (41.8%)	0
Christoph	2;3,9	12	0	3 (20%)
Melina	2;6,25	62	46 (42.6%)	0
Maximilian	2;9,12	50	19 (27.2%)	1 (1.4%)
Total		244	141 (36%)	7 (1.8%)

the monolingual data. German, Dutch, French, and Italian children pass through a stage during which target-deviant object drop constructions are used. The languages differ with respect to the extent to which children make use of target-deviant object drop. Children from a Germanic background omit objects twice as frequently as children from a Romance background with a comparable MLU. The longitudinal Italian data suggest that children from a Romance background with an MLU below 2.6 omit objects to a degree comparable to that of children from a Germanic background with an MLU between 2.6 and 3. Put differently, Romance children with an MLU of about 2.6 have learned that their language is not a generalized topic drop language: they use object drop at about 11% or less. German and Dutch children need more time to “get rid of” target-deviant object drop constructions as compared to the French and Italian children (both if one compares MLU values and ages). Target-deviant object drop decreases with age in children from all four language backgrounds, in particular with the lexical instantiation of the C-system: children with a lexically instantiated C-system omit objects to a much lesser extent in a target-deviant way than younger children who do not yet show lexical reflexes of the adult C-system.

How can we account for early child object drop and for the interaction between usage of target-deviant object drop and lack of constructions related to the C-system? We would like to follow Müller, Crysmann, and Kaiser (1996) and assume that a structure like (8b) or (9b) underlies the children’s

object drop constructions, in which PRO is adjoined to IP (for a detailed discussion of an analysis in terms of an IP-adjoined PRO cf. Müller et al., 1996).

- (8) a. *Ivar répare*  
“Ivar repairs it.”  
b.  $[_{IP} PRO_j [_{IP} Ivar répare t_j]]$  (object-drop)
- (9) a. *Verse*  
“I pour it in.”  
b.  $[_{IP} PRO_j [_{IP} PRO_i [_{IP} t_i Verse t_j]]]$  (multiple argument drop)

Moreover, we suggest that in the early stages of acquisition all children use a pragmatic strategy to license the empty element (PRO) via discourse (cf. Schaeffer, 1997 and Hoekstra and Hyams, 1998 for discourse-related mechanisms in other domains of early child grammar). Discourse licensing is part of the set of default representations which all speakers possess and, as such, is part of Minimal Default Grammar. The child’s task, during acquisition, is to find out what role discourse licensing plays in the specific target language.

In the Germanic and the Romance languages, the child sees evidence for object drop. In French and Italian, the constructions with an empty canonical object position as in (10) and the constructions in (4) may constitute evidence for the structure in (8b) and (9b).<sup>23</sup> In all construction types, the canonical object position is phonetically empty, as in (8b) and (9b). In addition, the construction with a fronted topicalized object in (10b) may support the analysis of an IP-adjoined empty topic.

- (10) a. *Il le voit [ec] / Lo vede [ec]*  
he it sees  
“He sees it.”  
b. *(Parce que) ça je sais [ec] / (Perché) questo so [ec]*  
(because) it I know  
“(Because) I know it.”

Note that researchers have made the observation that object clitics (in contrast to subject clitics in French) are acquired late in French and Italian and that they develop only gradually in some children (Clark, 1985; Friedemann, 1992; Guasti, 1993/94; Hamann, Rizzi, and Frauenfelder, 1994; Jakubowicz, Müller, Kang, Riemer, and Rigaut, 1996; Müller et al., 1996). This observation fits into the general picture of early child object drop. The Germanic languages present the child with ample evidence for

<sup>23</sup> Whereas the Romance child gets confusing evidence for the realization of objects, this is not the case for subjects, independently of the analysis of subject clitics, since subject clitics are canonical realizations of the subject position.



the validity of this discourse strategy also in the adult grammar. The structure in (8b) allows for multiple adjunction to IP (as in (9b)) and can account for multiple argument drop in child grammar. It becomes illicit once CP is fully integrated into child grammar since the PRO in IP-adjoined position would be governed by the higher C-head (Müller et al., 1996), the latter situation contradicting universal constraints (PRO being allowed in ungoverned contexts only). More generally, once CP is fully activated, the adjoined element is no longer accessible to an external discourse licenser (cf. Rizzi, 1992 for null subjects in early child language). To summarize, we would like to follow Müller et al. (1996) by assuming that the object omissions exhibited in early child speech are of the Chinese type (cf. Huang, 1984).

We have suggested above that licensing of dropped constituents via discourse is a universal (pragmatic) strategy during early stages of language acquisition. Although children from all four language backgrounds have evidence for the validity of this strategy in the adult grammar, the monolingual French and Italian children seem to converge earlier on the target system when contrasted with children from a Germanic background. We have observed that when French and Italian children use target-deviant constructions at 11% or less, German and Dutch children continue to use a high number of object omissions; omissions which correspond or do not correspond (the finite verb is not clause-initial or more than one argument is being dropped) to the target. Although, as we have argued, a French or Italian child receives input which may lead to the assumption that the universal discourse strategy is valid, there is also evidence that an empty object position is licensed by a (preverbal) object clitic. Although evidence for more than one analysis exists, one analysis based on Minimal Default Grammar and one based on a language-specific grammar, the monolingual French/Italian data are clearly different from the Germanic data. Object omissions are less frequent in monolingual French/Italian children during comparable MLU stages and ages. Monolingual French/Italian children converge quickly with the adult grammar. If our suggestions are plausible, the 11% of object omissions in French/Italian monolinguals do not reflect mere performance errors, but the (now) residual importance of an earlier stage of language acquisition which conformed to a greater extent with Minimal Default Grammar.<sup>24</sup> The Italian

data clearly show that monolingual children use object omissions at a higher rate during earlier stages. This observation is predicted once we assume that these omissions reflect Minimal Default Grammar (as Chinese as an adult language would for the grammatical phenomenon in question). What evidence could be used in favor of the view that 11% of object omissions are not due to performance? Tiedemann (1999) has observed that object omissions in Italian monolingual children observe certain restrictions. In Martina, one of the children studied by Guasti (1993/94) for object omissions, of the 43 omitted objects (during the whole period of investigation), 12 omissions concern the ditransitive verb *mettere* “put” and 9 the ditransitive *dare* “give”. Also, the monolingual Italian children of the elicited production task omitted objects more frequently with ditransitive than with transitive verbs. Jakubowicz (p.c.) made a similar observation for her monolingual French children (cf. also van der Velde, 1998 for lexical restrictions on object omissions in French children). Note that the children also realize the two objects with ditransitives. It is plausible that the 11% of object omissions are not performance errors.

What about the Dutch/German children? For the German children, we know that they stay longer in the stage during which they have access to Minimal Default Grammar. They also use target-deviant object drop twice as frequently as children from a Romance background with a comparable MLU/age. This difference can be explained by the Germanic adult system: Dutch and German are topic drop languages. The monolingual child is presented with ample evidence for the validity of (universal) discourse licensing in the adult grammar. With respect to German, we made the distinction between target-like and target-deviant object omissions. The question is whether the target-like omissions are describable in terms of the adult German topic drop system or whether they must be treated on a par with the target-deviant constructions (i.e. they reflect Minimal Default Grammar). Under the latter interpretation, the fact that half of all object omissions in German correspond to the target is a mere coincidence. The decision in favor of one of the interpretations is not straightforward. On the one hand, it would be favorable to analyze children’s target-like omissions in terms of adult German as involving topic drop. This would prevent us from disadvantaging the child during a stage where both target-like and target-deviant constructions occur. On the other hand, empirical evidence against an adult topic drop analysis comes from lexical topicalization of objects and topic drop of subjects. The first observation is that children acquiring a V2 language pass through a

<sup>24</sup> We cannot discuss the question here of whether there is a stage in language acquisition which fully conforms with Minimal Default Grammar or whether Minimal Default Grammar always competes with language-specific grammars.

stage characterized by the absence or only formulaic usage of OVS constructions (cf. Müller and Penner, 1996). This stage corresponds to the stage reported here during which object omissions are very frequent. If target-like object omissions (resulting in V1 constructions) are to be analyzed in terms of adult topic drop, the absence/formulaic usage of OVS would be surprising since one would have to ask why children do not use lexical object NPs in preverbal position. The next observation concerns the frequency with which group 1 children omit subjects.<sup>25</sup> Table 16 shows that group 2 children use fewer target-deviant object omissions but the absolute frequency of omissions remains rather constant as compared with group 1. With respect to subject omissions, it is the absolute frequency of omissions which changes dramatically, with group 1 children producing a high number of subject omissions (about 40%). If we assume that group 2 children's behavior mirrors (near-) adult German grammar, we must conclude that in adult German topic drop is rare with subjects.<sup>26</sup> The empirical observations from topic drop of subjects also lead to the conclusion that argument omissions in early German child grammar do not reflect adult German topic drop. We would like to suggest that, although German group 1 children clearly know that their language is different from French/Italian, they have not yet acquired knowledge that their language is a V2 topic drop language. Put differently, German children make a choice in favor of topic drop early in development, however, they still have to switch from "free" topic drop of the Chinese type to German V2 topic drop.

A further observation is that the monolingual children studied in the literature continue to use target-deviant object omissions for some time, despite evidence for a lexically instantiated C-system. Müller and Penner (1996) show that monolingual German and French children pass through a transitional stage in the acquisition of the target C-system during which the children gradually make productive use of the different types of subordinate clauses

<sup>25</sup> Another observation is that target-deviant omissions hardly ever concern subjects in group 1 children. The near absence of target-deviant subject omissions can be explained if one considers the observation that SVX is by far the most frequent word-order pattern used by these children, and omission of the subject results in a V1 construction which, at the surface level, corresponds to adult German, but does not necessarily have to be analyzed in terms of finite verb-movement to COMP (cf. Fritzenschaft et al., 1990; Müller and Penner, 1996). Consequently, the subject does not necessarily have the status of a topic and therefore is different from the fronted object.

<sup>26</sup> Erica Thrift (p.c.) also finds that in adult Dutch subjects cannot be easily topic-dropped, except in diary contexts, where it is possible in other languages as well.

Table 16. *Subject and object omissions in spontaneous interaction: German*

	Target-deviant		Total	
	subject	object	subject	object
Group 1	4.4%	24.3%	39.5%	45.9%
Group 2	1.2%	1.8%	8.6%	37.8%

(adjunct vs. complement clauses for example) and the different types of lexical complementizers (heads vs. non-heads for example). Put differently, for both grammatical phenomena researchers have not observed an abrupt change, but instead a gradual development.

The above discussion leads us to the theory of monolingual language acquisition recently advocated by Roeper (1999). He has defended the view that "monolingual" speakers are also "bilingual" in the sense that monolingual children "work with" different grammatical systems at particular points in language development (Fritzenschaft, Gawlitzek-Maiwald, Tracy and Winkler, 1990; Koster, 1993; Ferdinand, 1997). All researchers working on child data know the phenomenon, namely that children evidence a form of "bilingualism" when they appear to be between stages of language development. A "stage B child" may still use constructions characteristic of the previous stage A to a large extent. Consequently, crosslinguistic influence could be defined in terms of the influence of one (previous) grammar (stage A grammar) on a more advanced grammar (stage B grammar). This view of first language acquisition opens interesting perspectives for a parallel treatment of "monolingual" and bilingual first language development. We want to suggest that the monolingual children described in the literature show evidence of the activation of more than one grammar at one developmental stage. Thus, the children may use a lexically instantiated CP structure, not allowing adjunction of PRO to IP, and the structure in (8b) and (9b) at the same developmental stage.

### Object omissions in bilinguals

In what follows, we will present the results of three bilingual children, the German–French bilingual boy Ivar (Iv), the Dutch–French bilingual girl Anouk (An) and the German–Italian bilingual girl Carlotta (Ca). Since the three bilingual children investigated are similar with respect to object omissions, we will not present and discuss the data separately. We will confine ourselves to the presentation of the French and Italian data in all three children; space limita-

tions do not allow us to present the analysis of the Germanic language in the children.<sup>27</sup> Suffice it to say that the children behave similarly with respect to object omissions in German and Dutch as monolingual children: they frequently use object drop constructions and they exhibit the same types of erroneous object drop constructions. Furthermore, the decrease of target-deviant object omissions is also related to the increase of target-like constructions related to the C-system.

The first longitudinal study we have considered is discussed in Müller et al. (1996). The authors analyze a German–French bilingual boy – Ivar – from the DUFDE study (Deutsch Und Französisch – Doppelter Erstspracherwerb “German and French – Simultaneous First Language Acquisition”), conducted by J.-M. Meisel (Meisel, 1990b, 1994a). The second child is Anouk, a Dutch–French bilingual girl studied by Hulk (1997, 1999) and Hulk and van der Linden (1996). The third child is the German–Italian bilingual girl Carlotta from the research project Frühkindliche Zweisprachigkeit: Italienisch/Deutsch und Französisch/Deutsch im Vergleich (“Bilingualism in Early Childhood: comparing Italian/German and French/German”), conducted by N. Müller. All children have been raised bilingually from birth, following the principle “une personne–une langue” of Ronjat (1913). Furthermore, it is the mother who speaks the Romance language with the child and the father the Germanic language. The corpora were collected by making audio recordings in Anouk’s case and video recordings in Ivar’s and Carlotta’s cases. In Anouk’s case, the recordings were made every three weeks, starting at age 2;3,13, until the age of 3;10,7. Ivar was recorded from 1;5,24 until 5;10,8. Carlotta is still being recorded: the recordings started when she was 1;8,28; she is in her sixth year. For Anouk and Carlotta, the MLU is word-based,<sup>28</sup> while for Ivar, the MLU is morpheme-based (Schlyter, 1990b). Thus, Ivar cannot be compared with either the monolingual or with the other bilingual children solely based on MLU values.

All children pass through two major develop-

<sup>27</sup> Since our approach for the monolingual children would make it necessary to analyze the Germanic C-system of the bilingual children, i.e. the presentation of the development of V2 and the emergence of wh-questions and complementizers, we had to limit the presentation to the Romance languages. The CP development of the children has been presented at the 23rd and the 24th Boston University Conference on Language Development and at GALA 1999; cf. Müller and Hulk, 2000.

<sup>28</sup> Since this seems to be the standard way of measuring MLU for the majority of corpora, we decided to count words instead of morphemes for Anouk’s and Carlotta’s utterances. Anouk and Carlotta are thus comparable with the monolingual children presented in the previous sections.

Table 17. *The emergence of object clitics in Ivar (tokens) (Müller et al. 1996)\**

Age	MLU	me	te	le, la, les	lui, leur	nous, vous	se
2;4	1.29	0	0	0	0	0	0
2;5	2.93	0	0	0	0	0	0
2;6	3.58	0	0	0	0	0	0
2;7	3.51	0	0	0	0	0	0
2;8	3.96	0	0	0	0	0	0
2;9	4.55	0	0	0	0	0	13
2;10	4.90	0	0	0	0	0	0
2;11	4.90	0	0	0	0	0	2
3;0	6.79	1	2	1	0	0	3
3;1	5.47	0	4	4	0	1	2
3;2	6.01	1	2	8	0	0	5
3;3	6.64	0	0	12	0	0	0
3;4	6.81	0	1	16	0	0	2
3;5	5.37	0	0	7	0	0	1

\* The 13 tokens at 2;9 refer to 1 type, namely *ils se battent* “they each other beat” which is probably rote-learned. The 2 tokens at 2;11 refer to *ils se battent* and *elle se lève* “she herself gets up”. For an attempt to explain the early use of reflexives clitics cf. Crysmann and Müller, 2000.

mental phases: the first phase is characterized by a high number of target-deviant object omissions and the absence or infrequent usage of object clitics and constructions related to the C-system in the adult language. The second developmental phase sees the decrease of target-deviant object omissions and the increase of object clitics and C-related constructions. In Ivar, the first developmental phase lasts until the age of approximately 2;11/3;0; in Anouk until approximately 3;1 (MLU 3.3); and in Carlotta until approximately 2;4 (MLU 2.6). Due to space limitations, we are not able to show that all three children separate the languages during the period under investigation; this has been shown elsewhere (Meisel, 1990a, 1994b; Schlyter, 1990a; Müller, 1993, 1994, 1996; Hulk and van der Linden, 1996; Hulk, 1997, 1999; Köppe, 1997).

### *The first developmental phase*

During the first developmental phase, all children use object clitics infrequently (cf. Meisel, 1986; Kaiser, 1994 for Ivar’s data). Tables 17, 18, and 19 contain the absolute number of the different French and Italian object clitics.

Furthermore, object omissions are frequent in all children, as shown in Tables 20, 21, and 22. In this respect, the bilingual children differ considerably from the monolingual French and Italian children and resemble monolingual German and Dutch

Table 18. *The emergence of object clitics in Anouk (tokens)*

Period	MLU	absolute number of clitics
2;3,13–2;7,5	2	2
2;7,28–3;1,4	2.9	3
3;3,17–3;4,28	4.3	15
3;6,25–3;10,7	5	46

Table 19. *The emergence of object clitics in Carlotta (tokens)\**

Age	MLU	Mi	ti	lo, la, le, li	gli, le	ci, vi	si
1;10,30	1.13	0	0	0	0	0	0
2;2,4	2.17	0	0	0	0	0	0
2;2,19	2.24	0	0	2	0	0	0
2;3,2	2.63	0	0	5	0	0	0
2;3,17	2.53	0	0	0	0	0	1
2;4,7	2.56	0	0	0	0	0	3
2;4,21	2.62	3	0	2	0	0	1
2;6,9	2.6	0	0	6	0	0	0
2;6,23	2.84	1	0	5	0	0	5
2;7,13	2.43	0	1	9	0	0	0
2;9,11	2.43	0	0	7	0	0	0
2;9,25	3.26	1	0	19	0	0	1
2;10,16	3.92	1	0	13	0	0	0
2;10,30	3.73	2	1	7	0	0	1
2;11,13	4.04	0	0	2	0	0	0
2;11,27	4.38	0	0	6	0	0	0

\* The first non-reflexive clitics at 2;2,19 are used in the constructions *eccolo* ‘‘there it’’ and *eccoli* ‘‘there them’’. At 2;3,2, Carlotta uses the (probably) rote learned construction: *ce l’ha NP* ‘‘there is NP’’ three times. During the same recording, she uses the object clitic *la* in the constructions *pottala via io* (=portala via io) ‘‘takes-it away I’’ where the feminine form refers to a masculine noun and in *qua la siede qua* ‘‘there it sits/puts there’’ with the meaning ‘‘I put it there’’ where *la* also refers to a masculine noun (papà); these are the first productive uses of object clitics.

Table 20. *Object omissions (tokens) in obligatory contexts in Ivar’s French (Müller et al. 1996)*

Age	MLU	–OBJ	–OBJ (in %)
2;4	1.33	1	100
2;5	2.93	17	46
2;6	3.58	7	47
2;7	3.51	7	47
2;8	3.96	4	50
2;9	4.55	6	35
2;10	4.90	4	25
2;11	4.90	5	25
3;0	6.79	0	0
3;1	5.47	2	8
3;2	6.01	4	9
3;3	6.64	0	0
3;4	6.81	0	0
3;5	5.37	0	0

Table 21. *Object omissions (tokens) in obligatory contexts in Anouk’s French*

Age	MLU	–OBJ	–OBJ in %
2;4,17	2	4	40
2;4,18	2.13	2	100
2;4,23	2.97	4	40
2;5,20	2.5	4	33
2;6,11	2.5	5	55
2;7,5	1.21	3	33
2;7,28	2.21	11	31
2;8,22	2.35	15	47
2;9,17	3	1	100
2;11,13	3.65	6	32
2;11,27	3.47	4	13
3;1,4	3.31	9	23
3;3,17	4.69	13	13
3;3,21	4.05	9	18
3;3,25	3.72	5	18
3;3,27	4.32	5	18
3;3,28	3.54	1	25
3;4,28	5.16	24	20
3;6,25	4.91	22	23
3;7,9	4.13	3	7.5
3;7,29	5.63	9	12
3;8,18	4.44	3	29
3;9,1	5.63	7	18
3;10,7	5.53	10	25

Table 22. *Object omissions (tokens) in obligatory contexts in Carlotta’s Italian*

Age	MLU	–Obj.	–Obj. (in %)
1;10,30	1.13	4	100
2;2,4	2.17	1	13
2;2,19	2.24	4	40
2;3,2	2.63	3	21
2;3,17	2.53	4	44
2;4,7	2.56	4	40
2;4,21	2.62	0	0
2;6,9	2.6	1	9
2;6,23	2.84	2	11
2;7,13	2.43	4	24
2;9,11	2.43	3	13
2;9,25*	3.26	5	13
2;10,16	3.92	2	5
2;10,30	3.73	3	10
2;11,13	4.04	3	10
2;11,27	4.38	2	6

\* During the recording, we conducted the elicited production task presented in Jakubowicz et al., 1996.

children, if one compares MLU values and ages. Ivar omits obligatory objects with a mean percentage of 39.5%, Anouk with a mean percentage of 32.5%, and Carlotta with a mean percentage of 36.4%.

Some examples for object omissions are listed in (11).

- |  |   |
|--|---|
| <p>(11) a. <i>Ivar répare</i><br/>Ivar repairs<br/>“Ivar fixes it.” (Iv:2;4,9)</p> <p>b. <i>A pas trouvé</i><br/>has not found<br/>“Ivar did not find it.” (Iv:2;5,7)</p> <p>c. <i>Mami connaît pas</i><br/>Mummy knows not<br/>“Mummy doesn’t know it.” (An:2;6,11)</p> <p>d. <i>J’ai déjà raconté</i><br/>I have already told<br/>“I have already told it.” (An:3;1,4)</p> <p>e. <i>Prendiamo</i><br/>we-take<br/>“We take it.” (Ca:2;2,19)</p> <p>f. <i>Schiaccia io</i><br/>tramples-down I<br/>“I trample it down.” (Ca:2;3,17)</p> | <p>Iv: <i>Oui / remets ici</i><br/>yes put back here<br/>“Je la remets ici.” (Iv: 2;6,6)</p> <p>b. A: <i>Tu veux pas de yaourt ou de yaourt à la banane?</i><br/>“You don’t want to have a yoghurt or a banana yoghurt?”<br/>An: <i>Veux pas</i><br/>want not<br/>“I don’t want it.” (An:2;11,27)</p> <p>c. A: <i>Dov’è che manca la punta? Vediamo. Qua</i><br/>where is that misses the point? Look there<br/>“Where is it where the point is missing? Let’s have a look. There it is.”<br/>Ca: <i>No, io fa / No io</i><br/>no I makes / no I<br/>“No I make it.” (Ca:2;4,7)</p> |
|--|---|

The next important observation is that object omissions are not restricted to a small class of verb types, but instead occur with a great variety of transitive verbs in all children.

The children are able to use two arguments per clause, as shown in (12).

- |   |
|---|
| <p>(12) a. <i>On met une robe</i><br/>one puts on a dress (Iv:2;5,7)</p> <p>b. <i>Je veux sirop</i><br/>I want syrup (An:2;11,13)</p> <p>c. <i>Baby beve la bottiglia</i><br/>baby drinks the bottle (Ca:2;2,4)</p> |
|---|

Furthermore, the children both use and drop the obligatory object with the same verb (cf. in (13)).

- |  |
|--|
| <p>(13) a. <i>Non maman prend</i><br/>no Mummy takes (Iv:2;5,7)</p> <p>a'. <i>Il prend-eh prend ça ti, ti</i><br/>he takes it, the teddy (Iv:2;5,7)</p> <p>b. <i>Cherche</i><br/>look for (An:2;7,28)</p> <p>b'. <i>Je cherche petit nounours</i><br/>I look for small bear (An:2;7,28)</p> <p>c. <i>Prendiamo</i><br/>we-take (Ca:2;2,19)</p> <p>c'. <i>Prendiamo arancione</i><br/>we-take orange (Ca:2;4,7)</p> |
|--|

These observations indicate that a performance-oriented explanation of the data in the sense that length of the VP, for example, determines object drop in child grammar is not plausible.

Interestingly, the empty object represents the discourse topic in (14) (where A=Adult).

- |  |
|--|
| <p>(14) a. A: <i>Tu as enlevé la musique? (=l’horloge)</i><br/>You have taken off the music (=clock)<br/>“Did you take off the clock?”</p> |
|--|

All children exhibit multiple argument drop, as in (15). Note that the absence of subject pronouns which do not carry contrastive stress is predicted in Italian since adult Italian is a pro-drop language. Therefore, no Italian example is given in (15).

- |  |
|--|
| <p>(15) a. <i>Répare</i><br/>repair<br/>“I/Ivar repair(s) it.” (Iv:2;4,9)</p> <p>b. <i>Allume</i><br/>switch on<br/>“I switch it on.” (An:2;7,5)</p> |
|--|

The children’s speech exhibits productive use of lexically instantiated topicalization into a pre-S position (cf. (16)).

- |  |
|--|
| <p>(16) a. <i>Ça on met</i><br/>this one puts (Iv:2;5,7)</p> <p>b. <i>Un aut livre de Babar je connais</i><br/>an other book of Babar I know (An:2;11,13)</p> <p>c. <i>La scatolaio taglio (=toglio)</i><br/>the box I take-away (Ca:2;4,21)</p> |
|--|

During the first developmental phase, Ivar’s speech is characterized by the absence of root wh-question formation, target-like complementizers, relative pronouns, and embedded wh-questions (cf. table 23).

In Anouk and Carlotta,<sup>29</sup> constructions related to the C-system are infrequent during the first developmental phase as well (cf. Tables 24 and 25). Complementizers such as *quelche* “that” and *si/se* “if/whether” are completely absent in Anouk’s French and Carlotta’s Italian during the first phase.

<sup>29</sup> Some wh-words other than *dove* are already attested in root clauses before 2;4,21. Only from age 2;3,2 onwards, are verbs other than *essere* (namely the form *è* “is”) and *stare* “be located” (namely *sta* “is located”) used in wh-questions, like *andare* “go” and *fare* “make” at 2;3,2.

Table 23. *The emergence of wh-questions and complementizers in Ivar's French (Müller et al. 1996)*

Age	Où		other wh-words		complementizers
	Matrix	Subordinate	Matrix	Subordinate	
2;4	1	0	0	0	0
2;5	1	0	0	0	0
2;6	0	0	0	0	0
2;7	1	0	0	0	0
2;8	1	0	0	0	0
2;9	0	0	0	0	0
2;10	3	0	0	0	0
2;11	0	0	1	0	3
3;0	0	0	0	1	4
3;1	7	0	7	4	13
3;2	8	1	5	3	11
3;3	1	0	4	2	5
3;4	3	0	7	9	18
3;5	3	1	3	3	9

Table 24. *The emergence of wh-questions and complementizers in Anouk's French*

Age	Où		other wh-words		complementizers
	Matrix	Subordinate	Matrix	Subordinate	
2;4,17	0	0	0	0	0
2;4,18	0	0	0	0	0
2;4,23	0	0	0	0	0
2;5,20	0	0	0	0	0
2;6,11	0	0	0	0	0
2;7,5	0	0	0	0	0
2;7,28	5	0	0	0	0
2;8,22	1	0	3	0	0
2;9,17	0	0	2	0	0
2;11,13	1	0	4	1	0
2;11,27	2	0	3	9	0
3;1,4	2	3	9	2	1
3;3,17	0	0	5	2	8
3;3,21	1	0	4	4	1
3;3,25	0	0	7	1	5
3;3,27	0	0	7	0	3
3;3,28	1	0	2	0	2
3;4,28	0	0	7	5	15
3;6,25	0	0	13	8	8
3;7,9	0	0	4	3	9
3;7,29	0	0	9	10	12
3;8,18	0	0	6	0	6
3;9,1	1	0	2	10	7
3;10,7	0	0	2	7	20

### *The second developmental phase*

During the second developmental phase, the C-system is lexically integrated into child grammar. The lexical instantiation of the C-system in its target

Table 25. *The emergence of wh-questions and complementizers in Carlotta's Italian*

Age	Dove		other wh-words		complementizers
	Matrix	Subordinate	Matrix	Subordinate	
1;10,30	1	0	0	0	0
2;2,4	4	0	4	3*	0
2;2,19	2	0	1	0	0
2;3,2	2	0	2	0	0
2;3,17	13	0	1	0	0
2;4,7	0	0	3	0	0
2;4,21	2	0	5	1	0
2;6,9	9	1	2	7	0
2;6,23	3	0	2	7	0
2;7,13	0	0	0	0	0
2;9,11	0	0	2	5	0
2;9,25	1	0	1	5	0
2;10,16	0	0	1	7	2
2;10,30	1	0	0	2	2
2;11,13	0	0	3	7	6
2;11,27	0	0	0	4	5

\* The three tokens are the rote-learned relative clause *Luca che piangeva* "Luca who cried".

form is demonstrated by the presence of target-like wh-question formation with a variety of wh-words, productive use of relative markers, use of complementizers and wh-words which introduce embedded clauses. It is evident from tables 24 and 25 that the integration of the C-system is gradual in Anouk and Carlotta, i.e. it takes about eight months. For example, Anouk's first wh-words are *où* "where" at 2;7,28, *co* (=comment) "how" and [kesk] (=qu'est-ce que) "what" at 2;8,22, *quoi* "what" at 2;11,13, *qui* "who" at 2;11,27, *pourquoi* "why" at 3;1,4. The first embedded questions appear at 3;1,4, the first relative clauses at 3;3,17, and the first complementizers (*que* "that") as late as 3;3,17. In contrast, Ivar is a "faster" learner (cf. table 23).

Object clitics start to be used productively as well in this phase (cf. Tables 17, 18, and 19). Target-deviant object omissions decrease dramatically at the age of 3 in Ivar, as shown in table 20. In Anouk and Carlotta, object drop constructions are used less than during the first developmental stage, but they continue to be used once the CP in its adult form starts to be integrated. In other words, we have evidence for a rather long transitional stage in these children. Note, however, that the gradual decrease of target-deviant object omissions is parallel to the gradual increase of C-related constructions (cf. Tables 24 and 25) and object clitics in both children. In other words, those children who exhibit a rather long transitional phase for the disappearance of object

drop also show a gradual development in other grammatical domains, the usage of object clitics and constructions related to the C-system.

To summarize: the three bilinguals studied here evidence object drop in the Romance languages in a similar way as monolinguals (they use the same types of erroneous constructions) but to a much higher degree. Target-deviant object omissions decrease once the C-system is lexically integrated into child grammar, but they continue for a rather long period in two of the bilingual children. Such a long transitional stage has not been reported for monolingual children.<sup>30</sup> Thus, there is a sharp quantitative, but not a qualitative difference between bilingual and monolingual language development.

### Object drop in bilinguals: a grammatical analysis

We suggest a similar structure for French and Italian object omissions in bilingual children as in monolingual children, i.e. a structure where an empty operator is adjoined to IP, i.e. the structure in (8b) and (9b). The similarity in structure underlying object omissions accounts for the observation that the two types of acquisition do not differ with respect to the types of errors. As has been claimed for the monolinguals, the structure becomes illicit once the C-system is instantiated as required in the target-systems. Müller et al. (1996) argue that lexical instantiation of the C-system reflects the fact that there was a c-commanding head COMP in the children's representation at the second developmental phase, and, therefore, a PRO adjoined to IP, being governed, was no longer licensed. The approach predicts that a PRO in IP-adjoined topic position should be illicit once the C-system has been established. It does not imply that the topic position itself disappears. Indeed, we find evidence in all three bilingual children for its lexical instantiation: *Maintenant il travaille* "Now he works" (Iv:3;2,14). We have observed in the Romance language of all three bilingual children that target-deviant object omissions decrease once the C-related constructions are used, with a lexical (i.e. overt) representative in C or Spec of CP, thus corroborating the above prediction. Furthermore, we have observed in the Romance language of all the bilingual children that object clitics are used with low frequency or they are not used at all during the stage

which is characterized by a high frequency of illicit object omissions. This observation represents another parallel with the monolingual data and is expected within an approach of discourse licensing of empty topics. Note that for Carlotta and Anouk, some uses of (non-reflexive) object clitics are evidenced during the first stage. This observation is also corroborated by findings from monolingual French and Italian children. Analyzing the speech of two monolingual French children (Grégoire and Philippe), Friedemann (1992) finds that the acquisition of object clitics is a gradual process. The same observation is made by Guasti (1993/94) for three monolingual Italian children. Note that this is not excluded under our analysis: children might start to use object clitics well before they fully instantiate their C-systems. However, if they do not (as Ivar), the sudden unavailability of "free" object drop may aid them to acquire the full object clitic paradigm as object clitics (or object agreement morphology) are the only device left for licensing an empty object position.

### Quantitative differences

We have observed two types of quantitative differences between bilinguals and monolinguals.<sup>31</sup> First, all three bilingual children use object omissions to a much higher degree in their respective Romance languages as compared to monolinguals with a similar MLU/age. The frequency of object omissions in the Romance languages of the bilinguals corresponds to that found in the Germanic language of the monolinguals. Second, two of the bilingual children continue to use object omissions to a high degree during the stage when we have evidence of the gradual instantiation of the C-system in its target form. In other words, some bilingual children seem to pass through a rather long transitional stage before fully converging with the target-grammar.

The important question is why bilinguals evidence more illicit object omissions in French and Italian than monolingual children with a comparable MLU/age. Two hypotheses are plausible for the bilingual data: first, one might assume that French and Italian are directly influenced by the respective Germanic languages. If direct influence was at work in the case of bilingual children, how could we explain that monolingual children exhibit illicit object omissions as well? We could hypothesize that object omissions are mere performance errors in monolinguals. However, a rate of 11% for object omissions is "too much" to claim that they are performance errors. It

<sup>30</sup> Müller and Penner (1996) report on monolingual German and French children and observe transitional stages with a length between two weeks and two months. As one reviewer suggests, this statement has to be taken with caution since it is possible that as more and more monolingual children are observed longitudinally, more variation with respect to the length of the transitional stages may be evidenced.

<sup>31</sup> We did not use statistical methods to establish significance.

has been shown that object omissions present in the speech of monolingual children observe certain restrictions (cf. van der Velde, 1998; Tiedemann, 1999) and, at least for Italian monolinguals, we have observed that they make use of object drop more frequently during earlier stages of language development (Guasti, 1993/94). Therefore, we do not adopt the hypothesis of direct influence of one language on the other in the domain of grammar studied in the present paper. It is not our intention to exclude it in the general case.

The second hypothesis, favored here, assumes that the French and Italian of the bilingual children are indirectly influenced by the respective Germanic languages. If one assumes that licensing of dropped constituents via discourse is a universal (pragmatic) strategy during early stages of language acquisition, also available to bilinguals (cf. Meisel, 1990a for a similar view on subject omissions), adult German and Dutch present the child with substantial evidence for the validity of this discourse strategy. A child acquiring French or Italian, however, gets confusing input for this licensing strategy. On the one hand, adult French and Italian contain constructions in which the canonical object position is empty; this might give the child the idea that discourse licensing is also at work in adult language. On the other hand, the French/Italian data are clearly different from the Germanic data, since in most cases, the empty object position is licensed by a (preverbal) object clitic. Therefore, although adult French and Italian seem to contain evidence for more than one analysis from the child's perspective, the monolingual French/Italian child will soon abandon the discourse licensing strategy. For the bilingual child, however, the situation is somewhat different. The input the child gets from French/Italian may present little evidence in favor of a discourse licensing analysis. The Dutch/German input, however, contains a lot of positive evidence for such a strategy. If it is plausible, as suggested here, that a discourse licensing mechanism of empty arguments is part of Minimal Default Grammar, we may rephrase the bilingual situation in the following way: the bilingual child (as the monolingual child) has to abandon Minimal Default Grammar. However, the bilingual child has to do so for both language types.

### *Abandoning Minimal Default Grammar*

We have argued that there is a natural language fully converging with Minimal Default Grammar with respect to discourse licensing, namely Chinese. Müller et al. (1996) suggest a three-fold typology of adult topic drop constructions: first, the Chinese type

of “free” topic drop where an A'-binding PRO hinges upon being in an ungoverned position,<sup>32</sup> second, German topic drop, where, supposedly, a *pro* is positioned in the specifier of a “rich” C-system;<sup>33</sup> and, finally, the French type where *pro* arguments are licensed “in situ” through object clitics, which are analyzed in this approach as “strong” agreement markers (i.e. object clitics do not represent arguments). The authors had to leave open the question of how *pro* in adult German topic drop constructions may be identified, as in nearly all cases of topic drop there is no corresponding agreement morphology on the verb, the only exception being when the topic is the subject. They suspected that the ultimate solution to this puzzle lies in the peculiarities of the German C-system, since German is a V2 language. Although we have to leave this problem unresolved, it is clear that adult German is different from adult Chinese and thus from Minimal Default Grammar. Both language types, the Germanic and the Romance languages, present the child with evidence for discourse licensing as made available by Minimal Default Grammar, the Germanic languages to a much higher degree than the Romance languages. When we discussed the monolingual data, we observed that monolingual children have more problems abandoning Minimal Default Grammar for the Germanic languages than for the Romance languages. This was argued to be the case because adult German and Dutch are topic drop languages whereas French and Italian are not (in both languages, empty arguments are licensed by morphological devices/clitics, i.e. *not* via discourse in the general case). The data from the three bilingual children give the impression that they have difficulty giving up Minimal Default Grammar in the Romance languages as well. In other words, the topic drop character of adult German or Dutch has the effect that the bilingual child is not able to map the universal strategies onto language-specific rules as quickly as the monolinguals

<sup>32</sup> There are two possible explanations which have also been explored in the literature: first, it may be assumed that Chinese has no CP (cf. Fukui, 1986 for a similar proposal for Japanese). Second, C in these languages does not contain the inherent features  $\pm wh$  and  $\pm Q$ . In the latter case, the SpecCP would be ungoverned because there are no features to be shared, under Koopman and Sportiche's (1991) definition of head government.

<sup>33</sup> German (and Dutch) allows for topic drop in the specifier of CP whenever the finite verb is raised to C. Given that German has finiteness features in C, in addition to  $\pm wh$  and  $\pm Q$ , the empty operator option is blocked. Adjunction is not an option either, as it is generally believed that this is disallowed for German CPs. Thus, the only remaining option is *pro* in SpecCP which will be licensed and identified by the verb in C (cf. Platzack, 1983 and Haider, 1993 for the proposal that the German CP is indeed a merger of INFL and COMP).



do. S/he is confronted with a much wider range of language-specific syntactic possibilities and one of the possibilities seems to be compatible with a universal strategy. Put differently, we would like to argue for the existence of crosslinguistic influence which is induced by the mapping of universal principles onto language-specific principles, in particular of pragmatic principles onto syntactic principles. One could define such influence as *mapping induced influence*. In earlier publications we used the term “indirect” influence (Hulk, 1998a, b, 1999; Müller, Hulk, and Jakubowicz, 1999; Müller and Hulk, 2000) in order to distinguish this kind of crosslinguistic influence from transfer as direct crosslinguistic influence.

*Mapping induced influence* may also have the effect that the Germanic–Romance bilingual learner remains in a transitional stage for a longer time in the Romance languages as compared to monolinguals. In other words, Minimal Default Grammar competes with a language-specific grammar in the Romance languages of the bilinguals for a longer time than in monolinguals with a Romance background. Again, we would like to argue that this is due to the influence of the Germanic system, being a topic drop system, which resembles Minimal Default Grammar with respect to discourse licensing.

### *Internal vs. external bilingualism*

Following Roeper’s (1999) approach to universal bilingualism we would have to argue that the bilinguals, like the monolinguals, have to solve the problem of simultaneous access to multiple grammars, Minimal Default Grammar and language-specific grammar(s). In addition, they must cope with the fact that access to multiple grammars is found in both of the two languages to be acquired and that the languages may converge to different degrees with Minimal Default Grammar. In this light, it is conceivable that language separation and crosslinguistic influence are characteristics of the same developmental stage in a bilingual child. Yang (1999, 201) suggests that language acquisition within the UG framework may be stated in his variational learning framework (Yang, 2000). The “fitness” or appropriateness of a grammar is defined as the proportion of the input sentences with which it is compatible. When an input sentence is presented, the learner selects a grammar  $G$  with its associated probability  $P_G$ , and then performs grammatical analysis (e.g. parsing). The success (or failure) of  $G$  in analyzing the sentence increases (or decreases)  $P_G$ . We may rephrase these assumptions for the situation of our bilingual children: *mapping induced influence* occurs only in those domains of the grammar where the language learner

is confronted with positive evidence for more than one possible structural analysis in one language and the other language favors/reinforces one of the two (or more) analyses. Thus, one of the two languages (French/Italian) is treated as if responding as frequently as the other language (German/Dutch) to a particular stimulus, that is, a sentence with an empty object in the input for the present purpose. In addition to the monolingual children, who according to Roeper (1999) show evidence of a type of *internal bilingualism*, the bilingual children have to cope with a type of *external bilingualism*, i.e. sentences in the input may be inherently ambiguous or contradictory from the child’s perspective (allowing for an analysis both in terms of Minimal Default Grammar and a language-specific grammar), in one of the two languages and in both languages. However, the probability for either grammatical analysis (in terms of Minimal Default Grammar and a language-specific grammar) has to be determined for each language separately. It is plausible to assume that bilingual children are equipped with one grammatical performance system or with one system determining the probability  $P_G$  of an associated grammar  $G$ . In other words, the problem created by *external bilingualism* is to associate a 100% compatibility of a particular grammar / of particular grammars with all the input of a particular language, which may turn out to be difficult once there is a certain overlap of the two grammatical systems. This view presupposes that the bilingual child has separate grammatical systems, like the monolingual child. The weight of a grammar (as defined as the measure of confidence the learner associates with it) may be viewed as part of the speaker’s competence if a grammar of a particular language is not a homogeneous object but consists of several coexisting grammatical systems with different weights. In this sense, the mapping induced crosslinguistic influence, or what we have defined as indirect influence in previous work, is reflected in the child’s competence.

### *Vulnerability of the C-domain*

We have observed that crosslinguistic influence is evidenced during the stage when the C-system is not lexically instantiated in child grammar as required by the target-system. We would like to argue that mapping induced influence is evidenced during the period when the C-system is radically underspecified. Why would this be the case? We would like to argue with Platzack (1999) that the C-domain represents a vulnerable domain due to its interface character which connects internal grammar with other cognitive systems and different levels of grammatical

representation: pragmatic and syntactic information are exchanged at the C-level, e.g. in the case of topic drop. Although both language types, German/Dutch and Chinese, are topic drop languages, the availability of “free” topic drop differs. In contrast to Chinese, German and Dutch are not free topic drop languages in the sense that topic drop obeys syntactic restrictions (only the constituent in SpecCP may be dropped). The interaction between pragmatic and syntactic information seems to be particularly difficult for children. Hoekstra and Hyams (1998) have argued for a similar approach to the child’s early declarative matrix sentences containing an infinitival verb form (Root Infinitives). They suggest that Root Infinitives are unanchored structures in which the eventuality is not fixed through the grammatical mechanisms of syntactic binding of a variable by a syntactic operator. Rather, it is discursively interpreted in the manner of a free pronoun. Pronoun resolution depends on discourse and other contextual information. There is a tension between syntactic binding and pronoun resolution: once the situation arises in the adult system in which a reading obtained through syntactic binding is indistinguishable from a reading obtained through free pronoun resolution, the grammaticality determined interpretation takes precedence. In the child’s language, in contrast, the grammatical and the discourse-related mechanisms are available in the interpretation. In the present view, we may suggest that Minimal Default Grammar requires as little interaction as possible between different components of grammar and Minimal Default Grammar competes with a language-specific grammar when the child performs a grammatical analysis. Interestingly, two of the bilingual children showed evidence of a rather long transitional stage which we would like to interpret as a competition between the (fully) grammatical and the discourse-related mechanisms in developing grammar. If future research shows that our speculative assumption is correct, namely that bilingual children demonstrate a longer transitional stage than monolingual children, we will have another piece of evidence for the effect of delay created by the mapping problem in external bilingualism.

### *Language dominance*

We have argued that crosslinguistic influence is likely to be related to properties of the grammatical phenomenon involved. What about the role of language dominance? Does the dominant/preferred/stronger language influence the weaker language (cf. e.g. Döpke, 1992)? One criterion to determine the dominant or stronger language is MLU. If language

Table 26. *The MLU of Anouk in her two languages*

Age	MLU Dutch	MLU French
2;4,9	2.3	1.5
2;5,20	1.56	2.97
2;6,11	2.57	2.5
2;9,17	2.6	3
2;11,13	3.1	3.65
2;11,27	2.18	3.47
3;1,4	4.49	3.31
3;6,25	3.31	4.91
3;7,9	6.04	4.13
3;7,29	4.12	5.63
3;10,7	4.52	5.53

dominance were an explanation, we would expect that the respective Germanic language was the dominant language. This is not supported by the data in any of the children. Furthermore, we would not expect crosslinguistic influence to occur in both directions during the same developmental phase. This is, however, supported by the comparison of object drop phenomena (the Romance language is the target of influence) with finite verb placement in subordinate clauses (the Germanic language is the target of influence) (cf. e.g. Müller, 1998).

In Anouk, it is difficult to decide which language is dominant during the whole period of investigation (cf. Table 26). Her MLU is slightly higher in French than in Dutch.

In Ivar, German is the dominant language until 2;4. From 2;5 onwards, the relevant period for the present investigation, French may be said to be dominant: this is especially the case from age 3 onwards; cf. Schlyter (1990b) and Table 27. Furthermore, during the same period we may observe crosslinguistic influence in Ivar where German is influenced by French. Ivar uses correct word orders in his early (not lexically introduced) French subordinate clauses (Müller, 1993). In German, the finite verb does not surface, as required, in clause-final position (Müller, 1998), however.

As for Carlotta, if there is a dominant language at all during the period of investigation, it is the Romance language (cf. Table 28).

Interestingly, as in the case of Ivar, finite verb placement in her German subordinate clauses differs from adult German: during the period of investigation, she produces not a single subordinate clause with the finite verb in clause-final position. On a parallel with Ivar, Carlotta uses correct finite verb placement in her Italian subordinate clauses.

We may thus conclude that language dominance

Table 27. *The MLU of Ivar in his two languages*

Age	MLU German (base)*	MLU French (base)
1;10,12	1.12 (69)	1.13
1;11,17	1.41 (99)	1.31 (68)
2;0,2	1.68	—**
2;0,29	1.63	1.31
2;2,7	1.71	1.47
2;3,5	1.80	1.35
2;4,9	1.83	1.29
2;5,7	2.76	2.93
2;6,6	3.03	3.58
2;7,17	3.35	3.51
2;8,15	3.52	3.96
2;9,18	3.82	4.55
2;10,24	4.29	4.90
2;11,21	4.77	4.90
3;1,3	4.55	5.47
3;2,14	3.90	6.01
3;4,23	5.68	6.67

\* The base is indicated if below 100.

\*\* The base is insufficient.

Table 28. *The MLU of Carlotta in her two languages*

Age	MLU German (base)	MLU Italian (base)
1;10,30	1.34 (92)	1.13
2;2,4	1.75 (40)	2.17
2;2,19	1.68 (80)	2.24
2;3,2	2.38	2.63
2;3,17	2.04	2.53
2;4,7	2.27	2.56
2;4,21	2.51	2.62
2;6,9	2.7	2.6 (83)
2;6,23	2.81	2.84
2;7,13	2.44	2.43
2;9,11	2.63	2.43
2;9,25	3.11	3.26
2;10,16	3.58	3.92
2;10,30	2.52 (94)	3.73
2;11,13	3.91	4.04
2;11,27	3.81	4.38

cannot explain the crosslinguistic influence observed with respect to object omissions. We believe that our approach, in terms of properties of the grammatical phenomenon in question, is strengthened by this result. Our approach makes a testable prediction: if language dominance does not determine crosslinguistic influences, but rather properties of the grammatical phenomenon, then a bilingual child acquiring French or Italian and English (the latter not being a topic drop language) should not evidence

more object omissions in the Romance language when compared to monolinguals. Johanne Paradis (p.c.) suggests that our prediction turns out to be correct in the English–French bilingual children she studied.

### Summary of the results

In the present paper, we have argued that there is crosslinguistic syntactic influence in bilingual children which cannot be explained by language dominance or by the children's inability to separate the two languages. As for the question of when and where to expect crosslinguistic influence, we have argued that it is the grammatical phenomenon which plays an important role in determining when and where influences occur. Once language A allows for more than one grammatical analysis from the child's perspective and language B contains positive evidence for one of those possible analyses, language A is likely to be influenced by language B. We have further argued that crosslinguistic syntactic influence is evidenced during a stage where the C-domain is radically underspecified: the C-domain is particularly "vulnerable" since it represents an interface level which connects internal grammar with other cognitive systems and it connects different levels of grammatical representation: pragmatic and syntactic information are exchanged at the C-level.

In the present case of object drop, the effect of crosslinguistic influence was delay. Crosslinguistic influence may also have a positive effect on language development in the bilingual child: since bilinguals are confronted with more possibilities, development may be quickened in domains difficult for monolinguals (cf. e.g. finite verb placement in German root clauses, cf. Meisel, 1986).

We did not discuss the individual component, which is important when comparing longitudinal case studies of children (cf. e.g. Fritzenschaft et al., 1990). We have observed that Anouk and Carlotta exhibited a long transitional stage in the acquisition of licensing of empty objects. Currently, we have no explanation for the differences or for how individual differences may be explained in the framework of UG.

In the present study, we have analyzed longitudinal studies of bilingual children. These studies have the advantage that they may contribute to our understanding of the developmental path children take when they acquire two languages from birth. They have the disadvantage that one cannot study large populations. The study of more bilingual children, also from different language backgrounds, is necessary to verify our claims.

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## PEER COMMENTARIES

**The importance of discourse-pragmatics in acquisition**

SHANLEY ALLEN

*School of Education, Boston University, 605 Commonwealth Avenue, Boston, MA 02215, USA*

E-mail: shanley@bu.edu

In their keynote article, Müller and Hulk provide valuable evidence bearing on a question of central importance in the field of bilingual acquisition. Contrary to previous claims in the literature (e.g. Paradis and Genesee, 1996), they suggest that the two languages of a bilingual learner can and do influence each other in the course of acquisition, provided the right circumstances obtain. Though the logic of argumentation is somewhat complex, Müller and Hulk present it very clearly and illustrate it well with the situation of Germanic–Romance bilingual children learning about omission of objects. This article raises many very interesting issues which all would be great starting points for further discussion and research. However, I will limit my comments here to two issues which touch on pragmatics. First, I will address the first of Müller and Hulk's conditions for crosslinguistic influence in bilingual acquisition – that the structure in question must involve the interface between syntax and pragmatics. Second, I will raise some questions about children's use of pragmatic knowledge in argument omission, and elaborate this with reference to my own and related research.

Müller and Hulk claim that the C-domain is particularly vulnerable for both the monolingual and bilingual learner since it is here that children must interface between syntax and other cognitive systems, especially pragmatics. For the monolingual learner, structures which exist at this interface are particularly difficult to learn, and for the bilingual learner, such structures are susceptible to crosslinguistic influence. This claim is not new for research on monolingual children, as Müller and Hulk note. In fact, it has become rather epidemic in the field to reanalyze what once were considered paradigm examples of acquisition of pure syntax as situations in which pragmatics has a major influence in the acquisition process. Some examples of this include null subject and object (e.g. Schaeffer, 2000), root infinitives (e.g. Hoekstra and Hyams, 1997), and principle B (e.g. Chien and Wexler, 1990). While I find it very intriguing that the syntax–pragmatics interface poses special problems for learners, and while I do indeed think that discourse-pragmatics plays a large part in language acquisition, I think that there are a number of difficulties with raising the interface claim to the level that Müller and Hulk do.

In order to make very clear that the *interface* between syntax and pragmatics in the C-domain is the relevant factor that causes particular problems or allows for crosslinguistic influence, Müller and Hulk would need to control for several other possible explanations. Most obviously, they would need examples of structures which they believe are *not* at the syntax–pragmatics interface (either syntax

alone or pragmatics alone), and therefore structures which they predict should not be vulnerable to special learning difficulties for monolinguals, or to crosslinguistic influence for bilinguals. Without such evidence, the relevance of the syntax–pragmatics interface seems convenient rather than strongly motivated, and it is not clear that Müller and Hulk are saying anything more than that both syntax and pragmatics are relevant for acquisition, or that it takes more time to master more complicated structures, which is certainly not news.

A second control of the interface hypothesis would address the issue of causality vs. correlation. Müller and Hulk show that the onset of the C-system, as indicated by the appearance of such structures as complementizers, verb second (V2) in Germanic, and topicalization, closely co-occurs in time with a decrease in target-deviant object omission (leaving aside some individual differences and variations from the standard pattern). However, co-occurrence does not necessarily mean causality, especially in this situation since numerous changes in the grammatical system occur right around MLU 2.6. The argument that the onset of the C-system *causes* a reanalysis of the mechanics of object realization from a universal pragmatic analysis to a language-specific syntactic analysis would be much more convincing if one were able to show that other changes at that time were not related to this reanalysis.

In the same vein, the importance of the interface would be supported by extending this analysis to other phenomena which have relevance for both syntax and pragmatics. An obvious candidate is subject drop, which also meets both of Müller and Hulk's criteria. Subject omission clearly involves both syntactic and pragmatic issues, and Minimal Default Grammar allows subject omission (see Müller and Hulk's (9)). Languages like Italian allow subject omission in the adult target. In languages like German, which typically do not allow subject omission, some evidence in the form of omitted subjects in imperatives and root infinitives is nonetheless available (Lasser, 1997), and could possibly mislead the child in his/her reanalysis from the pragmatics-based Minimal Default Grammar to the language-specific syntactic requirements at the onset of the C-system. It would be particularly interesting for Müller and Hulk to analyze subject and object drop simultaneously in German–Italian bilingual children, since their hypothesis would predict that the same child would be slower than monolinguals in learning about object drop in Italian and subject drop in German, while keeping pace with monolinguals in object drop in German and subject drop in Italian.

In summary, while I find Müller and Hulk's ideas about

the relevance of the interface between syntax and pragmatics in the C-domain interesting, I would prefer to have more evidence of the type noted above before allowing myself to be convinced by their arguments. Note, however, that these concerns are relevant for the field as a whole and not just for Müller and Hulk.

In the rest of my commentary, I turn to the question of pragmatics and how relevant it is to Germanic–Romance bilingual children’s difficulties with object drop. In fact, Müller and Hulk spend almost no time in the article discussing the pragmatic factors that play a part in the child’s decision to drop an object. This is not unique to Müller and Hulk; rather, it is typical of much of the work noted in the second paragraph above. However, lack of information about which pragmatic factors are relevant makes it difficult for the reader to understand how pragmatics plays any part at all in acquisition of the structures at hand, and therefore how anything more than a change in understanding of syntactic constraints is important to the children’s skill with object drop.

Müller and Hulk’s appeal to pragmatics is summarized in a quotation following their example (9): “we suggest that in the early stages of acquisition all children use a pragmatic strategy to license the empty element (PRO) via discourse . . . Discourse licensing is part of the set of default representations which all speakers possess and, as such is part of Minimal Default Grammar. The child’s task, during acquisition, is to find out what role discourse licensing plays in the specific target language.” They later show several examples in which “the empty object represents the discourse topic”. I repeat one of these examples (example (14a); repeated as (1) below) here for convenience, taken from Ivar at 2;6.6:

- (1) A: tu as enlevé la musique? (= l’horloge)  
 you have taken off the music (= clock)  
 “Did you take off the clock?”  
 Iv: oui remets ici  
 yes put back here  
 “Yes, (I) put (it) back here.”

In this example, the object (the clock) was explicitly mentioned in the adult utterance immediately preceding the child’s utterance, and can thus be considered a topic for the child because it has now become salient in the minds of both speech act participants. An NP under such conditions is typically “reduced”: it is no longer realized in speech as a full NP, but rather as a pronoun or as a null element, depending on language-specific requirements. Minimal Default Grammar, like Chinese, allows realization of such an argument as a null element; French rather requires an overt pronoun.

The logic of realizing already-salient referents as pronouns or null elements is fairly clear. However, determining what is “already salient” is rather complex and involves the interaction of several different discourse-pragmatic factors. Unfortunately, Müller and Hulk don’t offer any detailed discussion of this, including how a child might come to understand what these factors are and how they affect argument realization. Müller and Hulk’s figures show that even at the youngest ages children aren’t

omitting 100 percent of their arguments, which one might expect if they were applying Minimal Default Grammar indiscriminately. How do children know from the beginning which objects they can omit in accordance with discourse-pragmatic principles, and which they cannot? In other words, where is the pragmatics in the syntax–pragmatics interface hypothesis?

Recent work on language acquisition from a functionalist perspective has focused on determining just exactly what the discourse-pragmatic factors determining argument omission are. Greenfield and Smith’s (1976) “principle of informativeness” is usually cited as the starting point for this discussion – the idea that children tend to encode those aspects of the event that are most informative to the listener, and fail to encode those aspects of the event that can be taken for granted. Many authors in both functionalist and formalist traditions have concretized the notion of “informativeness” using the new–given distinction. Clancy (1997) has further developed this idea, including newness as well as three other features characterizing “informativeness” (absence, contrast, query), and person and animacy. She shows that two Korean children aged 1;8–2;10 omit arguments in their spontaneous speech much more frequently when the referent is first or second person, animate, and/or not “informative” (i.e. the referent has just been mentioned in discourse, is present in the physical context surrounding the interaction, is not explicitly contrasted with another similar referent, and is not being questioned). I have found similar results using logistic regression with spontaneous speech data from four Inuktitut-speaking children aged 2;0–3;6 (Allen, 2000a). My subsequent work shows that in addition to pragmatic factors alone, the interaction between factors is also relevant (Allen, 2000b). I considered four factors – newness, contrast, absence, and differentiation in context (i.e. two potential referents for the same argument are present in the physical context) – and found that an argument representing a referent which is not “informative” for any of these factors was omitted in the children’s speech in 81.8 percent of cases. By comparison, arguments representing referents which were “informative” for only one of the factors (e.g. absent from the physical context but already mentioned in discourse and not explicitly contrasted) were omitted in 71.3% of cases, for two of the factors in 43.5% of cases, and for all of the factors in only 13.8% of cases. This indicates that children are indeed highly sensitive to various discourse-pragmatic factors in the discourse, and adjust their speech accordingly. My data is unfortunately not well suited to analyzing developmental trends since each child is only followed for nine months. However, this method of analysis would be quite illuminating in determining what factors are relevant for children at various stages of development, in determining what a topic is and which arguments may be omitted.

Given this background, it is not clear from Müller and Hulk’s work that pragmatics has to do with the Germanic–Romance children’s difficulties with object drop in anything but a superficial way. In fact, all the examples that Müller and Hulk give of target-deviant object drop are ones in which the pragmatics seems correct but the syntax



is wrong. In all 20 examples in which the object is incorrectly omitted, the object is translated in English as “it”, suggesting that these are indeed pragmatically appropriate contexts for reduced arguments. In the three examples where the discourse context is given (i.e. (14)), the object is always mentioned explicitly in the immediately preceding utterance, which is a classic pragmatic condition permitting reduced arguments. By contrast, in the six examples of non-dropped objects (i.e. (12) and (13a',b',c')), the object is always a full NP which suggests that the object is not in a pragmatically appropriate context for reduced arguments. Thus, it appears that the problem is always with the syntax. In the four monolingual Germanic examples, object drop is target-deviant because the verb is not in initial position (2a,3a) or because the subject is omitted as well as the object (2b,3b); presumably object omission by itself is perfectly fine. In the 16 monolingual and bilingual Romance examples, object drop is target-deviant because reduced arguments can only appear as pronouns in French. It is not apparent to me that any notion of syntax–pragmatics interface is relevant here, or that pragmatics itself is relevant in any interesting way. More attention to the pragmatics at the syntax–pragmatics interface would be most welcome.

In conclusion, I believe that Müller and Hulk have raised some very interesting questions for the relationship between syntax and pragmatics in language acquisition, whether monolingual or bilingual. I hope to have shown

that more concrete investigation in the area of pragmatics would be one fruitful approach in pursuing these questions further.

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## Individual rather than group differences?

MARGARET DEUCHAR

*Department of Linguistics, University of Wales, Bangor, Gwynedd LL57 2DG, UK*

**E-mail:** m.deuchar@bangor.ac.uk

Müller and Hulk have produced an intriguing analysis of why developing bilinguals acquiring a Germanic and a Romance language might behave differently with respect to object deletion in their Romance language when compared with Romance monolinguals. The idea that crosslinguistic influence from the Germanic language input might lead to delay in the adult-like production of the Romance language seems entirely plausible, and merits further exploration in future research. However, I shall argue that until more research dedicated to this question has been conducted, it is premature to conclude that a quantitative difference between bilinguals and monolinguals has actually been established.

The bilingual data analysed by Müller and Hulk are from longitudinal studies of three children. We are presented with detailed information (Tables 20, 21, and 22) about the children's ages and MLU, and the number and percentage of object deletion at intervals over a period of one to one-and-a-half years. However, the monolingual data available to them for comparison are mostly from non-longitudinal studies collected using different methods, and providing cross-sectional group percentage scores which mask any variation between or within individual children, as well as raw scores.

Given the lack of suitable comparable monolingual data, it is clear that Müller and Hulk are attempting to do their best with what is available, and they rightly emphasize the importance of matching MLU or age in comparisons to be made. But I shall suggest that if we take this advice seriously, the evidence for group differences between the bilinguals and monolinguals is inconclusive. I shall focus specifically on the empirical claim that "the bilingual children differ considerably from the monolingual French and Italian children and resemble monolingual German and Dutch children, if one compares MLU values and ages". Where possible, I shall compare data from children with similar ranges of MLU rather than age, since MLU has been established as a more reliable predictor of stage of development.

To begin with the French data from the bilingual data of Ivar (Table 20), the range from MLU 3.58–4.90 would arguably match reasonably well the Jakubowicz, Müller, Riemer, and Rigaut (1997) group 2 data from monolingual French children (Table 6) where the MLU range is 3.22–4.95. During the period selected, Ivar's average monthly object deletion was 38.16% (or 36.26% overall, taking into account the raw figures for the selected period as a whole). This is considerably more than the figure given for Jakubowicz et al. Group 2, 4.2% (Table 8). The figure of 4.2% is of course a group average, with no indication of range, whereas we know from Table 20 that the range for Ivar was 25–50% over this period. But the average figures for Ivar

and the monolinguals are certainly very different, providing an initial indication of support for the claim being tested.

If we now look at a comparable MLU range for one of the other bilinguals, Anouk (3.31–5.16, Table 21), we find that the average object deletion in her French over this period was 18.5% (or 17.5% overall). This figure is still considerably more than Jakubowicz et al's average of 4.2%, but considerably less than Ivar's figure of 38.16%. This raises the question of how homogeneous the bilinguals as a group will turn out to be. If we then set out to compare Ivar's data with that of Carlotta, the third bilingual, the most compatible MLU ranges to compare are 2.93–4.55 for Ivar (Table 20) to be compared with 2.84–4.38 for Carlotta (Table 22). For Ivar over this period the figure for object deletion is 45% on average and 44.57% overall. For Carlotta, however, it is 11.5% on average, or 10.48% overall. The ranges are 25–50% for Ivar and 6–24% for Carlotta, which are non-overlapping, suggesting yet again that the bilinguals may not be a homogeneous group.

In comparing Carlotta's data with that of the monolinguals, it is fortunate that there are some longitudinal data from two Italian monolinguals with roughly matching ranges of MLU. Thus we can compare Carlotta MLU 3.26–3.92 (Table 23) with Victor 3.18–3.93 and Chloé 3.15–3.90 (Table 9). Carlotta's average object deletion during this period is 9% or 8.97% overall, while Victor's average object deletion is 11.96%, and Chloé's is 5.7%. These figures suggest that the bilingual Carlotta has a similar percentage of object deletion to the two monolinguals, while we have already seen that she differs considerably from her fellow bilingual Ivar.

So on the basis of the comparisons we have been able to make so far of Romance data from the bilinguals and from monolinguals, we can say that Ivar's degree of object deletion in French certainly looks greater than that of the group of French monolinguals with a comparable range of MLUs studied by Jakubowicz et al. However, when French data from the bilingual Anouk are compared both with Ivar's and the same monolingual data, it falls somewhere in between. When Ivar's data are then compared with data from the third bilingual, Carlotta over a similar range of MLUs, we find that her data are much more similar quantitatively to that of two monolinguals than to Ivar's. So rather than the bilinguals differing quantitatively from the monolinguals in the Romance data, it looks as though there may be considerable individual differences between all the children, whether bilingual or monolingual.

Let us now consider the second part of the claim mentioned above, that the Romance data from the bilinguals resemble monolingual German and Dutch data in the extent of object deletion which they exhibit. We shall

compare the same MLU range of Ivar's data (3.58–4.90) with the Jakubowicz et al. group 2 German monolingual data as we did with the French group 2 data. The MLU range of the German data is 3.33–4.7 (Table 1). The figure of 38.16% average object deletion for Ivar's Romance data can be compared with the very similar figure of 37.8% average object deletion by the monolinguals (Table 4), and contrasted with the figure of 1.8% for target-deviant object deletion. This suggests that almost all of the monolingual Germans' object deletion was of the kind allowed in adult German, e.g. where the object is the topic. To fully compare Ivar's French data with that of the monolingual Germans, it would have been interesting to know what proportion of the objects deleted were topics, involving deletion which would have been allowed in adult German, but not in adult French. It would also have been interesting to compare these figures with object deletion in Ivar's German. Müller and Hulk assume that this patterns in the same way as in the monolingual data, but this is an empirical question.

Nevertheless, the figures we have suggest that Ivar's object deletion in French is similar to that of the German monolinguals. However, this is not the case with Anouk, if we compare the same MLU range (3.31–6.16; Table 21) as was used in comparing her data with that of the French monolinguals. Anouk's figure of about 18% object deletion over this period is considerably less than the figure of 37.8% for the German monolinguals. Thus while Ivar's data appear similar to that of the German monolinguals and different from that of the French monolinguals, Anouk's data appear different from both.

If we now take into account the third bilingual, Carlotta, we see (Table 22) that she has no MLU range which compares well with any of the Jakubowicz et al. monolingual groups. Her age range corresponds partially with that of the Dutch monolingual Hein studied by Kraemer (1995) (Table 5), although there is no MLU information for Hein. In the absence of this we might venture to compare ages 2;4,7–2;10,30 for Carlotta with ages 2;4–2;11 for Hein. Hein's average object deletion during this period is 31.5%, whereas Carlotta shows 13.89% average object deletion over a comparable age range, or 12.83% overall. These figures do not look at all similar, although a comparison of this kind based on ages rather than MLU must be interpreted with extreme caution. However, combined with the other figures obtained from comparing the Romance data of the bilinguals with the Germanic data of the monolin-

guals, we again have a picture of considerable variation between individuals.

In the preceding discussion, it has been possible to establish neither that bilinguals differ from monolinguals in their use of deletion, nor that they are similar. The pattern which emerges instead is one of individual variation. However, one reason for our inconclusive results may be that we have been trying to compare data that are not really comparable. We have tried rashly to compare cross-sectional group data with individual longitudinal data, we have not always had comparable MLU information, and the data have been collected by various people using various methods.

Nevertheless, Müller and Hulk have set us the worthwhile goal of investigating the possibility of crosslinguistic influence with regard to object deletion in the input to bilingual compared with monolingual children, and they have provided an interesting analysis of this possible influence. What we now need is a "purpose-built" study to test their hypotheses, with longitudinal data collected in the same way from bilinguals and monolinguals over similar periods at similar intervals. In the case of the bilingual data collection, the language mode would have to be monolingual (cf. Grosjean, 1998; Müller, 1998, 190) to make genuine comparison possible. Not only would production in one of the bilinguals' languages and that of monolinguals be compared as in the present study, but the bilinguals' productions in each language would be compared with one another. It would also be desirable to collect and analyse the input data, to examine to what extent each child is exposed to topic-deletion constructions, and how this might be reflected in the child's output.

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## On the complementarity between UG and other language acquisition models

SUSANNE DÖPKE

*Department of Linguistics, PO Box 11A, Monash University, VIC 3800, Australia*

**E-mail:** susanne.dopke@arts.monash.edu.au

Müller and Hulk followed the development of object drop in three Romance–Germanic bilingual children. They found that target-deviant structures of these bilingual children were qualitatively the same as in monolingual children of similar development stages, but that quantitatively they were more pervasive and persisted for longer. The authors propose that this difference between monolingual and bilingual children in the development of Romance languages is due to topic drop being a licensed structure in the language-specific grammars of the bilingual children's Germanic languages. They argue that discourse licensing of empty objects is available to all young children through the Minimal Default Grammar (MDG) prior to the setting of language-specific parameters. In their view the bilingual Romance–Germanic child lets go of this strategy more slowly than the monolingual Romance child does because of the sustained evidence for topic drop in the Germanic part of the bilingual's input.

Overall, this is a promising development in the discussion of the cognitive realities of simultaneously bilingual children. It is pleasing that the field is increasingly moving beyond the preoccupation with showing that bilingual language acquisition is either qualitatively different to monolingual acquisition or that 2L1 equals 2xL1. Instead this new approach looks at the effects which the 2L1 situation has on the path of language acquisition and what it can tell us about the mechanisms involved in the process of language acquisition. This shift in perspective has the potential to enlighten our understanding of language development not only in bilingual contexts but in monolingual contexts as well.

However, as progressive as Müller and Hulk's approach may be, their explanation for the difficulties that the bilingual Romance–Germanic children seem to have in leaving MDG behind and identifying that their Romance language is not a topic drop language, does not tell the full story yet. The authors' explanation is largely limited to the following:

“The topic drop character of adult German/Dutch has the effect that the bilingual child is not able to map the universal strategies onto language-specific rules as quickly as the monolinguals do. S/he [i.e. the bilingual child, SD] is confronted with a much wider range of language-specific syntactic possibilities and one of the possibilities seems to be compatible with a universal strategy . . . Crosslinguistic influence . . . is induced by the mapping of universal principles onto language-specific principles.”

Müller and Hulk predict that crosslinguistic effects are particular to the transition from MDG to language-specific grammar. Moreover, they suggest that the pragmatic nature of the universal principles of the MDG predicts that

crosslinguistic influences are a feature of the CP-level because of its interface character between discourse and grammar.

I see two problems with this explanation. Firstly, the reasons for the proposed difficulty are not made explicit. The authors are silent about *how* the mapping works and *how* it is different for monolingual and bilingual children. I believe that such explanations can be gleaned from other acquisition models, in particular cognitive functional approaches. Secondly, my own data indicate that structural overlaps between languages can lead to variation in the acquisition paths at any level of the structural hierarchy.

The suggestion that the formulation of principles of UG and the parametric variation between languages does not provide a sufficient level of explanation for how the child moves from the default options of UG to the specific language she is learning has been made at times by generativists themselves. Such comments point towards the need for considering the possibility that general cognitive capacities act as an interface between genetically determined UG operations and language-specific input. Thus Meisel (1990, 12) wrote: “Although UG does indeed, according to our hypothesis, function as a ‘language acquisition device’ (LAD), as it used to be called, one cannot hope to explain the patterns of language development unless various mechanisms of language processing and discovery procedures are also taken into account.” In a similar vein, Tracy (1995, 8) argued that “a more comprehensive picture of information processing and cognitive structure building is called for and indispensable for a better understanding of the way in which UG interacts with and depends on other cognitive faculties”. Although not intended by these authors, their views suggest that theories which are typically considered opposing and incompatible complement each other. One such theory is the Competition Model developed by Bates and MacWhinney (1989). The Competition Model has the potential to flesh out the quality of the general cognitive strategies which the child needs to draw on in order to make the leap from the MDG to the language-specific structures of the target language. (For an elaboration of my view of the Competition Model within the 2L1 context see Döpke, 2000, 210f., 222f.)

There are obvious parallels between claims of the Competition Model and learning theoretical conceptualisations within the UG framework. For instance, Roeper (1996) presented monolingual data where the same form is realised twice in an utterance, once in the base position and once in the moved position.

- (1) I did broke it (Roeper, 1996)  
 (2) I hurt my finger that Thomas stepped on it (Roeper, 1996)

Roeper proposed that this phenomenon is due to a degree of fluidity between grammatical default options and language-specific target structures. In terms of the Competition Model this fluidity is due to the two forms competing for structural functions. These two views are complementary. The Competition Model provides an explanation for the fluidity.

The positions held by Tracy (1995) and Hoekstra and Jordens (1994) sound curiously compatible with the Competition Model as well. Both consider saliency to play an important role in the acquisition of new structures. This can well be described in terms of cue strength based on availability, reliability, and saliency as proposed by the Competition Model. The advantage of the more detailed concept of cue strength is that it can explain *why* some cues are stronger than others and therefore adjoined or projected first. In fact, Tracy (1995) uses very similar terminology to the proponents of the Competition Model. She talks of “system internal conflicts” and “competing analyses” (p. 147) and of “matching” and “merging” (p. 184), and puts language mixing down to “on-line competition” between the languages (p. 482).

If structural cues are processed across languages, as proposed by MacWhinney (1997), then crosslanguage similarities should enhance the structural patterns which are alike in two languages. This might result in some structural templates being unduly strengthened. Such was obviously the case in my own bilingual data where the co-occurrence of SVO in German and English strengthened the VO pattern in the bilingual children’s German and at the same time weakened the German OV pattern. As a result, the children seriously overused VO in German (Döpke, 1998, 2000). A similar thing appears to have happened in the French of French–Dutch subjects reported by Hulk (1997). The Dutch SOV pattern strengthened French preverbal object clitics to the point that general OV became a possibility in the children’s French as well. The extended use of object drop in the Romance–Germanic children studied by Müller and Hulk could possibly be conceptualised in these terms as well.

In the psychological literature on first language acquisition, researchers have traditionally looked at correlations between adult input and child output. Their findings provide empirical evidence for the theoretical claims regarding the building of constructional schemata and the learners’ orientation on templates (Langacker, 1987; Bates and MacWhinney, 1989). Rowland and Pine (2000) suggest that young children recognise the distribution of structures in the input, but lack the hierarchical understanding of grammar. Similarly, Tomasello (2000) reviews a range of experimental studies all of which show that there is little evidence of abstract syntactic knowledge among children under the age of 3;0. Instead schematic entrenchment appears to be the best predictor for correct usage. Such entrenchment is crucially related to the frequency of the relevant structures in the input.

In order to explore the question of entrenchment with respect to the object clitics studied by Müller and Hulk one would like to see a list of those object clitics which are already in use during the time of high object drop and those which are deviant. Is there possibly a relationship to input frequency with respect to correctly used target structures, both in monolingual and bilingual contexts? With their reference to Yang (1999), Müller and Hulk have largely conceded that general cognitive capacities which orient on frequency are involved in moving from the MDG to the grammar of the specific language.

In summary, the theory of UG provides an excellent description of the structures of languages and the state of knowledge once structures have been acquired. In terms of learning, it orients towards the deductive processes involved in language acquisition but remains largely silent on *how* the young child is accomplishing this. The Competition Model conceptualises the inductive processes involved in moving from the prelinguistic stage to the target language, but remains underspecified for most grammatical structures. Psychologists have provided valuable empirical evidence of the types of cues which engage in competition.

The Competition Model provides a framework within which the cognitive permeability between languages can be conceptualised. It has the potential to flesh out the active part which the child brings to the learning task in more concrete ways than is done within the UG framework. This is the case for monolingual and bilingual acquisition alike. For the latter the Competition Model has a valuable contribution to make in explaining the motivation for “cognitive permeability” between the languages of the simultaneously bilingual child.

In order to uphold the hypothesis that crosslinguistic influences happen at the transition between MDG and language-specific grammar as a core mechanism in simultaneous bilingualism, one would need to exclude all other influences between languages. The German–English data I have collected do not support this. The verdict on Müller and Hulk’s proposal needs to be kept on hold. At this stage the “MDG to language-specific grammar” as the pivotal point for crosslinguistic influences is an interesting proposal, but I doubt that it can be generalised to all cross-language phenomena.

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## The permeability of grammars in bilingual language acquisition

MARY AIZAWA KATO

*Department of Linguistics, Universidade Estadual de Campinas, Cidade Universitária Zeferino Vaz, Barão Geraldo, 13083–970 Campinas SP Brasil*

**E-mail:** makato@attglobal.net

By maintaining that “bilingual children are able to separate the two languages from early on”, Müller and Hulk claim that crosslinguistic influence is present in areas that involve the C-system, considered by Platzack (1999) a vulnerable domain for language acquisition. They also claim that target-deviant constructions are rarer in monolingual children than in bilingual children because “crosslinguistic influence creates confusion and delay in the acquisition process of the bilingual child”.

The article recalls an interesting paper by Silva-Corvalán (1993) where, quoting Weinreich (1953), she discusses, the “permeability of linguistic cells” in language contact, according to which permeability depends on the structural weaknesses of one of the languages. For Weinreich, as well as for Bickerton (1981), foreign grammatical elements may permeate the speech of bilinguals, but are rarely incorporated into the language as a code. Though Silva-Corvalán agrees in principle with this assumption, she proposes, studying Spanish–English bilinguals in the USA, that “any linguistic feature can be transferred from any language as a ‘nonce-borrowing’ in the speech of bilinguals, but only those that are compatible with the structure of the borrowing language at any given stage will be adopted, disseminated and passed on to new generations” (p. 20). Differently from Weinreich, her results indicate that “the permeability of grammars to foreign influence does not depend on its structural weaknesses, but rather on the existence of superficially parallel structures in the languages in contact” (p. 20). One such case is the use of the zero complementizer by bilinguals when speaking Spanish. This omission of the complementizer is not attested in relative clauses, which is, however, possible in English. The author argues that the possibility of the zero complementizer in complement clauses is due to the marginal, formal use of such omission in complements of verbs such as “creer” (believe):

- (1) *Te ruego Ø me lo envíes pronto*  
I pray (that) you send it to me promptly
- (2) \* *Te agradezco el regalo Ø me enviaste*  
Thank you for the present (that) you sent me

Though here we are dealing with adult bilingualism and features of the target second language, and not with child bilingualism, some eventual similarities between the former and the latter can be pointed out:

- (a) In the case of the zero complementizer we are dealing definitely with the C-system; in the case of object drop, Müller and Hulk assume it has to do with a PRO in CP which allows the pragmatic interpretation of the empty object;

- (b) In the case of the complementizer, the omission is freer in English, where it affects both complement and relative clauses; in the case of object drop in bilingual children, it is proposed to be of the unrestricted Chinese type, in both initial states, that interferes with the topic drop phenomenon in the target German, which is much more restricted than the Chinese object drop. In both cases the less restricted form interferes with the more restricted phenomenon.

The similarity ends here since the bilingual child does not persist in the object drop when acquiring French, while the adult bilingual will adopt, disseminate, and pass the new form to new generations.

The authors seem to be quite convinced about the nature of object-drop in the child. In other words, they assume that in the first stage the null object is of the Chinese type, a category bound by a PRO adjoined to IP. In the second stage it disappears because the C-system is activated and PRO is no longer licensed since it is now governed. The problem is: why doesn't it become illicit in Chinese after its C-system is activated? For Raposo (1986) the null object in Portuguese is also a variable bound by a PRO in A'-position, but likewise adult-Portuguese retains the null object of the same nature as that of the child-Portuguese.

Huang (1991) proposes a new analysis for the null object in Chinese, reformulating his previous analyses (Huang, 1984, 1989). The proposal is that it is a null noun, the empty category equivalent to epithets (cf. Lasnik, 1991; Lasnik and Stowell, 1991). The category is [+pronominal, +referential]. The pronouns in Asian languages are actually like nouns, with no inherent case like the pronouns in Western languages, and require that case be added from the numeration for checking. The same can be said of epithets and their null counterparts.

Kato (in press) shows that Brazilian Portuguese has pronouns of the Chinese type, without an inherent case, and proposes that it also has a null object of the Chinese type. She shows that the null object in this language occurs in all but one context where epithets occur:

- (a) both epithets and null objects can be A'-bound:
  - (3) a. **O João<sub>i</sub>**, o Pedro disse que a Maria ama Ø<sub>i</sub>  
the João the Pedro said that Maria loves Ø
  - a. **O João<sub>i</sub>**, o Pedro disse que a Maria ama **o**  
the João the Pedro said that the Maria loves the **safado<sub>i</sub>**  
bastard
- (b) neither epithets nor null objects can be A-bound by a higher subject:

- (4) a. \*O Pedro<sub>i</sub> disse que a Maria ama Ø<sub>i</sub>  
the Pedro said that the Maria loves Ø  
b. \*O Pedro<sub>i</sub> disse que a Maria ama o safado<sub>i</sub>  
the Pedro said that the Maria loves the bastard
- (c) both epithets and null objects can occur in islands:
- (5) a. Eu informei a polícia da possibilidade do  
I informed the police of the possibility of the  
Manoel ter guardado Ø<sub>i</sub>  
Manoel have put Ø  
no cofre da sala de jantar  
in the safe of the dining-room  
b. Eu informei a polícia da possibilidade do  
I informed the police of the possibility of the  
Manoel ter guardado  
Manoel have put  
o negócio na sala de jantar  
the thing in the dining-room
- (6) a. Eu conheço o rapaz que trouxe Ø<sub>i</sub> agora mesmo  
I know the boy who brought Ø just now from  
da pastelaria  
the bakery  
b. Eu conheço o rapaz que trouxe o negócio<sub>i</sub> agora  
I know the boy who brought the thing just now  
mesmo da pastelaria  
from the bakery
- (d) however, epithets can be bound by an element in  
possessive position inside the subject, but the null object  
cannot:
- (7) a. A mãe do Pedro<sub>i</sub> viu o safado<sub>i</sub>  
b. \*A mãe do Pedro<sub>i</sub> viu \_\_\_<sub>i</sub>

To solve this problem, Kato (in press) proposes that, just like the ECP for non-pronominal categories, the empty noun has restrictions of its own, namely that its antecedent be governed by the same type of head, namely V, or eventually *v*, in the logical form. This principle would explain why the antecedent can appear in the position of the object or of the subject if it is a derived one, but not in the position of the possessive or in the subject position of an active clause.

- (8) a. Tirei o relógio<sub>i</sub> para fora da caixa sem quebrar  
Ø<sub>i</sub>  
(I) took the clock out of the box without  
breaking Ø  
b. O relógio<sub>i</sub> foi tirado para fora da caixa sem  
the clock was taken out of the box without  
quebrar Ø<sub>i</sub>  
breaking

If the null object of the bilingual children is of the Chinese type, then we must conclude that it is a null noun and not the variable bound by a PRO.

But there is another type of null object, different from topic drop and more constrained than the Chinese type. It is the European Portuguese (EP) null object, studied by Raposo (1986, 1998). In the former study Raposo shows that the null object in EP is a variable, since it cannot have an antecedent in A-position and is, moreover, sensitive to

islands. In the later work, he proposes it is a mixed category (+pronominal, +variable) and relates the null object to a null clitic, which in turn he derives from a null article. For this author, only languages that can have bare plurals in generic DPs can have null objects. Of the Romance languages, Portuguese seems to be the only one that has bare plurals in generics and null objects. If the definite generic article is obligatory, then the language will have clitics and no null object. This may explain the general delay of children in acquiring clitics, since it is dependent on the acquisition of articles and the realization that it can be null. Until then the null object must be of a different type.

To say that the null object in child emerging grammars is of the Chinese type, defined by the authors as a variable bound by PRO, means to accept a chain-type category at this stage. However, in Huang's (1991) conception, the Chinese type is a null noun, which does not involve any movement. It is the less costly type since both the Portuguese type and the topic drop type involve movement. It is reasonable to assume, therefore, that the Chinese type is the "default" case and more in consonance with the concept of the Minimal Default Grammar (Roeper, 1999), defined in terms of economy.

In conclusion, the authors may be correct when they say that the emerging null object is of the Chinese type, but not in the way it was assumed to be represented.

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## Object omissions in young bilingual children: assessing the evidence

REGINA KÖPPE

*Research Center on Multilingualism, University of Hamburg.*

Address for correspondence: *Schlossgarten 60, D-22043*

*Hamburg, Germany*

**E-mail:** regina.koepp@hamburg.de

Natascha Müller and Aafke Hulk offer an elaborate account of object omissions in the speech of Romance–Germanic bilingual children. Their central claim is that during a specific developmental phase, the French and Italian speech of these children exhibits more omissions of obligatory objects than the speech of monolingual children, and that this quantitative difference can be attributed to indirect influence from the Germanic language.

Müller and Hulk discuss an issue that has gained increasing attention in recent years. While bilingual children have been shown to be generally able to differentiate their two languages early in development, it is currently a matter of debate in which domains and to what extent one language can influence the other. Müller and Hulk contribute to this ongoing discussion in a very straightforward manner, making clear and interesting claims and predictions, and discussing an impressive amount of empirical data.

I believe, however, that not all of their predictions can, in fact, be corroborated using the data they present. In this regard, I will argue in favor of a more careful approach to the available data and discuss a number of issues related to their methodology. On the basis of further data from a French–German bilingual child, I also want to address individual differences in more detail.

Let me begin by stressing that Müller and Hulk's account of target-deviant object omissions is a purely grammatical one. In their view, object omissions are no longer licensed once the C-system is instantiated in the child's grammar. As far as I understand it, the criterion for separating the children into groups in the cross-sectional data and for determining developmental phases in the longitudinal studies should therefore be the availability of CP. One might thus wonder why some German and Italian children figure under group 1, although they in fact produced C-constructions in the recording. Furthermore, how could the authors exclude the possibility that some of the group 1 children might have already been able to produce subordinate clauses, but, by chance, did not happen to do this during the recording? Finally, it is not clear to me why the second developmental phase in the bilingual child Anouk is claimed to begin at around age 3;1, given that Anouk starts to use subordinate clauses introduced by complementizers and *wh*-words two months earlier.

The formal definition of groups and phases is a crucial point because Müller and Hulk's main argument is based upon a comparison of mean rates of object omission within and across these two groups and phases. More specifically, they compare the average percentage of object omissions in

the three bilingual children with the average percentage of object omissions in a group of monolingual children.

First of all, with respect to the calculation of average percentages in the cross-sectional studies, we do not know whether the children in the same group are all at a comparable developmental stage. Table 15 also reveals that the individual percentages of target-deviant object omissions are quite variable in the German children, where the first group exhibits omissions ranging from 8% to 66.7%. Given this considerable degree of individual variation, one might doubt whether the average of 24.3%, calculated for the total of object omissions, is of any reliability at all. Moreover, the MLU values of the group 1 children are substantially lower in the German than in the French and Italian children; the average MLU is 2.46 in the German group 1, while it is 3.00 and 2.99 in the French and Italian groups 1, respectively. How, then, can one exclude the possibility that these German children omit objects to a greater degree simply because they are less advanced with respect to grammatical development?

Turning now to the two developmental phases discerned in the longitudinal data, I find it methodologically problematic to calculate averages for a first developmental phase that, at least in the analysis presented here, has no clear-cut starting point (while the second phase, by definition, never ends). Consequently, the bilingual children's mean rate of target-deviant object omissions during phase 1 is directly dependent upon how many recordings have been included in this phase. Note that the longitudinal analysis of the bilingual data begins quite arbitrarily at an MLU of 1.33 (in morphemes) for Ivar, 2.0 for Anouk, and 1.13 for Carlotta. The lowest MLU values of group 1 children in the cross-sectional French and Italian data, however, are 2.92 for French and 2.47 for Italian. This amounts to saying that the bilingual data cover earlier developmental phases than the monolingual data. This is also true for the monolingual longitudinal studies, where – with one exception – we find an MLU of 2.6 as the lowest value. The exception is the Italian child Martina, who has an MLU below 2.0 in her first recording. Interestingly enough, Martina exhibits object omissions up to a rate of 39% in her earliest recordings. These rates are quite comparable to the bilingual data.

Nevertheless, Müller and Hulk do not hesitate to compare the German cross-sectional data to the French and Italian, or the bilingual (longitudinal) data to the (mainly cross-sectional) monolingual data. In other words, what are being compared here are (a) mean percentages of object omissions, calculated on the basis of an arbitrarily

chosen number of subsequent recordings in one child, and (b) mean percentages of object omissions, calculated on the basis of an arbitrarily chosen number of cross-sectional recordings in a randomly chosen number of children. In my opinion, with respect to the data available, only the omission rates of individual children at given developmental stages can safely enter into a crosslinguistic comparison. Therefore, it is regrettable that individual rates are not presented for the French and Italian cross-sectional studies. Generally, concerning the monolingual data, one would also like to know more about the total numbers of target-deviant omissions and of obligatory contexts in each recording. Note further that percentages have been calculated from quite variable numbers of utterances, and that, in particular, the high rates of omissions in the German monolingual data, as well as in the bilingual data, are based upon comparatively few contexts.

With these reservations in mind, I seriously question the general conclusion that Germanic children omit obligatory objects twice as frequently as Romance children do. Firstly of all, there are no data at all on target-deviant object omissions in Dutch, nor are French data available for MLU values below 3.0. Müller and Hulk themselves suggest that the French and Italian data probably cover different developmental stages. Secondly, a closer look at individual children reveals that some German and Italian children indeed produce nearly the same rates of object omissions: the German child Baroudi exhibits 21.1% of object omissions at an MLU of 2.05, while the Italian child Martina omits objects at rates of 21% and even 39% at an MLU of 2.1. Similarly, Valerie (German, MLU 2.57, 31%) can be compared to Diana (Italian, MLU 2.6, 33%), and Leonardo (German, MLU 2.73, 20.8%) to Guglielmo (Italian, MLU 2.7, 20%). These data thus appear to contradict the alleged difference in the development of target-deviant object omissions between Germanic and Romance. However, the existence of this difference is a prerequisite for the claim that the bilingual children's omission rates are due to influence from the Germanic language. Therefore, further longitudinal data are needed to substantiate Müller and Hulk's claims more convincingly.

Let us take a look at object omissions in the French speech of another child, Pascal, who acquires French and German as first languages. Like Ivar, Pascal has been recorded in the DUFDE project. He should thus be perfectly comparable to Ivar. Pascal's grammatical development has been studied for a wide range of phenomena (see, e.g., the contributions in Meisel, 1994). According to Müller (1993), CP is evidenced in Pascal's French around age 2;05,05, and Kaiser (1994) finds both productive and quite frequent use of object clitics from age 2;04,07 onwards. During the period studied here, French is his preferred and grammatically more advanced language.

Table 1 shows Pascal's object omissions in the French recordings from 1;11,28 (MLU 1.63) to 2;10,13 (MLU 5.00). MLU values have been calculated on a morpheme basis. Pascal exhibits extremely high rates of object omission up to age 2;02,12. Note, however, that the absolute number of obligatory contexts is very low in these early recordings. At age 2;02,26, we find no object omissions at

Table 1. *Object omissions (tokens) in obligatory contexts in Pascal's French*

Age	MLU	–OBJ	Total contexts	–OBJ (in %)
1;11,28	1.63	10	16	62.5
2;00,09		4	8	50.0
2;01,00	2.14	5	8	62.5
2;01,14		9	10	90.0
2;01,28	2.49	1	5	20.0
2;02,12		2	3	66.7
2;02,26	2.42	0	3	0.0
2;04,07	3.45	11	31	35.5
2;04,21		6	16	37.5
2;05,05	3.63	8	20	40.0
2;05,19		10	27	37.0
2;06,02	3.93	8	23	34.8
2;06,16		4	17	23.5
2;07,00	4.53	7	38	18.4
2;08,17	4.87	3	19	15.8
2;09,01		2	26	7.7
2;09,16		4	41	9.8
2;09,28		2	12	16.7
2;10,13	5.00	1	17	5.9

all. In the subsequent recordings up to age 2;06,02, Pascal exhibits a 35 to 40% rate of object omissions, which then slowly decreases. Only after age 2;09,01 do we find omission rates of lower than 10% of the obligatory contexts.

Recall now Müller and Hulk's initial assumption that the decrease of object omissions is motivated by grammatical changes. This hypothesis has been developed by Müller, Crysmann, and Kaiser (1996), who observe that a sudden decrease of object omissions, as well as the productive use of object clitics, co-occurs exactly with the instantiation of the C-system in the French speech of the bilingual child Ivar. However, evidence for a particular co-occurrence of these phenomena is not shown in the majority of the other children analyzed by Müller and Hulk. Returning to Pascal's data, we again find that the frequency of object omissions does not decrease dramatically with the availability of the C-system. Should we then conclude that Pascal is "delayed", like Anouk and Carlotta? At least in the bilingual children, such a delay appears to be rather the norm than the exception. To decide this issue, more longitudinal data from monolingual children will clearly need to be studied.

A further question is how Pascal's low percentages of target-deviant uses at the ages of 2;01,28 and 2;02,26 might be explained. Note that subsequent recordings of other children also show considerable variation in the rate of object omissions. There is also much variation across children with comparable MLU values. In the German group 1 for example, Clarissa omits only 8% of obligatory objects, while Valerie does so in 31% of the contexts (both children having MLU values of about 2.5). In the longitudinal Italian study, omission rates vary between 0% and 33% at an MLU of about 2.6.

Müller and Hulk leave unanswered how such substantial

variation could be accounted for. Arguing against a grammatical explanation for subject omissions in young bilingual children, Meisel (1990) hypothesizes that individual variation is likely to occur in those areas where pragmatic strategies like discourse organization play a role and perhaps even override grammatical principles. In fact, it is reasonable to assume that discourse-related factors can indeed account for the individual variation observed in the present case. If young children's speech can be described in terms of a free topic drop language, then subjects as well as objects should be generally omitted, and the use of overt arguments should be restricted pragmatically to contexts of emphasis and clarification. In other words, the occurrence of object omissions is directly linked to discourse-related factors in the actual situation, which cannot be easily controlled and captured in frequency counts and comparisons. Children might also tend to use this strategy more or less often due to individual preferences. It is thus difficult to see how the frequency of use of a pragmatic strategy could provide evidence for crosslinguistic differences during the first developmental phase.

Concerning the second phase, Müller and Hulk assume that individual differences can be explained by Roeper's (1999) concept of "internal bilingualism". In other words, some children still appear to produce structures with empty IP-adjoined topics to a certain extent, although they may also use CP structures. However, one would expect object omissions never to occur in a subordinate clause. How could one account for structures like those in (1) and (2), where this is exactly what happens?

- (1) parce qu'(il) faut pas mettre là haut jusqu' – jusqu'en  
bas (Pascal 2;09,28)  
because one should not put up there downward

- (2) parce- parce que il a mordu / parce que il a mordu de  
petits garçons, le lion (Pascal 2;09,01)  
because- because he did bite / because he did bite small  
boys, the lion

Clearly, more research is needed in this area. Müller and Hulk have advanced some very explicit and challenging hypotheses. Their study provides possible answers to a number of questions and at the same time highlights new areas for discussion. I believe that their contribution indicates directions for further research into the similarities and differences between monolingual and bilingual first language acquisition.

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## Are object omissions in Romance object clitic omissions?

JOHANNE PARADIS

*Department of Linguistics, 4–46 Assiniboia Hall, University of Alberta, Edmonton, Alberta, T6G 2E7, Canada*

**E-mail:** johanne.paradis@ualberta.ca

One of the most important components of Müller and Hulk's article is the proposal for a unified account of bilingual and monolingual L1 acquisition. More specifically, they argue that crosslinguistic influence in bilingual acquisition will be indirect in nature. Thus, instead of producing novel, bilingual-only transfer errors, crosslinguistic influence acts to magnify or prolong typical developmental errors in the bilingual acquisition context. In other words, the difference between monolingual and bilingual L1 acquisition will be one of degree and not kind. Furthermore, they found evidence for such indirect influence at the pragmatics/syntax interface. This adds a possible corollary to their unified account: the pragmatics/syntax interface will be a challenging problem space in any language acquisition context.

I would like to pursue the search for a unified account further by suggesting that what is vulnerable at the pragmatics/syntax interface in both bilingual and monolingual L1 acquirers of Romance may be vulnerable for all Romance language learners, L1 and L2, normally developing and impaired. In so doing, I want to expand on an aspect of Müller and Hulk's report, the emergence of object clitics in Romance, and argue that object omissions in the acquisition of Romance could be described more specifically as object clitic omissions. I will support this argument with evidence from learners of French. I will then discuss how this proposal could be integrated into Müller and Hulk's account of the quantitative differences in the monolingual and bilingual children they studied.

Müller and Hulk offer the following observations with respect to object clitics in Romance. First, object clitics form a different method of licensing an empty canonical argument position, in contrast with the use of discourse-connected PRO in the C-domain in topic drop languages like German and Dutch. Second, object clitics are acquired late in monolingual L1 Romance. Third, object omissions decline in the Romance language of the bilingual children as object clitics are used more frequently. This third observation begs the question of a possible connection between these phenomena.

Müller and Hulk do not draw a lot of attention to the fact that object clitic use is a pragmatically determined phenomenon, as is topic drop. Moreover, the pragmatic context in which one can use anaphoric devices like object clitics (antecedent understood by both speaker and hearer) has a great deal of overlap with the pragmatic context in which topic drop can occur. In fact, the contextualized examples given in (14) in their article are also places where object clitics could have been used. As such, object clitics, as well as topics residing in the C-domain, are items at the pragmatic/syntax interface. In addition, the tardy appear-

ance of object clitics in acquisition could be explained in part by their complex interface structure. Object clitics are part functional, part lexical category, involve movement, and their syntactic use must be coordinated with pragmatic principles (cf. Jakubowicz, Nash, Rigaut, and Gerard, 1998).

Research I have conducted in collaboration with Martha Crago (Crago and Paradis, 1999) shows a connection between pragmatic context, object clitic use, and object omissions in French-speaking children with specific language impairment (SLI) and child L2 learners of French. We analyzed spontaneous language production samples from four groups of children: (1) seven-year-old monolingual, French-speaking children with SLI; (2) seven-year-old English-speaking children acquiring French as an L2 who had the same MLU as group (1); (3) seven-year-old monolingual, normally developing (ND), French-speaking children, and (4) three-year-old monolingual, ND, French-speaking children matched on the basis of MLU with groups (1) and (2). The children's language samples were coded for the presence of object clitics in "permissible" contexts. Permissible contexts were defined as contexts where the object of the verb being referred to had already been mentioned in near discourse, making pronominal reference possible. The samples were also coded for the presence or absence of objects, whether lexical or clitic, in the context of transitive verbs.

Our statistical analyses revealed that the children with SLI and the L2 children used object clitics less frequently in permissible contexts than ND age and MLU controls (see also Jakubowicz et al., 1998). In fact, they used object clitics in less than 50% of permissible contexts. The difference in object clitic use between the three-year-old MLU controls and the seven-year-old age controls was not significant (76% versus 96% respectively), but the absolute scores showed that the three year olds were not at ceiling. We suspect that the three year olds were close to, but not at, the end of the acquisition stage for object clitics in L1 French.

So, our initial analyses showed that L2 and SLI learners of French have difficulties with object clitics. Our second round of analyses was aimed at discovering their error patterns in object clitic contexts. What we found was that in the majority of cases, their errors were object clitic omissions (SLI: 75%; L2: 78%). Other errors included repeating the full DP, or using the pronoun-like form, *ça*, in canonical object position. Finally, for both the SLI and L2 groups, the majority of all object omissions occurred in object clitic permissible contexts. An excerpt from a transcript illustrating a child with SLI dropping an object clitic is given in (1).

- (1) EXP = experimenter; CHI = child (Byanca)  
 EXP: ah elle est encore dans ton sac à dos?  
   “ah, it is still in your backpack?”  
 CHI: non.                                  “no.”  
 EXP: elle est où?  
   “where is it?”  
 CHI: ma mère a jeté.                  “my mother threw away.”

Put together, these findings suggest that a large part of the variable appearance of obligatory objects in French could be object clitic omissions. Therefore, we could speculate that the challenging problem space object clitics pose for learners of French is the principal mechanism underlying object omissions in development.

Why would object clitic omissions, hence object omissions, be more pronounced in bilingual L1, SLI, and L2 Romance than in ND, monolingual L1 Romance? Let us look first at the Germanic–Romance bilinguals. Müller and Hulk put forth a persuasive explanation for object omissions in their structural overlap account. They argue that the topic drop/empty canonical object position structure in Germanic and the object clitic/empty canonical object position structure in Romance result in competing evidence for the target structure in Romance. They propose that this overlap causes delay in convergence on the correct Romance target structure, the observable result of which is a protracted and magnified period of object omissions. I would like to suggest that the majority of these object omissions may actually be object clitic omissions. If this is correct, the influence of the Germanic language may be more precisely described as causing delay and confusion in the acquisition of object clitics, the result of which is a prolonged period of object omissions.

Since the monolingual children with SLI have no influence from a language with topic drop, their object clitic omissions must be due to another source. These children could be expected to display protracted acquisition of object clitics on the basis of comparison with what researchers have found for the acquisition of tense morphology in English-speaking children with SLI. For instance, normally developing L1 acquirers of English go through an optional infinitive stage of acquisition, whereas children with SLI show an *extended* optional infinitive stage (Rice, Wexler, and Cleave, 1995; Rice, Wexler, and Hershberger, 1998). Also, pragmatics in general and pronominal reference in particular have been found to be areas of weakness in English-speaking children with SLI (Leonard, 1998). Thus, because object clitics in French are late acquired in normal development and involve pragmatics, we could predict that they would be a particularly challenging component of French for children with SLI to acquire.

Similar to the children with SLI, the English-speaking L2 learners of French have no influence from a topic drop language, and yet they display object omissions. Nevertheless, influence from their L1 could explain their object clitic omissions. I would like to suggest that in their case it is the complete inability to transfer properties of the pronominal system from L1 to L2 that underlies their omissions in object clitic context. The object pronominal

systems of French and English are highly divergent, whereas lexical objects are placed in same position in both languages. For example, English pronouns are strong pronouns, not clitics, and object pronouns reside in canonical position. In contrast, French has a more complex pronominal system involving both strong pronouns and clitics, with object pronominal clitics appearing in preverbal position. English-speaking L2 learners of French cannot transfer their L1 system of pronoun use to their L2 and one possible outcome of this inability could be delay and confusion in their acquisition of the target pronominal system. In turn, the result of this delay and confusion may be similar to other learners of French: object omission errors.

Let me summarize my argumentation as follows. Object clitics can be considered a vulnerable area at the pragmatics/syntax interface in the acquisition of Romance. I would like to predict that this aspect of the grammar will be problematic for all learners of Romance, in the spirit of a unified account. The outcome of the problematic nature of this aspect of the grammar will mainly, although not exclusively, take the form of object omissions in acquisition. Object omissions will be more pronounced in certain acquisition contexts, namely under an impaired language faculty, and when another language is being acquired either simultaneously with or prior to the acquisition of Romance, and where that other language provides misleading (Germanic) or opposing (English) evidence for the target structure. In my view, the advantage of analyzing the object omissions of the Germanic–Romance bilingual children Müller and Hulk studied as object clitic omissions is that it would permit the integration of their findings with those for other learners of Romance.

In conclusion, the overarching purpose of this discussion was to highlight the necessity of conducting cross-learner comparisons in order to further our understanding of what aspects of language acquisition are universal, and what aspects vary according to learner context. Accordingly, it is important to point out that Müller and Hulk's article is a significant contribution towards this goal.

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## Modular and pragmatic perspectives on Minimal Default Grammars

THOMAS ROEPER

*Department of Linguistics, University of Massachusetts, South College, Amherst, MA 01003, USA*

**E-mail:** roeper@linguist.umass.edu

This finely focussed and insightful article shines a light upon the microscopic variation that characterizes both bilingual and monolingual children. Müller and Hulk advance our notion of Multiple Grammars and raise important questions beyond those raised by Roeper (1999) and Yang (2000) and, as far as I know, those in the literature on historical change. We will address these:

- (a) does Minimal Default Grammar (MDG) demand modular independence?
- (b) can we show the effects of constructions rather than language dominance?
- (c) how does one separate MDG from language transfer?

While theory cannot yet accommodate all of the variation at hand, basic contrasts begin to emerge. First the authors show nicely that “language-dominance” is not a useful grammatical construct, though it may be an important social one. One must look at more refined dimensions.

Then they adopt the view that not only target grammars, but MDGs may be at work in the bilingual child’s mind. If the less dominant grammar contains elements that reflect an MDG, then they may “dominate” the dominant language.

They also suggest that: “Minimal Default grammars require as little interaction between different components of the grammar as possible”. This observation reflects the traditional learnability claims that the learnability problem is mathematically reduced if we assume the independence of parameters. This translates into the view that Minimal Grammars minimize connections between modules because changes in one module would cause too many changes elsewhere, and then the computational complexity quickly becomes enormous. We can extend the suggestion to a Minimalist plus Multiple Grammars perspective: ideally different modules would each have an independently acquired grammar, with highly limited crossmodular connections. Thus one might have a choice of possible theta-grammars which include/exclude more complex thematic roles (are Patient and Beneficiary distinct?). This choice would be largely independent of binding theory, although a slender point of contact would be necessary. (Such as: all thematic roles can be bound.)

Another question they raise emerges in the deeper claim entailed in their “mapping induced influence” (MIL):

Does the child revert to the Minimal Default Grammar or to the other bilingual target grammar when deviations in a grammar arise?

The MIL claims that either MDG or the restricted grammar is available. In particular, they claim that Chinese

is one instance of an MDG, allowing direct pragmatic control of missing arguments, assuming absent CP is a UG option. They provide ample evidence for this instance of MDG. Could the child however choose German over MDG-Chinese in using French? This would be an instance of old-fashioned translation and seems possible. Thus the child simultaneously juggles three grammars: MDG-Chinese, V2-German, and clitic-French, each of which leads to deletion in a different way. The result is a “delay” in fixing both German and French, as I understand it. The reason this arises, I believe, is that (phonological and lexical homogeneity aside) the child seeks to establish:

A single grammar in each of a set of module-based grammars.

Let us term them:

1theta, 2binding, 3wh-movement, 4case, etc.

For each of these modules the child seeks to maintain the kind of simplicity everywhere (in both grammars) that Minimalism guarantees. Therefore they seek a common German-French thematic system, wh-movement system, etc. In each instance, they are eventually forced to divide the grammars. However, the apparent delay is an effort to seek the simplicity that would result if, in that module, only one grammar were present. In each module the child must resolve conflicting data. For missing arguments, the pragmatic data is particularly complex if all three options are alive.

The child thus never has the idea (in an abstract sense) that she is bilingual. She asks of each of its ten modules whether, individually, one grammar or two is needed. In many instances, a single system may emerge. For instance, the article system is largely identical in French and German for many distinctions, with variation capturable as “lexical” features on “la” or “der”, etc. Thus when the child figures out that “la” is an article in French, it immediately extends that grammar to German and should produce more rapid progress in German than say a child who tries to learn Chinese and German.

One factor which may determine “dominance” or cause a parallel grammar to be eclipsed, is the recognition of recursion. If an operation can apply inside itself or repeat itself, then it may be seen as the genuinely productive grammar. Recursion is inherently productive. The realization that a subject can be missing in both a matrix and a subordinate clause would reveal a recursive kind of argument deletion.

As usual, data is ahead of theory, and much remains unexplained here. Why, exactly, do children have fewer

subject omissions? The answer may lie in syntactic intricacies that we have not explored, but other factors may play a role. Why, if +CP and –CP are absolute opposites, do we find shifting proportions? Some of the explanation may be social. If a child may have more occasions to use the subjunctive as it matures, then whatever invites subject deletion may involve more sophisticated social postures.

Another reason may lie in the syntactic/pragmatic (semantic) interface. If the child in general seeks to avoid “retreat”, then they will make very narrow assumptions about semantic appropriateness. In African-American English (AAE) there is a preterite “had” form that signals the onset of a causal event (Rickford, 1999). Instead of:

(1) I slipped and fell

we can hear:

(2) “I had slipped and fell”

What is the “had” doing here? It seems to mark a kind of “aspectual” difference of the sort common in AAE. Now suppose all children are looking for subtle differences that may not occur in their language. For instance, we find remote past, immediate past, habitual, and other distinctions in various languages and therefore in UG. The child who hears “had” or “hat” may mark it first as *past-causal* before it grasps that it covers a wide variety of past tenses. In German, as the imperfect disappears, precisely the form “hat V-t” expands its temporal range. Could even German-learners momentarily treat “hat” as a marker of a causal event? The hypothesis could be present for a week and then dropped without any adult detecting it. Here again, the presence of distinctions in a bilingual environment may lead to more extended periods of hypothesis-testing to

establish just exactly what the correct range of interpretations may be.

It is well known, for instance, that L2 speakers of English, coming from German, allow the present in English to be progressive. The expression “he plays tennis” could mean, in German, both that he plays tennis generally or that he is doing so now. In English no progressive is implied. This seems to be an instance where either an MDG or a direct influence of German could be present. If UG defines overt verb-raising as preferable to LF-verb-raising, then it is an instance of MDG. If UG prefers covert Feature movement to overt Feature-movement, then it is a direct influence of German. In a sense, the theory must decide. On the other hand, data from bilingualism could be relevant. If the interpretive error arises only in bilinguals where one grammar raises verbs, then it may be language particular. If it arises between two languages where neither raises verbs, then it is another matter.

In sum, this article invites many kinds of new theoretical reasoning and it will be interesting to see the questions raised examined in light of new empirical explorations where bilingualism or Multiple Grammars are at work.

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## Pragmatic rules, C-domain, and language dominance

SUZANNE SCHLYTER

*Institute of Romance Studies, Lund University, Sölvegatan 7, SE-223 62 Lund, Sweden*

**E-mail:** [suzanne.schlyter@rom.lu.se](mailto:suzanne.schlyter@rom.lu.se)

Müller and Hulk presuppose that the two languages of a bilingual child are separated from early on, as is generally accepted by most scholars within the last ten years – in opposition to the earlier position, in which an initial common syntactic system was postulated. On the background of this general principle of separation, they argue for a subtle kind of influence: bilingual children may use constructions that are superficially similar to those of monolinguals, here utterances without objects, but to a higher degree and for a longer period than comparable monolingual children.

The authors argue that before the entire development of the C-system, when the system is vulnerable, there is about 23% of target-deviant object omission in German monolingual children, whereas in monolingual French children (and possibly Italian ones) there is about 11%. In the Romance language of a bilingual German–French, German–Italian, or Dutch–French child, the object omissions during this time have a tendency to be as frequent as in monolingual German children. Later, when the C-system is stabilized, object omissions almost disappear in monolingual and most bilingual children.

The authors impute this crosslinguistic influence to the “Minimal Default Grammar”, so that “bilingual children confronted with the input from two partially overlapping languages may tend to persist longer at a universal (pragmatic) stage”. This would imply that the bilingual children in their Romance language, longer than do monolingual children, use null objects if the referent is known from the context, instead of using an object clitic.

### Pragmatics

The authors thus advocate possible pragmatic grounds for the persisting of object drop in Romance, and it would therefore be interesting to know more about the pragmatic rules involved. The tables show that the data are very variable, often varying strongly from one recording to another. This could be taken as an argument in favor of pragmatic factors – the variation depending on what is talked about, the nature of the interaction, etc. The authors also point to the difficulty for the child in finding the pragmatic rules, which govern topic drop in German and Dutch but not in Italian and French.

However, very few pragmatic analyses are given. It seems evident that the pragmatic conditions for the dropping of the object are different in the pre-C period and in the period after which C is lexically instantiated. In the former case, many objects are dropped in cases where this is not acceptable in adult German (e.g. *auch mach*) whereas after, object drop is acceptable only in topic position (e.g.

*hab ich schon gesehen*), and probably under certain conditions concerning discourse and register. The authors give syntactic rules for what is and is not acceptable, but we do not see under what contextual or pragmatic conditions this occurs: how accessible must a referent be in order to be omitted as an object? The abundant research on such factors (cf. Schøsler, 2000; Muñoz, 1995; Ariel, 1994), i.e., under what discursive/pragmatic conditions a referent is reintroduced as 0, pronoun, NP etc., should be taken into account if one wishes to seriously develop this line of reasoning.

The variations in the data and the few occurrences in each sample also point to a methodological problem, namely the criteria for considering something an “omission” and if such, whether “target-like” or “target-deviant”. The dropping of an object in any language is something rather variable and fuzzy, unlike stricter syntactic rules such as V2, etc. Object omission seems to depend strongly on factors such as pragmatic licensing, register, normative behavior, etc. We do not get much information on how the omissions, as well as target-deviance, are calculated with respect to these facts.

We can look at some examples from other data for discussion: are the following to count as object omissions or not, and in that case as target-deviant or not?

- (1) Adult: qu'est-ce qu'il fait là?  
“what does he do there?”  
Child: il tient\_\_  
“he holds” or “it holds”
- (2) C: moi j'ai vu ça à la télé  
“I have seen that on the tv”  
A: tu as vu\_\_ à la télé?  
“you have seen on the tv?”
- (3) A: c'est un crocodile qui veut manger le capitaine  
“it is a crocodile which wants to eat the captain”  
C: mais il \_\_ peut pas  
“but he can not”

Example (1) is uncertain because of the interpretation; example (2) would in isolation probably be considered a target-deviant omission, but in this case it is the French-speaking adult who utters it, so it would have to be considered as acceptable, perhaps pragmatically licensed; example (3) is a very normal answer in French, but an informant with a strong sense of normativity could interpret it as target-deviant instead of “il ne le peut pas” of a formal register. So considering whether the examples of the different databases have object drop, and if so, whether of target-deviance, is a difficult and subtle matter. I suppose that native speakers have been asked for acceptability



judgments (but this is not indicated). The problem is that if informants have been asked for the target-deviance of the omissions calculated, there must necessarily be different persons for the different languages in question, and these persons may have been more or less severe in their judgments. So how does one compare?

It would therefore be important, in further studies, to go carefully through the discursive and sociolinguistic conditions under which (a) an object can be omitted in German, in a target-like way, applied to the data presented here, (b) subjects and objects are omitted in early German child language, and (c) the same conditions are valid for the omissions in the Romance languages of the bilingual children (and consider to what extent). In that way the authors could avoid the risk of pragmatics being simply a waste-paper basket for unresolved syntactic phenomena.

It could also be interesting to further compare these facts to non-generative studies of Romance languages. For example, Schösler (1999) shows a very interesting development of object drop in Romance languages – it is frequent in historical stages where the valency is clearly marked in some way: in Latin with case, in modern French with obligatory subjects. In stages of ancient French (and other Romance languages, thus Italian) with subject drop and without case, the object drop is much less frequent. In fact (in spite of the Italian data presented here), it seems that in many cases object clitics appear very early in monolingual Italian, well before the C-system (Antelmi, 1998), which could in this view be related to the subject drop in Italian. This implies that it is not impossible that the frequent object drop in bilingual German–Italian could also have another source, namely lack of subject drop in the child’s Italian (to be studied). The principle postulated by the authors could be even more clearly studied in the case of null subjects: do the bilingual children overextend the pragmatic rules for the use of a subject, i.e., use subjects more often than do monolingual Italian children, due to the influence from German, where the subjects are much more frequently used? It is well known that in the case of subject drop there is also a continuum, from repeated VPs where both German and Italian drop the subjects, to contrasting the subjects or changing the on-line referent where both languages need a subject. It cannot be easy for a bilingual child to grasp these differences.

#### **Influence only in the C-domain?**

If the authors want to generalize the position presented in this paper, on the vulnerability of the C-domain, there seem to be problems with VO–OV, as described in earlier work by Müller. In Platzack’s paper referred to by the authors, rather many phenomena are attributed to the C-domain; but if anything is not, it is the VO–OV word order, concerning infinitive verb forms.

There are also data from ongoing studies on the DP domain (Bernardini, Schlyter), which do not seem to be accountable for as related to the C-domain, even if we consider D as parallel to C. The phenomena concern the

order NA or AN, of possessives. The Swedish–Italian child Lukas (Bernardini Röst, 2000) uses in his Italian, very systematically, only one of two possessive constructions: *la mia chiave* (DAN) but not *la chiave mia*, (DNA), whilst an Italian child exposed to Swedish and Italian living in Italy produces both pre-and-post-nominal adjectives and possessives, as soon as these elements appear. This fits well with the general “target-input” principle advocated by Müller and Hulk, since the child uses to a greater extent a construction which is the only one in Swedish, and which also exists in the Italian input. However, it fits less well with the “vulnerable C-domain” principle, since there is no question of C or of mapping pragmatics–syntax. The same type of phenomena are observed for the AN word order: for example, Lukas uses target-deviant orders like *la blu casa* (“the blue house”) and does not use the postposed adjective, but only the preposed one.

However, one child (Alice), at a certain period, productively uses NA in Swedish (*en katt röd* = “a cat red”, etc.; Alice 3;2), which is more problematic for the principles proposed here. The construction is clearly ungrammatical in Swedish and German, and the NA construction has, as far as I know, never been observed in monolingual Swedish children. Such constructions cannot be due to a simplified system, since NA is generally analyzed today as the N being raised above A. The simpler structure without raising, AN, is that generally found in younger French monolinguals, as well as in the French of Swedish–French bilinguals, in both cases earlier than NA. So the only possible source is the French of the same child, since in French Alice uses this construction frequently. This means that for this case, neither the proposal that the construction should exist in the input of both languages, nor the relevance of the C-domain, nor of mapping pragmatics–syntax, seem to be relevant.

What seems to be the case, however, is the language dominance, since Alice’s dominant language is French and her Swedish is clearly weaker. (Dominance is taken in the sense of preferred language, with a clearly higher MLU, and a richer vocabulary than in the other language, cf. Schlyter, 1994 for criteria, and Schlyter, 1993 for L2-similar effects in the weaker language.) In French–Swedish children with less strong dominance of French, or with dominance of Swedish, such constructions have not been observed. Müller and Hulk refute, for the data presented here, language dominance as responsible for the cross-linguistic influence studied – which, however, indicates that they presuppose that such an influence may play a role.

The comments presented here just show some possibilities for further research – the very explicit hypothesis immediately stimulates the reader to try to verify it on more data.

(I owe thanks to Petra Bernardini for helpful discussions on these comments.)

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## A view from a “multiple roots” perspective

ROSEMARIE TRACY

*University of Mannheim, Schloss, D-68138 Mannheim, Germany*

**E-mail:** rtracy@rumms.uni-mannheim.de

If – as we have good reasons to believe – children basically know that all languages are variations on a universal theme, the fact that bilingual children bother working out subtle contrasts between their input languages is particularly remarkable. Like monolinguals they do not settle for options which work just fine from a pragmatic perspective, and they certainly do not simply stick to the “easier” language among the running mates; indeed, they may be downright intrigued by the formal puzzles involved. In the case dealt with in the interesting article by Müller and Hulk, the Germanic and Romance input languages are sufficiently distinct for the child to successfully embark on separate developmental tracks from early on, probably long before the first words are uttered. Nevertheless, as the authors suggest, acquisition paths might be affected by “overlapping” patterns. My own research in the domains of monolingual and bilingual first language acquisition supports the claim by Müller and Hulk that – mixed utterances apart – bilinguals stay within the spectrum of structures familiar from monolinguals (cf. Tracy, 1995, 1996, 2000). The specific type of cross-linguistic influence proposed in the paper is most intriguing and in many ways complementary to the “bootstrapping hypothesis” of Gawlitzek-Maiwald and Tracy (1996).

I would have liked to learn more about how many and what types of covert elements should be attributed to sentences with missing arguments. If we took the representations in (8) and (9) seriously, we should arrive at the following impasse: on the one hand, the PRO analysis provides us with a nice explanation for why the child (unless he or she is acquiring Chinese) eventually stops adjoining PRO to IP after lexical complementizers and other representatives of CP appear, since PRO has to remain ungoverned (PRO Theorem). At the same time, however, (8) and (9) show that PRO originates in a governed position, leaving a governed trace, in accordance with the Empty Category Principle. Unless the authors wanted to claim that PRO adjoins to IP in order to “escape” its governor – a futile effort, given the trace – this contradiction needs to be resolved and makes me wonder whether it might not be advisable to consider better candidates than PRO for the various types of gaps to be accounted for. This would entail a more detailed discussion of the empty canonical position, of the empty topic, and possibly also of the abstract representative of a discourse/situational antecedent. In this context it might also be worth considering Radford’s proposal (1992), which distinguishes lexical and syntactic satiation, thereby initially avoiding the projection of early empty objects onto syntactic levels. Temporary coexistence of both options (lexical and syntactic satiation) might help account for the gradual disappearance of

deviant patterns. However, if one *does* look for early syntactic solutions, other candidates for the empty canonical position would be the variable *pro* or a null-deictic, as proposed by Kato for the earliest stages of the acquisition of Portuguese. And, given the observation that initially Romance clitics are used inconsistently and missing from their obligatory contexts as well, would it not be necessary to include a null third-person clitic (again along the lines of Kato, 1994) as a covert representative of object agreement?

I also asked myself what representations might enable the bilingual child to identify correspondences or “overlapping” structures in the first place. At a fairly superficial level, English *He ran fast* and German *Er rannte schnell* could be considered syntactically equivalent, and I guess this is what the authors have in mind. At the same time, the representations underlying these sentences could be quite different, namely IP for English, and – depending on one’s theoretical framework – IP, CP, or a conflation of the two for German (cf. the range of options discussed from an acquisition perspective in Fritzenschaft, Gawlitzek-Maiwald, Tracy, and Winkler, 1990; various articles in Meisel, 1992; and in Tracy and Lattey, 1994). How exactly can we tell how far the learner’s German/Dutch grammar has come on its way from the Minimal Default Grammar, and what phrase structure representation is available as an appropriate, supposedly unambiguous match for the child’s French/Italian constructions?

I could hardly be more sympathetic to Müller and Hulk’s claim that monolingual children behave like bilinguals. According to my own “multiple-roots” perspective, monolinguals start with different, but UG-consistent, structural fragments or sentential roots (including idiosyncratic lexical projections), which gradually converge (Tracy, 1991, 1995). In the best scenario, old representations are reanalysed within a more coherent overall system. A perspective which allows the coexistence of different types of root sentences provides us not only with an appropriate framework for understanding the overall spectrum of intra- and inter-individual variation. It may also help us gain a better understanding of the dynamics and mechanisms of change, because not all coexisting options are compatible, even though each of them may conform to UG.

According to this view, children acquiring German initially develop one sub-system/grammar (or even more than one) for productive verb-end formats (*Mama bus fahren*, “mummy bus ride”) while other, more or less formulaic expressions mimic V2-effects as in [*dazð*] *ball* (“there-s-the ball”) (cf. Tracy, 1991, 1995). Eventually, the coexistence of basically incompatible representations, with verbs appearing in more than one position, ought to trigger truly constructive conflicts and lead the child to infer the

existence of further levels of representation on which these conflicts can be resolved, for instance by the construction of a derivational relationship.

There is by now plenty of evidence on temporarily coexisting systems in the monolingual child, for instance with respect to variation of verb placement in main and subordinate clauses or variable question formats (cf. Fritzenschaft et al., 1990; Gawlitzek-Maiwald, Tracy, and Fritzenschaft, 1992; the articles in Tracy and Lattey, 1994; Gretschi, 2000; Hohenberger, in press). In all of these cases, clashes between competing representations should lead the child to consider reanalysis and restructuring. The conjecture by Müller and Hulk certainly encourages us to take a closer look at monolingual fluctuations and to investigate potential consequences for bilingual acquisition (cf. also Müller, 1998; Döpke, 1998).

Should the authors' high expectation of PRO indeed prove untenable in its current form, what other options come to mind in our attempt at explaining the gradual elimination of deviant object drop? Dissatisfaction with the ways in which different acquisition theories deal with null subjects and their elimination (where they are inappropriate) led Verrips (1994, 116) to propose the principle *MAX* (maximize input): *For every input string, create as many UG-allowed representations as possible.* Children should then start with the assumption that all sorts of empty subjects are possible. i.e. *MAX* allows children "the flexibility to entertain competing representations if no specific information is available to them for choosing between them" (ibid.). With time, however, the child would discover the strong or weak properties of INFL and then proceed to restrict the occurrence of empty subjects accordingly, context by context, which explains why empty subjects do not disappear in an all-or-nothing fashion. Might it not be possible to create a parallel scenario for null objects? Kato (1994, 150) points out that null variants tend to be much more restricted in their distribution than their lexical counterparts. If this is the case, the set of sentences containing null elements is smaller than the set containing sentences with lexically represented arguments. From this perspective, then, complete absence of arguments would turn out to be a perfect subset after all, that is the child could proceed conservatively, carefully taking into account different contexts until there is no more constraint to discover.

The adjunction analysis proposed by Müller and Hulk can also be related to patterns such as the following from monolingual German-speaking children. The episode in (1) demonstrates that the whole spectrum of possibilities, including overt and covert topics, gets put to use (cf. the Topic-adjunction analysis in Tracy, 1991, 368). Capital letters indicate stress, falling intonation.

- (1) S. (1;10,15) trying to get her father to rebuild a toy bridge:  
 DA brücke neu machen\ "there bridge new make"  
 PApa machen\ ein BRÜcke machen\ "Daddy make\ a bridge make"  
 JETZT wieder neu papa machen\ "now again new Daddy make"  
 BRÜcke wieder neu machen\ "bridge again new make"  
 DAS papa wieder neu machen\ "that Daddy again new make"

For the child Florian (*floa*, *flo* in (2)–(3)), constructions

like the following, with non-finite and finite root clauses, occur in significant numbers before the CP level is established. Note, in particular, that in some cases objects appear doubled, if not illicitly split.

- (2) F. (2;5,22)  
 M: Wer hat die Brücke denn gebaut? "who has the bridge built?"  
 F. pointing to one: DIE floa brücke macht\ "that F. bridge built"  
 to other one: DIE tracy macht "that T. built"
- (3) F. (2;7,27)  
 DIES flo will wegmachen\ "this F. wants-to away-take"  
 DIESE drei kommen autos\ "these three come cars"  
 (2;8.11)  
 RUTSCHbahn flo dies aufbaun "slide F. this up-build"

Finally, a last point, just out of curiosity: the authors mention several times that there were production effects in their elicitation task. With so much hinging on the child's initial pragmatic strategies, it should be particularly revealing to consider what went on in these cases. By doing so, we might stand to gain additional insight into the child's perception of those verbal and non-verbal contexts which support object omissions and ellipsis in general.

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## Crosslinguistic influence revisited: an L2 perspective

LYDIA WHITE

*Department of Linguistics, McGill University, 1085  
Dr. Penfield, Montréal, Québec, H3A 1A7, Canada*  
E-mail: LWhite@po-box.mcgill.ca

Müller and Hulk analyse data from three bilingual children acquiring a Germanic and a Romance language simultaneously, focussing on the phenomenon of object omission. They compare production data from these bilingual children with data from monolingual learners, observing that, in the case of children acquiring only one language, object drop is much more prevalent in Germanic than in Romance. The extent of object drop in the Romance of bilingual language acquirers is: (a) much greater than object omission in the production of monolingual children acquiring a Romance language; (b) similar to the rate and extent of object omission by monolingual children acquiring a Germanic language.

Müller and Hulk follow Roeper (1999) in assuming that all children adopt a Minimal Default Grammar, whereby certain default options permitted by Universal Grammar surface in the early grammar without the need for triggering input. Müller and Hulk suggest that object drop is permitted in the Minimal Default Grammar, the null object being licensed by discourse (as is in fact the situation in adult Chinese, for example). German is a topic drop language, permitting null topics, including objects which happen to be topics. Null objects, then, are licensed in adult German, although not in the same way as in Chinese. In the acquisition of German, there will be extensive input consistent with an object drop analysis, confirming the Minimal Default Grammar. In the case of French, on the other hand, while sentences are found without overt DP objects following the verb, as soon as children become aware of preverbal object clitics, they will realise that a discourse-licensed object drop analysis must be incorrect. Thus, monolingual German children make more extensive use of object drop because the German input provides many examples which are consistent with a discourse strategy sanctioned by the Minimal Default Grammar. Monolingual French children abandon this discourse strategy sooner, when they notice the presence of object clitics.

Turning now to bilingual acquisition, the child also starts off with a Minimal Default Grammar analysis of object drop, for each of the languages being acquired. Müller and Hulk propose that there is unidirectional crosslinguistic influence in this context. The idea is that, if input from a language A is consistent with more than one possible analysis of some grammatical phenomenon and input from language B provides positive evidence for one of these possible analyses, crosslinguistic influence is expected, in one direction only, namely from A to B. That is, possibilities allowed in A but not B will nevertheless appear in the learner's grammar of B. In the case of object drop, Germanic (German or Dutch) constitutes language A,

while Romance (French or Italian) constitutes language B. However, it is important to note that the claim being made is not that the child's grammar of German (or Dutch) directly influences the grammar of French (or Italian). Rather, the Germanic input (which includes examples of topic drop of objects) somehow feeds into the grammar being acquired for the Romance language (which is itself, initially, the Minimal Default Grammar). Input from both Germanic and Romance provides some evidence for object drop but this is much more extensive in Germanic; hence, Germanic input influences the construction of the bilingual child's grammar of Romance but not vice versa, making the discourse-based analysis of null objects more persistent than in the case of monolingual Romance acquisition.

Similar proposals for unidirectional crosslinguistic influence have been discussed in a variety of frameworks in second language (L2) acquisition for many years, with researchers trying to explain why some aspects of language are more liable than others to transfer from the first language (L1) to the interlanguage grammar, why some L1 properties are particularly persistent, and why it makes a difference which language is the L1 and which the L2. For example, Zobl (1980) looks at the position of pronouns in interlanguage and notes that native speakers of Romance languages do not transfer the possibility of preverbal object clitic pronouns to their L2 English, i.e., they do not say things like *I her see* in place of *I see her*, whereas native speakers of English learning French do place pronouns after the verb, consistent with L1 order: *Je vois elle* ("I see her") instead of *Je la vois* ("I her see"). Zobl further proposes that this unidirectionality is due to the fact that, when English is the L2, there is no congruity between Romance and English. There is nothing in the English input to support an analysis where pronouns are preverbal clitics, whereas, when French is the L2, French SVO word order could confirm an incorrect hypothesis by a native speaker of English that any object, whether a full DP or a pronoun, can be placed in the postverbal position.

In a related vein, Andersen (1983, 178) proposes the *transfer to somewhere principle*: "A grammatical form or structure will occur consistently and to a significant extent in interlanguage as a result of transfer *if and only if* there already exists within the L2 input the potential for (mis-)generalizing from the input to produce the same form or structure." Similarly, Adjémian (1983, 255) argues that there will be transfer from the L1 lexicon to the L2 and that "learners will use ready-made hypotheses wherever they perceive them to fit the available primary data".

Similar ideas have been addressed in terms of markedness and associated learnability problems (e.g. White, 1987), particularly in the context of the Subset Principle

(e.g. *Finer and Broselow, 1986; Hirakawa, 1990; White, 1989*). When the L1 grammar generates more marked forms, or permits structures that form a superset of those found in the L2, the L2 data will be partially consistent with the L1 grammar. For example, following *Manzini and Wexler's (1987)* proposal for a Governing Category Parameter, studies have consistently shown that learners whose L1 is a language like Japanese (which allows both local and long-distance antecedents for reflexives) assume that English also allows long-distance binding.

Let us consider Japanese, the L1, as language A and English, the L2, as language B: in a case like this, adopting the parameter setting exemplified in grammar A results in a persistent misanalysis of the input from language B. The L2 input provides evidence for local binding; the L1 grammar sanctions both local and long-distance binding. Thus, the L2 input is partially consistent with the L1 parameter setting; in consequence, this setting is incorrectly maintained in the interlanguage grammar. The influence is unidirectional, at least as far as long-term effects are concerned: if English were the L1 and Japanese the L2, there would be no potential for overgeneralisation. While learners might start with an overly restricted L1-based analysis, permitting only local antecedents for reflexives, positive L2 input is in principle available to show that long-distance binding is permissible, hence that the interlanguage grammar must be restructured (i.e., the parameter reset) to accommodate the L2 input. (However, there are cases where learners eventually fail to acquire properties which are exemplified in positive input from the L2. Even in such cases, it is the nature of the L1 grammar which determines how the L2 input is perceived. See *Sorace (1993)* for discussion.)

So far, we have seen that there are parallels between what *Müller and Hulk* propose as the source of cross-linguistic influence in the case of simultaneous child bilingual acquisition and what has been proposed in the literature on L2 acquisition. There are also some differences between the proposals in these domains, as well as some interesting questions that arise from a comparison of the two situations.

Of course, an obvious difference between bilingual acquisition and L2 acquisition is that two grammars are being acquired simultaneously in the former case, whereas in L2 acquisition, the mother tongue is acquired prior to the L2. In consequence, there is a difference in how the influence of one grammar on another is interpreted. Under *Müller and Hulk's* proposal, it is the Germanic input that influences the Romance grammar; they do not claim that the child's grammar of German directly influences the child's grammar of French. (Recall that the child's original object drop analysis does not come from either German or French but from the Minimal Default Grammar. Indeed, the child's grammar of object drop in German at this point is presumably identical to the child's grammar of object drop in French, since both conform to the Minimal Default Grammar. The analysis of object drop in adult German is actually irrelevant to the child.)

What *Müller and Hulk* are suggesting is that input data from one of the two languages (German or Dutch)

somehow feeds into the grammar the child is constructing for the other language (French or Italian). In other words, German serves as primary linguistic data for French. This seems somewhat counter-intuitive. Since *Müller and Hulk* are proponents of the separation hypothesis for bilingual grammars, it is not entirely clear why the input from one language should influence the grammar of the other in this way. (*Sorace (2000)* makes a proposal regarding L1 attrition which has parallels with *Müller and Hulk's* claim about the effects of input from the "wrong" language. *Sorace* suggests that, in the case of near-native speakers, the L2 may have effects on the L1 grammar, not because of properties of the L2 grammar as such but because the L2 input somehow feeds into the L1 grammar.)

In contrast, in L2 acquisition a stronger claim is made with respect to the influence of the grammar; namely, it is the L1 grammar (not the L1 input) that directly influences the interlanguage grammar (e.g. *Schwartz and Sprouse, 1996; White, 1985*). In the case of the Governing Category Parameter discussed above, the interlanguage grammar of Japanese-speaking learners of English incorporates the L1 parameter setting, which cannot be disconfirmed by positive L2 input; hence, the L1-based analysis is maintained, reinforced by the fact that the L2 input is partially consistent with it. Assuming the interlanguage representation to be initially based on the L1 grammar, it is the L2 input (not the L1 input) that serves as primary linguistic data for the interlanguage grammar, in some cases leading to restructuring in the course of development, in other cases not (*Schwartz and Sprouse, 1996*).

An interesting question emerges from considering the parallels with L2 acquisition, namely the potential learnability problem. In the L2 context, when the L1 has a grammar yielding a superset of sentence types permitted in the L2, this has been argued to constitute a particularly difficult situation for the L2 learner to retreat from, a situation where negative evidence might be necessary (*White, 1991*) or where change in the more restricted direction would be impossible (*Schwartz, 1993*). Is there an equivalent retreat problem in the bilingual context? If input from one of the child's two languages has led to the other grammar being overly inclusive, how does the child retreat? What brings about grammar change? In the particular situation examined by *Müller and Hulk*, it appears that retreat will not be a problem. As they point out, object clitics may eventually provide the necessary positive evidence that discourse-licensed null objects are not possible in Romance. But if their proposal extends to other contexts, then one can conceive of cases where an incorrect analysis (based on primary linguistic data from the 'wrong' language) would be permanent.

In conclusion, although there may be differences in the effects of crosslinguistic influence on bilingual and L2 acquisition, it is clear that there are important common concerns. The crucial issue in both cases is the relationship between grammars and primary linguistic data: the nature of the grammar necessarily informs the learner's perception and analysis of input data; the data in turn may motivate grammar change or may fail to do so, depending on how well they fit the learner's current analysis.

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## AUTHORS' RESPONSE

## “Comment expliquez-vous?” Null objects in adults and children

NATASCHA MÜLLER

*Institut für Romanistik, University of Hamburg, Von-Melle-Park 6, D-20146 Hamburg, Germany*

**E-mail:** nmueller@rrz.uni-hamburg.de

AAFKE HULK

*Fransse Taalkunde UvA, University of Amsterdam, Spuistraat 134, NL-1012 VB Amsterdam, Netherlands*

**E-mail:** aafke.hulk@hum.uva.nl

We are very happy to see that most commentators agree with our main claim that language separation and cross-linguistic influence coexist in bilingual first language acquisition. Our hypotheses as for where to expect this crosslinguistic influence raised more questions. We thank all commentators for their interesting comments. In this response we will address only some of them. In future research we hope to tackle some of the more fundamental points in more detail.

### Research strategies

The main point raised by **Margaret Deuchar** is that our study showed more individual variation within the groups of monolinguals and bilinguals than variation between the two groups. Deuchar uses MLU matches in order to compare the children. One error in the presentation concerns Ivar's MLU: Ivar is the only child who cannot be compared with respect to MLU either to the monolinguals or to the other two bilingual children, since his MLU is morpheme-based while the MLU of the other (monolingual and bilingual) children is word-based. Yet, we also mention this in the article. This is the reason why Deuchar compares Ivar's first development stage (the object drop stage) with the group 2 monolingual French children (the adult-like stage) of the elicited production task and the second stage of the other bilingual children. Furthermore, it is not clear why Deuchar compares Carlotta's (German–Italian child) data with the French monolinguals Victor and Chloé. Deuchar's commentary raises an important issue. We have observed that once children have reached an MLU of 3 (word-based!) it may vary a lot from session to session. We believe that the picture is much more realistic if MLUs below 3 are compared. We would further like to mention that in combination with MLU other measures, such as standard deviation and type–token analysis are important. The problem was that we had done such analyses for the bilingual data we presented, for Carlotta and Anouk, but this information was not available for the longitudinal monolingual data and for Ivar. Therefore, we decided to take MLU, which, we agree, was not the best criterion. Since we were aware of the difficulty related to MLU comparisons, we included a qualitative criterion, namely the usage/absence of structures related to the C-system. We chose this criterion as there seems to be agreement on the

observation that child speech lacks these structures during early developmental stages. Another difficulty related to MLU as a means of comparison is the following: recent studies on the acquisition of determiners and other functional categories have shown that *some* children use proto-forms instead of adult-like functional categories. The important observation is that only *some* children do (acquiring the same language) while others leave the position radically empty (cf. Kupisch, 2000 for a comparison of German and Italian). However, with respect to MLU (word-based), an utterance like *maman veut [n] pomme* “Mummy (I) want proto-form apple” contains four words, while *maman veut pomme* consists of three words. A further finding is that if children do use these proto-forms, they may use them abundantly, i.e. for all types of functional categories. In other words, at the level of MLU we measure the individual's ability to use a particular amount of words per utterance. Of course, this makes MLU (as the only measure) unusable for comparisons of groups of children, bilinguals and monolinguals.

This brings us to **Regina Köppe's** troubles with our analysis. Why do we compare averages? If we had not, it would have been impossible for a reader who does not know the data to follow our arguments. The absolute numbers are all in the article. We are fully aware of the problem posed by a comparison of groups and individuals. This is why we also considered longitudinal monolingual (Dutch, French, Italian) data. Longitudinal German data were missing when we studied our bilingual children. The data are available now. The absence of monolingual German data represents a real gap in the analysis. This issue allows us to correct a real error in the article. In our first submitted version, we did not include longitudinal Italian data. One of the reviewers suggested including Maria Teresa Guasti's findings on monolingual Italian children. Unfortunately, we compared our bilingual data with her (longitudinal) monolingual data since we forgot (!) that we had a good reason to exclude them from our analysis. Guasti (1993/94) was not particularly interested in object omissions and thus she counted omissions of *all* cliticizable complements, e.g. direct objects, indirect objects, prepositional objects, and reflexives. Her percentages cannot be compared with the percentages presented in our article since we were not interested in clitics in general. Therefore, the amount of object drop in monolingual Italian children should be much lower than in Guasti

(1993/94) and hence even more comparable to the 11% of object omissions in the monolingual French children.

We agree with **Margaret Deuchar** pointing out that one has to control for the type of interactions in which the bilingual child is involved. The bilingual children under investigation have been observed in a bilingual setting: the children's parents knew both languages and the interlocutors who were interacting with the children during the recording sessions were "bilingual" as well, at least with respect to language comprehension. In Carlotta's case we systematically started the recording session with a different language, i.e. at point A we started with Italian, at point B we started with German. Thus, the observation that the influence is unidirectional is sufficient in order to exclude an influence of the language mode. But notice that even in a monolingual setting it could be the case that the child will be recorded in Italian after a whole day in German kindergarten or after a long play session with her monolingual Italian grandmother. This raises the question of whether we can really control for the language mode in a bilingual child.

#### **The grammatical analysis of object drop in child and adult language**

**Mary Kato, Johanne Paradis, and Rosemarie Tracy** criticized our analysis of child object drop in terms of a PRO adjoined to IP. We admit that we do not believe in the particular analysis anymore, also because it is not compatible with current generative theory. Since our main point was the issue of crosslinguistic influence and we had to take into consideration four languages, we did not have the space (1) to really justify the PRO analysis for child grammar (cf. Müller, Crysmann, and Kaiser, 1996) and (2) to present and discuss a different approach to object drop in the adult systems. Although we do not believe in the particular analysis anymore, and Mary Kato suggests an interesting alternative, we thought that even without revising the grammatical analysis we would be able to show that all children pass through MDG (some children faster than others, depending on the language to be acquired), that MDG corresponds to Chinese with respect to object drop, and finally that instantiation of CP and decrease of illegitimate object omissions are related. It is true that we were silent on the fact that there are analyses which claim that Chinese has CP. We had good reasons to do so. Until now, it is far from clear how to account for topic drop or object drop in adult systems. Mary Kato, in presenting Raposo's analysis of null objects in European Portuguese, suggests that European Portuguese is the only Romance language that has bare plural in generics and null objects. The issue of object omissions is much more complex than we presented it in our article.

Tuller (2000) points out that adult French exhibits null objects (Fónagy, 1985; Lambrecht and Lemoine, 1996), a language in which the definite generic article is obligatory. Adult Italian allows for null objects as well, although their occurrence seems to be more constrained as compared to French. Chierchia (1998) and Chierchia, Guasti, and Gual-

mini (2000) point out the possibility of having bare arguments in object position in Italian (not in subject position): *Voglio latte* "(I) want milk", *Leo odia gatti e cani* "Leo hates cats and dogs". Notice that the respective sentences are ruled out in French. What examples are there for licit null objects in adult spoken French? Following Tuller (2000, 7ff.), we have to differentiate (1) structurally arbitrary (generic) human null objects of the type *Ceci pousse* "à conclure ce qui suit" "This leads to conclude what follows" and (2) discourse or situation-controlled null objects with definite reference as in (The gardener with a movement of his head toward the tree:) *J'abats* "I cut down?". Tuller (2000) mentions that the class of transitive verbs allowing object drop is vast in French, but in contrast to Germanic languages it is a closed class. Furthermore, French null objects are always third person, another contrast with German. Interestingly, null objects may violate both subadjacency and strong-crossover: *Ce livre<sub>i</sub>, je connais un mec qui a lu<sub>j</sub>* "This book, I know a guy who has read (it)". Tuller concludes from these observations that the empty object is a null pronoun, identified by a salient discourse topic. But notice that French exhibits articles obligatorily.

That child object omissions are clitic omissions cannot be proved on the basis of our data, since the necessary evidence for such an analysis is missing (e.g. gender and number agreement morphology on the past participle in Italian constructions with a null object). We believe that the observation that children's constructions with an empty object in French and Italian correspond to adult constructions with a clitic is not sufficient for the claim that object omissions are object *clitic* omissions. Note further that German and Dutch children drop the object under the same pragmatic conditions but these adult systems do not exhibit object clitics as compared to French and Italian.

#### **The pragmatics of object omissions**

The discussion of the grammatical analysis of child object drop leads us to **Suzanne Schlyter's** and **Shanley Allen's** main point, namely that we have to account for the pragmatics of object omissions in child and adult Romance languages. We agree that this should be the next step in our research. Nevertheless, since we have argued that CP plays a crucial role in the development of the child "drop-system", we will approach this issue from the perspective of the feature make-up of CP in the languages under investigation. The majority of researchers agree that Germanic and Romance languages differ significantly with respect to the feature make-up of CP. It is, however, not clear to what extent and how this difference is related to object omissions. Notice that null objects are possible in French subordinate clauses, whereas they are ruled out in German subordinate clauses. Therefore, the study of what features constitute CP (TOPIC, etc.) in the different adult and child grammars and how these are related to the possibility (and the extent) of having null objects are on our research agenda. We did not intend to use pragmatics as a waste-paper basket. The main issue of the paper was to show that

null objects are not lexically/syntactically but pragmatically licensed (and identified) in early child language. However, we did not (yet) offer any detailed discussion of what a topic actually is or, especially, how a child might come to understand this phenomenon, as pointed out by Allen. Our next step will be to show what pragmatic licensing and identification really mean.

**Rosemarie Tracy** points out the desideratum to study the effects of the elicited production task in the light of our analysis of early pragmatic licensing and identification of child object drop. This will be very important in order to study the exact pragmatics of object omissions in child language. In Müller and Schmitz (2000) objects are compared with subjects for the monolingual German and Italian data for both elicited production and spontaneous interaction (cf. Jakubowicz, Müller, Kang, Riemer, and Rigaut, 1996 and Jakubowicz, Müller, Riemer, and Rigaut, 1997 for the monolingual French children, and Cantone and Schmitz, forthcoming for a bilingual German–Italian child): subject omissions seem to be of a different nature than object omissions, as pointed out also by **Shanley Allen** in her commentary.

### Really CP?

**Regina Köppe** did not find an exact correlation of usage of object clitics, decrease of object omissions and lexical instantiation of CP, neither in our data nor in Pascal, the child analyzed in her commentary. Already Müller et al. (1996) were aware of the study by Friedemann (1992) who found that object clitics were used (although sporadically) before lexical instantiation of CP in monolingual French children:

Analyzing the speech of two monolingual French children (Grégoire and Philippe), Friedemann (1992) found that the acquisition of object clitics is a gradual process. Note that this is not excluded under our analysis: children might start to use object clitics well before they fully instantiate their C-systems. If they do not, however, the sudden unavailability of free object drop may aid them in acquiring the full object-agreement paradigm [which equals object clitics in their approach]. (p. 58)

Both Carlotta and Anouk are not “perfect” children for a parameter-view of language acquisition, in contrast to Ivar. Carlotta and Anouk exhibit a rather long transitional phase with respect to lexical instantiation of CP and the complete absence of illegitimate object omissions. Let us turn to Pascal who resembles Carlotta and Anouk in many respects. It is true that Müller (1993) found that CP is lexically instantiated in Pascal around the age of 2;5 and Kaiser (1994) observed that object clitics start to be used around 2;4. However, Kaiser (1994) notes that “only at age 3;2 does Pa begin to employ object clitic forms other than *le(s)/lla* or *se*” (p. 144). This contrasts with Ivar who starts to use third person object clitics at the same time as first and second person object clitics. With respect to CP, Müller (1993) shows that lexically introduced subordinate clauses are very rare in Pascal at the ages 2;5, 2;6, 2;7, and 2;8, and six (out of eight) involve the conjunction *parce que* “because”. Only from 2;9 onwards does the picture change:

Pascal uses a higher number of subordinate clauses in one recording and a diversity of conjunctions and wh-elements. This age corresponds to the age where object omissions reach a percentage lower than 10%. The picture is, again, different in Ivar: he starts to use first lexically introduced subordinate clauses at 2;11, but already at age 3/3;1, he produces more than just one or two subordinate clauses per recording and a diversity of subordinate conjunctions: *parce que*, *quand* “when”, *comme* “as”, (*pour*) *que* “in order that/to”, *que* “which”, *qui* “who”, and *comment* “how”. To summarize, it seems as if Pascal is more like Carlotta and Anouk in that he exhibits rather long transitional phases.

Our approach, as presented in the paper, makes the prediction that illegitimate object omissions should not occur in subordinate clauses. Unfortunately, we were not able to investigate this issue since the children did not use enough subordinate clauses during the period of investigation. The example (1) in Köppe is a legitimate object omission: in French, it is very common to drop the object after (*il*) *faut*, e.g. *faut pas faire* “(one) should not do (it)”. The second example may be a self-correction. But let us suppose that Köppe’s examples are examples for illegitimate object drop in subordinate clauses. We believe that it is not a mere coincidence that these clauses are introduced by *parce que*. It has been observed that English children confuse “because” and “why”. De Villiers (1991) has suggested an analysis of children’s why-questions as being in topic position, i.e. “why” is attached to IP and the structure does not contain a trace. It would have interesting implications for the issue of object omissions if de Villiers’ analysis applies to “because”-subordinate clauses and if French children confuse the French counterparts of “because” and “why”.

**Suzanne Schlyter** highlights the issue that other functional categories may play such a crucial role for cross-linguistic influence as the CP in our approach. We did not exclude this possibility. It is the interface character of a functional category which creates confusion in monolinguals and to a higher degree in bilinguals. We would like to make one final remark with respect to Schlyter’s commentary where she proposes that the presence of lexical subjects might be a better candidate to explain the disappearance of null objects than the properties of CP: subject omissions have been studied in Carlotta and she behaves quantitatively like a monolingual Italian child in this respect. Lack of subject drop is thus not evidenced. Moreover, it is unclear what Schlyter’s hypothesis would have to say about Anouk’s French.

### Really influence?

**Lydia White** points out the differences and similarities of our approach with studies on second language development. Due to space limitations we could not address the question of second language acquisition, but we are convinced that both types of learners, first and second language learners, have similar problems with the grammatical domain we studied, object omissions. That data of language

A serves as primary linguistic data for language B in the case of bilingual *first* language acquisition, and the assumption that the languages are separated at the same time is not necessarily counterintuitive. We actually quite agree with what White calls the stronger claim: that it is the grammar of language A that influences the grammar of language B. A language A-based grammar is adopted when the language B input is partially consistent with it. As **Tom Roeper** puts it: the child simultaneously juggles three grammars, the MDG, the grammar of language A, and the grammar of language B, for the relevant phenomenon. Furthermore, at the stage when the child has already chosen the target grammar(s) for the relevant phenomenon, s/he may still assume MDG or juggle with three grammars for another grammatical phenomenon. This view implies that the issue of language separation cannot be discussed for a whole grammatical system (the grammar of one language), but for the particular grammatical domain. This assumption has far-reaching consequences for the whole issue of bilingualism. Lydia White's commentary also forces us to reflect upon the most interesting question which has received no satisfying answer yet: what makes the child bilingual? Or, put differently: what forces the individual to look for different grammatical analyses? It is perhaps the stage of "competing" syntactic subsystems which coexist without overt cues, which is most telling. The existence of competing syntactic subsystems may force the learner to analyze competing variants in the input as evidence for two linguistic systems (Kroch, 1989). Under this view, the difference between monolinguals and bilinguals (first and second language learners) disappears – a desirable result. This will probably also clarify some of the issues discussed by **Susanne Döpke**: the existence of competing syntactic analyses can be accounted for in a hybrid model of linguistic competence, as the one by Yang (2000). It does not mean that we have to adopt the Competition Model, although we agree with Döpke that "a more comprehensive picture of information processing and cognitive structure building is called for".

**Suzanne Schlyter** reports on research on the acquisition of DP in a Swedish–Italian child. She mentions that a target-deviant construction which the child uses in Swedish has never been observed in monolingual Swedish children. We would like to point out that our approach makes it necessary to define what *never* means. This is also an important point in **Tom Roeper's** commentary where he suggests that in some cases of monolingual acquisition a hypothesis could be present for a week and then dropped without any adult detecting it. Hulk and van der Linden (1996) found that a construction which is used for a very short time and with very low frequency (below 5%) in monolingual French children, *livre lire* "book read", is used much longer and with a higher frequency in the French of the bilingual Dutch–French child they studied. Furthermore, the construction as such does not exist in the input. However, a left-dislocation like *(le) livre (je) (veux) (le) lire* "the book I want to read it", where all elements which are systematically absent in early child speech are in parentheses, might lead the child to the assumption that topicalized constructions as in *livre lire* are

a good first guess for French. This is the reason why we said that *from the child's perspective* there must be a certain amount of overlap of the two grammatical systems. We fully agree with Schlyter that our mapping approach has to be extended to the mapping of syntax and semantics (which should be as problematic as the mapping between syntax and pragmatics).

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# Processing cost associated with inflectional morphology in bilingual speakers\*

MARJA PORTIN

*University of Turku*

MATTI LAINE

*Åbo Akademi University*

*In this study the visual recognition of inflected, derived and monomorphemic Swedish nouns in monolingual Swedish and bilingual Finnish–Swedish speakers was investigated. While bilinguals were slower overall, the inflected items yielded disproportionately longer reaction times in the bilingual group. The derived items, on the other hand, elicited fastest reaction times in both groups. The observed processing cost associated with inflectional morphology indicates that bilingual language background can affect the recognition process for inflected words, possibly by leading to morpheme-based recognition which is slower than full-form recognition. Further studies are needed to examine whether this effect is specific to the language background of our bilinguals (including Finnish which is a morphologically very rich language) or whether it could be a more general processing feature in bilingual speakers faced with regular inflected forms.*

## Introduction

Psycholinguists have long been interested in the organisation of the mental lexicon in bilinguals. Central research issues have included the independence vs. dependence of language-specific lexicons, the relationships between conceptual and lexical representations in bilingualism, and language switching mechanisms (e.g., Schreuder and Weltens, 1993; Kroll and Stewart, 1994; Brysbaert, Van Dyck and Van de Poel, 1999; Meuter and Allport, 1999). In contrast, lexical–morphological processing in bilingualism has been a largely neglected area, even though languages differ greatly in their morphological complexity and there is evidence that morphological structure and related factors affect storage and access of lexical items (for reviews, see Frauenfelder and Schreuder, 1992; McQueen and Cutler, 1998). In their introduction to the book *The Bilingual Lexicon*, Schreuder and Weltens (1993) note the following:

Will someone who speaks Finnish (with its very rich morphology) as a first language, employ the same morphological processes when speaking a morphologically much

simpler language like English? . . . How multilingual speakers of languages that are not closely related acquire new morphological processing mechanisms is an interesting question that has not been answered so far. It is unclear at present how much of these processing mechanisms can be shared, even for languages that are closely related. (p. 6)

As pointed out by Schreuder and Weltens in the quotation above, a theoretically interesting situation is created in a bilingual speaker who has acquired both a morphologically limited and a morphologically complex language. Would the representation and storage of morphologically complex words in one language be affected by the other language? Transfer effects have been shown in syntactic aspects of second language processing which is closely related to morphology (see Kilborn, 1994, for a review). In the present study, we explored this possibility by examining visual word recognition in a morphologically limited language (Swedish) by monolingual speakers of that language vs. bilinguals who are also fluent speakers of a morphologically very rich language (Finnish–Swedish bilinguals).

The morphological richness of a language has been considered as a potentially important factor in the organisation of the mental lexicon (Hankamer, 1989). Finnish, for example, is a non-Indo-European language which uses morphology to a far greater extent than most of the other languages that have been explored in psycholinguistic research. Each Finnish noun has over two thousand possible forms (consider the form *talo+i+ssa+nne+kin* “house” + plural + inessive case + possessive suffix + enclitic particle = “even in your houses”) and the number of possible

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Address for correspondence

Matti Laine, Department of Psychology, Åbo Akademi University, FIN-20500 Turku, Finland

E-mail: matti.laine@abo.fi

verb forms exceeds ten thousand. These estimates exclude derivation and compounding which are also very productive. Therefore it is not surprising that experimental results obtained from both normals (Niemi, Laine and Tuominen, 1994; Hyönä, Laine and Niemi, 1995; Laine, 1996; Laine and Koivisto, 1998; Bertram, Laine and Karvinen, 1999; Laine, Vainio and Hyönä, 1999) and aphasic patients (Laine, Niemi, Koivuselkä-Sallinen, Ahlsén and Hyönä, 1994; Laine, Niemi, Koivuselkä-Sallinen and Hyönä, 1995; Laine and Niemi, 1997) have consistently shown a processing cost associated with most case-inflected Finnish nouns. Within current theorising, where polymorphemic word forms can be recognised either as full entities or via their constituent morphemes ("dual route" morphological processing), results obtained with Finnish suggest morpheme-based processing. This form of word recognition is thought to entail a processing load as compared to full-form recognition because morpheme-based processing requires some computation (affix stripping at the access level plus recombination of stem and affix at the semantic-syntactic level for meaning calculation) (e.g., Frauenfelder and Schreuder, 1992).

Swedish, on the other hand, is a Germanic language with rather limited morphology. Swedish nouns can be affixally marked for definiteness and they are inflected for gender and number (e.g., *flicka* "girl" *flick+or+na* "girl" + plural marker + marker for definiteness "the girls"). All in all, however, there are only eight to ten forms of nouns and verbs in Swedish when genitives and passives are included. With lexical decision tests similar to those employed in Finnish where polymorphemic words are pitted against otherwise comparable monomorphemic control words, Ahlsén (1994) failed to obtain significant processing delays which would be indicative of morpheme-based recognition of inflected Swedish word forms. She concluded that at least for simple lexical tasks, normal speakers of this morphologically limited language employ whole-word processing even when faced with regular inflected forms.

The drastic difference in morphological richness between Finnish and Swedish offers an intriguing testing ground for morphological processing in Finnish-Swedish bilinguals. Could morphological processing strategies in the Finnish language (i.e., the consistently observed morphological decomposition of inflected items) possibly be transferred to the Swedish language in bilingual individuals? We addressed this question by using a visual lexical decision paradigm where Swedish monomorphemic control words (by definition accessed via whole-word recognition) were pitted against polymorphemic words of the same language.

Two types of polymorphemic words were employed, inflected (e.g., *car's*) and derived (e.g., *seeker*). While the boundary between inflection and derivation is not as clear as one may first think, there are features nevertheless which clearly differentiate prototypical inflection and derivation (for a review, see Henderson, 1985). Inflectional morphology is closely related to syntax, it is typically fully productive (e.g., a genitive marker can be added to any English noun) and the meaning of the inflected form is predictable. At the cognitive level, full productivity and transparency of meaning create favourable circumstances for morpheme-based access and representation. Accordingly, if Finnish-Swedish bilinguals employ the computationally more demanding morpheme-based recognition route with inflected Swedish items, we should observe significantly longer decision latencies for those items than for monomorphemic control words (as compared to Swedish monolinguals). Adding a derivational affix to a word, on the other hand, changes the meaning and may change the part of speech as well (e.g., verb "to seek" → noun "seek+er"). Moreover, transparency of meaning varies in derivational forms. On the basis of earlier results with derived items in Swedish (Ahlsén, 1994) and in Finnish (Hyönä et al., 1995; Laine et al., 1995), we expect that the derived target words have full-form representations, and thus yield lexical decision latencies comparable to those of monomorphemic control words both in monolinguals and in bilinguals (most recent results suggest that productive and unambiguous derivational forms could even yield faster RTs than monomorphemic words; see Bertram et al., 1999, for evidence in Finnish).

## Materials and methods

### Participants

Two groups of participants participated in the study. The 22 native monolingual speakers of Swedish (13 females and 9 males; age range 19–35 years) were undergraduate students from the University of Uppsala, Sweden, whereas the 20 Finnish-Swedish bilingual participants (17 females and 3 males; age range 20–30 years) were undergraduate students mostly from the Åbo Akademi University in Turku which is the only Swedish university in Finland (note that Finnish and Swedish are the official national languages of Finland). No participants reported a neurological illness or problems with visual acuity. All our bilingual participants were thoroughly interviewed on their language history (see Table 1). All of them had acquired the two languages simultaneously in early childhood such that one language had been



Table 1. *Language-related data on the bilingual participants*

<i>Language background</i>				
Languages used at home during childhood	Mother: Swedish Father: Finnish 7/20	Mother: Finnish Father: Swedish 13/20		
	Swedish	Finnish	Both	
Language at primary and secondary school	10/20	9/20	1/20	
Language at high school	9/20	11/20	—	
Language at university	15/20	4/20	1/20	
	Only Finnish or Swedish	Both Finnish and Swedish		
Reading and writing at ages 7–12	0	20/20		
Reading and writing at ages 13–20	0	20/20		
	Swedish	Finnish	Both	
Current languages used at home	6/20	5/20	9/20	
<i>Self-evaluation of the ability to speak and read Finnish and Swedish</i>				
Self-evaluation of ability to	Excellent	Good	Satisfactory	Deficient
• talk in Finnish in everyday context	17/20	3/20	—	—
• talk in Swedish in everyday context	11/20	8/20	1/20	—
• read ordinary written Finnish (e.g. newspapers)	19/20	1/20	—	—
• read ordinary written Swedish (e.g. newspapers)	15/20	5/20	—	—

used mostly with one parent and the other language mostly with the other one. Their school language had been either Finnish or Swedish and they continuously used both languages in their daily life. They reported a high level of proficiency in the two languages (as can be seen in Table 1) but Finnish was evaluated as the stronger language by the majority.

### Materials

The test materials consisted of 20 monomorphemic, 20 derived and 20 inflected Swedish words (see the Appendix). The derived target words were bimor-

phemic, carrying the deverbal agentive marker *-are* which corresponds to the English derivational ending *-er* (e.g., *dans+are* ‘dancer’). The inflected target words were trimorphemic, carrying two suffixes: *-en* or *-et* (depending on grammatical gender) signalling definiteness and *-s* which is a genitive marker (e.g., *bil+en+s* ‘the car’s’). As Ahlsén (1994) did not find any evidence for morphological decomposition of bimorphemic inflected Swedish nouns (plural forms such as *kanin+er* ‘rabbits’), we employed trimorphemic forms instead in order to maximize the possibilities of observing a processing cost with inflected words.

The three target word lists were matched for average surface frequency<sup>1</sup> (mean 7.30 for monomorphemic items, 7.30 for derived items, 7.15 for inflected items; source Allén, 1971–80) and for average length (6–8 letters). Monomorphemic and derived words were also matched for average lemma frequency<sup>2</sup> (mean 10.85 for monomorphemic items; 10.80 for derived items). Lemma frequency was significantly higher for inflected words (mean 45.35) as it was impossible to find suitable items that would be comparable also on this measure. In addition, 220 fillers (80 real words and 140 pseudowords) were included in the experiment, yielding altogether 280 stimuli. The pseudowords were either ‘monomorphemic’ or contained similar suffixes to the real words, and they were created by changing two letters in existing Swedish words. The pseudowords followed the phonotactic rules of the Swedish language.

### Procedure

The experiment was run on a PC using a specially designed computer program for word recognition experiments. Our task was a standard visual lexical decision test where the participants were instructed to decide as fast and as accurately as possible whether a letter string shown at the center of a computer screen was a real Swedish word or not. A centrally presented fixation point (asterisk) preceded each stimulus. It was displayed for 500 milliseconds, after which the stimulus word appeared at the centre of the screen. It was visible for a maximum of two seconds or until the participant pressed the reaction time key. The participant used two fingers of his/her dominant hand to press either ‘right’, if the stimulus was an existing Swedish word, or ‘wrong’, if it was a non-

<sup>1</sup> Surface frequency refers to the frequency of the presented word form.

<sup>2</sup> Lemma frequency refers to the summative frequency of all the inflectional variants of a word, including the word stem itself if it is a free-standing lexical item (e.g., boy, boy’s, boys, boys’).

word. The participants were tested individually in a separate room.

The participants were first presented with a practice session including 30 representative items. The actual experiment was divided in two parts of equal length (in both parts, 50% of the stimuli were real words, with 140 items in total), and there was a short pause in between. The presentation order was counterbalanced so that half of the participants got part A first and the other half part B first. The presentation order of the individual items within the two parts was randomised across the participants. It took about 30 minutes to complete the whole experiment.

## Results

All incorrect responses and reaction times that differed more than three standard deviations from the individual mean latency were removed from the data set. The removed reaction times were replaced by the corresponding condition averages for the participant. Two participants from the monolingual group and two from the bilingual group were discarded because of their high overall error rates (>15%). The bilinguals were treated as a single group because preliminary analyses revealed that those with a background of Finnish vs. Swedish school language performed in the same fashion.

Statistical analyses focused on RTs and error rates in the three real word-target conditions (monomorphemic, derived and inflected; see Table 2). As regards RTs, two-way ANOVAs (language group x morphological structure) yielded significant main effects for language group and morphological structure both in the by-participant and in the by-item analysis (language group  $F(1,36)=6.94$ ,  $p<.05$ ;  $F(2,1,57)=101.41$ ,  $p<.0001$ ; morphological structure  $F(1,2,72)=36.63$ ,  $p<.0001$ ;  $F(2,2,57)=14.74$ ,  $p<.0001$ ). The main effect for language group stems from the fact that the bilinguals were slower overall. As regards morphological structure, inflected items yielded longest RTs whereas latencies for derived words were shortest. There was also a significant interaction between language group and morphological structure ( $F(1,2,72)=7.98$ ,  $p<.001$ ;  $F(2,2,57)=6.15$ ,  $p<.01$ ), confirming that inflected items elicited disproportionately slow RTs in the bilingual group. As regards errors, language group did not yield a consistent main effect ( $F(1,36)=2.13$ , n.s.;  $F(2,2,57)=4.34$ ,  $p<.05$ ) whereas the main effect for morphological structure was statistically significant ( $F(1,2,72)=17.04$ ,  $p<.0001$ ;  $F(2,2,57)=5.76$ ,  $p<.01$ ), showing that error rates were by far highest for the inflected targets. The interaction term was statistically significant in the by-participant analysis ( $F(1,2,72)=4.08$ ,

Table 2. *Average lexical decision latencies and error rates for targets in the monolingual vs. the bilingual group*

<i>Monolinguals</i>		
Word type	RT in msec (SD)	Mean error rate (SD)
Monomorphemic	697 (185)	1.000 (1.076)
Derived	657 (159)	0.450 (0.605)
Inflected	718 (165)	1.350 (1.268)
<i>Bilinguals</i>		
Word type	RT in msec (SD)	Mean error rate (SD)
Monomorphemic	785 (72)	0.833 (1.465)
Derived	746 (107)	0.833 (1.043)
Inflected	891 (130)	2.500 (1.855)

$p<.05$ ) but just missed significance in the by-item analysis ( $F(2,57)=3.05$ ,  $p=.055$ ), suggesting that the bilingual group tended to have a disproportionately high error rate on the inflected targets.

In subsequent statistical analyses with one-way ANOVAs, the two groups were treated separately. In the monolingual group, analysis of RTs revealed a significant main effect for morphological structure ( $F(1,2,38)=9.18$ ,  $p<.001$ ;  $F(2,2,57)=6.49$ ,  $p<.01$ ). Pairwise comparisons were performed by F-tests in the by-participant analyses and by Student-Newman-Keuls multiple range tests (.05 level) in the by-item analyses. These comparisons showed that derived words were recognized significantly faster than monomorphemic words ( $F(1,19)=9.43$ ,  $p<.01$ ; Student-Newman-Keuls,  $p<.05$ ) and inflected words ( $F(1,19)=31.44$ ,  $p<.0001$ ; Student-Newman-Keuls,  $p<.05$ ). There was no significant difference between monomorphemic and inflected words ( $F(1,19)=1.34$ , n.s.; Student-Newman-Keuls, n.s.). Analysis of errors revealed a significant main effect for morphological structure ( $F(1,2,38)=6.58$ ,  $p<.01$ ;  $F(2,2,57)=3.70$ ,  $p<.05$ ), indicating that error rate was lowest for the derived targets and highest for the inflected targets. Pairwise comparisons indicated that derived targets elicited fewer errors than inflected targets ( $F(1,19)=11.93$ ,  $p<.01$ ; Student-Newman-Keuls,  $p<.05$ ) or monomorphemic targets, although here the comparison was significant in the by-participant analysis only ( $F(1,19)=4.61$ ,  $p<.05$ ; Student-Newman-Keuls, n.s.). The difference between monomorphemic and inflected targets was non-significant ( $F(1,19)=2.27$ , n.s.; Student-Newman-Keuls, n.s.).

The RT analysis in the bilingual group showed a significant main effect for morphological structure ( $F(1,2,34)=28.30$ ,  $p<.0001$ ;  $F(2,2,57)=13.79$ ;  $p<.0001$ ), with fastest latencies for the derived targets and

slowest RTs for the inflected targets. Pairwise comparisons indicated significantly faster reaction times for derived words than for inflected words ( $F(1,17)=46.69$ ;  $p<.0001$ ; Student-Newman-Keuls,  $p<.05$ ) or for monomorphemic words, although here statistical significance was reached in the by-participant analysis only ( $F(1,17)=6.57$ ;  $p<.05$ ; Student-Newman-Keuls, n.s.). Moreover, monomorphemic words were recognized significantly faster than inflected words ( $F(1,17)=21.99$ ;  $p<.001$ ; Student-Newman-Keuls,  $p<.05$ ). Analysis of errors showed a significant main effect for morphological structure ( $F(1,2,34)=11.49$ ,  $p<.001$ ;  $F(2,57)=5.30$ ,  $p<.01$ ): average error rates were equal for the monomorphemic and derived targets whereas the inflected targets elicited a higher error rate. Pairwise comparisons confirmed the significant differences in the error rates between inflected vs. monomorphemic targets ( $F(1,17)=12.88$ ,  $p<.01$ ; Student-Newman-Keuls,  $p<.05$ ) and inflected vs. derived targets ( $F(1,17)=18.48$ ,  $p<.001$ ; Student-Newman-Keuls,  $p<.05$ ).

## Discussion

The most intriguing finding in the present study was the rather dramatic processing cost (shown by long decision latencies and high error rates) the bilinguals exhibited with inflected Swedish words. To our knowledge, this is the first time this phenomenon has been reported. Given that neither decision latencies nor errors indicated a significant processing difference between inflected targets and monomorphemic control words in the monolingual group, the processing cost exhibited by bilinguals may indeed indicate a different word recognition strategy. In other words, the bilinguals may have recognized the inflected words via the slower and more error-prone morpheme-based recognition route, whereas the monolinguals would have utilized corresponding full-form representations in their mental lexicon. The surface frequency values indicate that most of our inflected targets were probably quite familiar to the participants, which could facilitate the development of full-form representations (see also Alegre and Gordon, 1999, for relevant evidence concerning English inflectional morphology).

As regards monolingual Swedish speakers, our results are thus in line with the findings of Ahlsén (1994) even though our inflected targets were structurally different. Sereno and Jongman (1997) recently reported similar results with inflected words in another morphologically limited language, namely English. At the same time, one should note that it turned out to be impossible to match the inflected

targets with the other two item types on lemma frequency. If our monolinguals indeed employed whole-word recognition, only the surface frequency match would have been critical (Sereno and Jongman, 1997). On the other hand, a more subtle processing difference where, for example, only part of the inflected items would have undergone morpheme-based recognition might have become invisible due to the higher lemma frequency of our inflected items. However, one should note that the difference in lemma frequency cannot explain the processing cost we observed in the bilinguals – if anything, the difference in lemma frequency should have worked against such a result.

Why did our fluent bilinguals exhibit a processing cost with inflected Swedish nouns? The first possibility is that they adopted a typical strategy in Finnish word recognition, morpheme-based access of inflected forms, when processing Swedish. This would mean that in a bilingual, the two languages would tend to share morphological processing mechanisms even when the languages are structurally very different, as is the case with Swedish and Finnish. As our participants represent early and simultaneous bilinguals, further studies are needed to examine whether this would hold for later and successive second language learners as well. The second possibility is that we are observing a general feature of bilingualism which is not dependent on the specific language pair we studied (Finnish–Swedish). Note that our bilinguals were slower overall and this is in line with findings that bilinguals seem to have a disadvantage in speeded verbal tasks (Ransdell and Fischler, 1987). In such a situation, the most demanding stimulus type, regular inflection, might prompt a bilingual with relatively less experience with such items to perform a time-consuming check of the legality of the specific stem–suffix combination prior to decision. This would then surface as a particularly pronounced processing cost. The third possibility would be a combined effect of the two factors just discussed. Relatively less exposure to regular inflected forms in the morphologically limited language, together with an influential model for morpheme-based recognition in the morphologically rich language, would prevent the bilingual speaker from developing full-form access representations for familiar regular inflected forms in the same way as monolingual speakers would. In future studies, it will be important to test these hypotheses by examining recognition of regular, productive inflected forms in bilinguals who possess two languages that are morphologically limited. For example, if the processing cost associated with inflected items were to surface even in such indivi-

duals, the second hypothesis would gain support. Other experimental paradigms will be needed as well to verify the present interpretation that the performance difference between monolinguals vs. bilinguals on inflected items reflects the use of different lexical access routes (full-form vs. morpheme-based). Specifically, an examination of the effects of lemma and surface frequency manipulation on lexical decision latencies (see Taft, 1979) could shed further light on the use of the lexical access routes in mono- vs. bilingual participants. For example, a surface frequency effect together with the lack of a lemma frequency effect would indicate the use of full-form access.

Finally, we should discuss the seemingly counter-intuitive finding that one type of morphologically complex items (derived forms) was recognised significantly faster than monomorphemic items. This was consistently observed in both groups. In fact, a look at Ahlsén's (1994) results obtained with the same Swedish derivational suffix (*-are*) points in the same direction (mean RT for monomorphemic targets 786 msec; 753 msec for derived targets), albeit Ahlsén's statistical analyses failed to show an equally consistent effect. We recently reported a similar result for a derivational Finnish suffix in monolingual Finnish speakers (Bertram et al., 1999). In that paper, the argumentation was based on a morphological race model of word recognition (Frauenfelder and Schreuder, 1992): at least certain derivational forms are assumed to have double representations (both whole-word and morpheme-based), being activated simultaneously via two temporally overlapping and independent access routes. Under such conditions, an item with double representations would tend to have a faster recognition time than an item for which only a single recognition route is available (see Raab, 1962, and Bertram et al., 1999, for an extensive explanation of this phenomenon labeled as statistical facilitation).

Even though theoretically plausible, there are some problems with the explanation provided by Bertram et al. (1999). First, they argued that only unambiguous and productive derivational suffixes would develop double representations and exhibit statistical facilitation (they failed to observe this effect with a low-productive derivational Finnish suffix and with a derivational suffix that is homonymic with an inflectional ending). This is in contrast with the present results as, like the English deverbal agentive marker *-er*, our derivational suffix *-are* is in fact homonymous with the commonly used comparative marker (e.g., *fort+are* "faster"). Yet we observe a "facilitatory" effect. Second, by employing inflected Finnish noun forms, Laine et al. (1999) provided

evidence that the whole-word and morpheme-based recognition routes have an inhibitory relationship which would wipe out a facilitatory effect. If these routes do have an inhibitory relationship when dealing with inflected words, it is not easy to see why their relationship would change when a derived form is encountered. There is currently no satisfactory solution to this dilemma. However, at least a potential orthographic confound should be controlled for in future studies: derivational targets always end up with the same letter sequence which may speed up their recognition in lexical decision, whereas word-final trigrams or bigrams of monomorphemic items vary (with inflected items, a morphological decomposition effect may be so robust that it would override any orthographic redundancies). Moreover, a post hoc analysis of our stimuli indicated a relatively higher rate of abstract items in our monomorphemic targets than in the other two target word groups (As can be seen in the Appendix, some of our monomorphemic items were rather abstract loan words like *relevans* "relevance" and *monument* "monument" which are more or less unavoidable as matching for word length calls for relatively long monomorphemic words). In principle, the higher rate of abstract items might have slowed down the recognition of monomorphemic targets, leading to faster responses for derived targets. Note that this would not explain the processing difficulties with inflected items we obtained with bilinguals: if anything, this difference in the rate of abstract items should have worked against that effect.<sup>3</sup>

To summarize, by employing a visual lexical decision paradigm, we observed a significant processing cost for inflected Swedish nouns in Finnish–Swedish bilinguals. This is a new finding in an important area of lexical processing that has hardly been explored in bilingualism. Further studies should be conducted to extend these results and to examine whether this processing cost depends on the specific language pair in question, or whether it represents a more universal feature of bilingual word recognition.

<sup>3</sup> One reviewer raised the issue of whether the different morphological structure of our polymorphemic items (bimorphemic derived forms vs. trimorphemic inflected forms) could have affected the pattern of results. As far as monolinguals are concerned, the similarity of our findings to those of Ahlsén (1994) who employed bimorphemic derived and inflected Swedish nouns suggests that the difference in the number of morphemes is not a likely confound. However, with bilinguals, it is quite possible that the trimorphemic nature of our inflected forms served to augment their processing difficulties.

## Appendix Materials used in the experiments

## Monomorphemic target words

1. potatis	“potato”
2. garanti	“guarantee”
3. elegans	“elegance”
4. fiktion	“fiction”
5. polemik	“controversy”
6. kurator	“counsellor”
7. hygien	“hygiene”
8. metafor	“metaphor”
9. mytologi	“mythology”
10. juridik	“law”
11. majestät	“majesty”
12. matador	“matador”
13. relevans	“relevance”
14. retorik	“rhetoric”
15. fylleri	“drunkenness”
16. romantik	“romanticism”
17. frekvens	“frequency”
18. parentes	“parenthesis”
19. monument	“monument”
20. revolver	“revolver”

## Derived target words: stem + deverbal agentive marker

21. drömm + are	“dreamer”
22. hjälp + are	“helper”
23. jag + are	“hunter”
24. känn + are	“expert”
25. rytt + are	“rider”
26. skap + are	“creator”
27. borg + are	“citizen”
28. spel + are	“player”
29. nämn + are	“denominator”
30. älsk + are	“lover”
31. sång + are	“singer”
32. saml + are	“collector”
33. tal + are	“speaker”
34. köp + are	“buyer”
35. segr + are	“winner”
36. skriv + are	“writer”
37. teckn + are	“drawer”
38. dans + are	“dancer”
39. härsk + are	“ruler”
40. vandr + are	“wanderer”

## Inflected target words: stem + definite singular marker + genitive marker

41. opera + n + s	“the opera’s”
42. antik + en + s	“the antiquity’s”
43. regim + en + s	“the regime’s”
44. natur + en + s	“the nature’s”
45. radio + n + s	“the radio’s”
46. logik + en + s	“the logic’s”
47. major + en + s	“the major’s”
48. final + en + s	“the finale’s”

49. atom + en + s	“the atom’s”
50. fiende + n + s	“the enemy’s”
51. dal + en + s	“the valley’s”
52. flagga + n + s	“the flag’s”
53. skald + en + s	“the poet’s”
54. åsna + n + s	“the donkey’s”
55. adel + n + s	“the nobility’s”
56. tsar + en + s	“the tsar’s”
57. natt + en + s	“the night’s”
58. klubb + en + s	“the club’s”
59. flotta + n + s	“the fleet’s”
60. rike + t + s	“the state’s”

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## Tip-of-the-tongue states in Hebrew–English bilinguals\*

TAMAR H. GOLLAN  
*University of California, San Diego, CA*  
 NINA B. SILVERBERG  
*Temple University, Philadelphia, PA*

*Tip-of-the-tongue states (TOTs) in proficient Hebrew–English bilinguals were compared to those of age-matched monolinguals. Monolinguals retrieved words in English, and bilinguals retrieved words from both languages. Results showed an increased TOT rate in bilinguals. However, bilinguals demonstrated comparable rates of spontaneous resolution, and similar ability to access partial information about target words. Interestingly, bilinguals named the same number of targets as monolinguals when naming an item in either language was counted as a correct response. Besides bilingualism, other factors that predicted TOT rate included word frequency (only for bilinguals), and age (younger participants had more TOTs). Unexpectedly, TOTs for Hebrew targets were not characterized by increased access to grammatical gender and number of syllables relative to control states, thus contrasting notably with TOTs for Italian and English targets respectively. We discuss these results in terms of their relevance for constraining models of bilingual lexical access and models of TOT.*

### Introduction

Tip-of-the-tongue states (TOTs) are word retrieval failures that are characterized by a feeling of imminent recall. TOTs occur on a regular basis, and are often accompanied by an ability to accurately report partial information about the target word (e.g., first phoneme, number of syllables, stress location) (Brown, 1991; Schwartz, 1999). In natural settings TOTs are estimated to occur only about once a week (Reason and Lucas, 1983). In laboratory settings they occur on about 10–20% of attempts to retrieve low-frequency targets. Few, if any, studies have investigated TOT rates for higher frequency words (Brown, 1991). Although it is important to understand TOT incidence, most studies of TOT have focused primarily on qualitative aspects of the TOT phenomenon rather than developing detailed accounts of TOT incidence (see Burke, MacKay, Worthley, and Wade, 1991 for an exception). In this study, we compared TOT incidence among monolinguals and bilinguals with the goal of evaluating the

influence of bilingualism on TOT rate, and to test predictions made by models of TOT and models of bilingual language production.

TOT states reflect a state of lexical activation that falls in between not knowing a word and having the ability to produce it without difficulty. In this regard, TOTs form part of a continuum of possible responses that may arise during the normal development of fluent word production and relate naturally to the topics of language acquisition and maintenance. However, to date there have been very few investigations of TOTs (and other types of lexical retrieval failures) in bilingual individuals, or in younger adults and children (but see Faust, Dimitrovsky, and Davidi, 1997; Heine, Ober, and Shenaut, 1999). In early stages of second language (L2) acquisition, speech production is characterized by short utterance length, is slow in rate, and is prone to hesitations and unfilled pauses (Lennon, 1990). Similarly, slips of the tongue are considerably more common and decrease as the level of proficiency in L2 increases (Poullisse and van Lieshout 1997). Because some hesitations in L2 speech no doubt reflect TOT states, it is reasonable to hypothesize that TOT states also occur more often in L2 relative to L1. However, word retrieval failures in early stages of second language acquisition are likely attributable primarily to the nature of lexical representations which may not yet be fully specified in terms of semantic, syntactic, and phonological information (Poullisse, 1997). It is not clear to what extent these types of retrieval failures are com-

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Address for correspondence  
 Center for Research in Language, University of California, San Diego, 9500 Gilman Drive, 0526, La Jolla, CA 92093–0526, USA  
 E-mail: tgollan@crl.ucsd.edu

parable to those experienced by fluent bilinguals (in either L1 or L2).

Two psycholinguistic models of the TOT phenomenon have dominated research on the topic. These models focus on two issues (activation and competition for activation) that are also central to understanding bilingual language production. One type of model, henceforth the *partial activation model*, proposes that the target word is in a state of incomplete activation (Burke et al., 1991; Yaniv and Meyer, 1987) or that the representation is degraded (Brown and McNeill, 1966). In this type of account it is assumed that the order of events in lexical access is the same as it is in on-line language production but that it has been slowed drastically (Brown, 1991).

A second type of TOT model posits that a competing lexical item blocks retrieval of target word (Woodworth, 1940; Reason and Lucas, 1983; Jones and Langford, 1987; Jones, 1989). In this type of theory, henceforth called the *blocking model*, the process of accessing the target word has been altered by the presence of an interfering and more active lexical representation. In more recent terminology, blocking could be implemented either with or without positing direct competition (e.g., Rumelhart and Zipser, 1986) between lexical representations. Direct competition is not necessary if there is a limited amount of activation that can be distributed among possible lexical candidates, but (at least in this instance) the outcome of direct and indirect competition is the same.

Although both the partial activation and the blocking models predict an increased TOT rate among bilinguals, to our knowledge no psycholinguistic investigations have tested this prediction. The blocking model has recently been subjected to criticism in research on both monolingual and bilingual TOT states, however it merits reconsideration in the context of predicting TOT incidence among bilinguals in which the number of potential blockers is multiplied considerably. One reason why the blocking model has suffered so much criticism is that it is relatively underspecified. For example, it is not clear whether blockers may be semantically similar words, or if the similarity must be phonological, or both. Research on TOT states in bilinguals is likely to be useful for further constraining the blocking model, as well as other models of TOT and bilingual lexical production.

The process of gaining fluent access to word-forms in two languages requires sufficient exposure to words in each language, and a way of managing the control of each set of words (i.e., a way to select which language will be used at any given point in time). Either insufficient exposure to word forms or

an inability to select between translation equivalents would lead to an increased rate of lexical retrieval failure. The partial activation model predicts that bilinguals should experience additional TOTs because word-forms in either language will be used less often, and less recently, relative to monolingual patterns of use. In making this prediction it is assumed that TOT targets are far from ceiling levels of resting activation (i.e., still have the potential to be affected by additional occurrences), and also that bilinguals and monolinguals require roughly the same number of exposures to words to produce them efficiently.

One potential problem with these assumptions is a finding reported by Ransdell and Fischler (1986) in which proficient bilinguals were compared to monolinguals on their ability to name pictures. No significant differences were found in naming times and accuracy when bilinguals were tested in their dominant language only (Ransdell and Fischler, 1986). This finding suggests that, although monolinguals are exposed to the word-forms that they know more often, relative to bilinguals (by virtue of using one language at all times), the impact of this additional exposure to words is negligible. Importantly, however, the materials used in this study were limited to relatively high-frequency words (Thorndike-Lorge A and AA frequencies) and because TOT targets are typically very low-frequency words, it is reasonable to suppose that different results could be obtained. Moreover, although no bilingual disadvantage was observed on most tasks in this study (Ransdell and Fischler, 1986) some tasks did produce differences between bilinguals and monolinguals (i.e., slower RTs in lexical decision, and studied word recognition) suggesting that differences may be obtained when the task demands change.

Like the partial activation model, the blocking model also predicts an increased TOT incidence among bilinguals because of the increased number of potential competitors in the bilingual lexico-semantic system. This prediction requires assuming that bilinguals cannot “turn one lexicon off”, and that there may be competition across lexicons. A number of recent studies on bilingual language comprehension and production suggest that this assumption is warranted (for recent reviews see Brysbaert, 1998; Dijkstra, van Jaarsveld, and Brinke, 1998; Francis, 1999; Gollan and Kroll, 2001). Moreover, most of the increase in the number of potential competitors comes from translation equivalents that are semantically (rather than phonologically) related words. Thus, it could also be argued that the blocking model only predicts an increased TOT rate in bilinguals if semantically related words can function as blockers.



Bilinguals present an intriguing test of the cognitive system's ability to cope with the need to learn two words for every concept. The closest approximation of this circumstance in monolingual language production is the existence of synonym pairs such as *sofa* and *couch*. Recent evidence on monolingual word production suggests that in early stages of lexical access both alternative word forms of close synonym pairs are active and provide more competition for lexical selection (Jescheniak and Schriefers, 1998; Peterson and Savoy, 1998). If cross-language translation equivalents are processed in a manner that is analogous to close synonyms in monolingual language production, then bilinguals are always confronted with a greater degree of competition relative to monolinguals. Hermans, Bongaerts, de Bot, and Schreuder (1998) obtained evidence suggesting that cross-language translation equivalents in Dutch–English bilinguals did in fact produce competition even when bilinguals were asked to name in a single language. However, unlike the within-language case, the time-course of cross-language competition appeared to be limited to earlier stages of lexical retrieval (i.e., semantic but not phonological levels).

However, the notion that translation equivalents compete during lexical selection for language production is not universally accepted. Using very similar methodology others have demonstrated other limitations on the degree to which translation equivalents compete for lexical selection, and suggest instead that lexical selection mechanisms are language specific (Costa, Miozzo, and Caramazza, 1999). By this view, an increased rate of TOTs in bilinguals would be predicted only if bilinguals use words in each language less often relative to monolinguals, and if this difference produces a measurable effect on TOT incidence. Although it may seem obvious that bilinguals use words in each language less often relative to monolinguals, this does not necessarily have to be true. For example, people who become fluent bilinguals may tend to be more verbally oriented and hence may tend to use more words when they speak.

We turn now to a review of the relevant existing literature on TOT states in bilinguals and monolinguals, beginning with recent criticisms of the blocking model that have come primarily from studies that introduced blockers (or potential blockers) experimentally. Perfect and Hanley (1992) demonstrated that carefully controlled attempts to increase TOTs by presenting potential blockers (i.e., semantically and/or phonologically related words) during an experiment produced no effect. Furthermore, Meyer and Bock, (1992) and more recently James and Burke (in press), showed that externally presented “blockers” can actually cue re-

trieval (i.e., more correct responses after related cues than after unrelated cues for the same targets). However, the latter results may not be useful in evaluating the blocking theory because it is possible that internally generated words may be more likely to act as blockers, whereas experimenter-provided words may be more likely to act as cues (Schwartz, 1999; Silverberg, 1997). Burke et al. (1991) reported other evidence that they argued is inconsistent with the blocking model. They showed that older participants, who experienced a greater number of TOTs, also reported fewer alternates (i.e., blockers) relative to young adults. However, in the same paper these authors also reported that TOTs that were accompanied by alternates required longer resolution times (in all age groups) and this appears consistent with the blocking model (especially given that longer resolution times were not necessarily associated with increased report of alternates). A distinction between alternates and blockers in future models of TOT may serve to resolve some of these apparent discrepancies.

Most recently, a study of bilingual TOT states (Askari, 1999) also demonstrated that externally provided “blockers” actually cue retrieval. Sixteen young-adults who had learned Farsi as a first language, English as a second language, and had a minimum of 6 years of formal education in each language listened to 36 word definitions. Half the definitions were in English and half in Farsi, and the bilinguals were asked to identify the target words in the same language as the definition. After each definition, a phonologically or semantically related prime was presented in either the same or different language as the target word. In the overall analysis (collapsing across within- and between-language conditions) both types of primes either had no effect or increased the likelihood of successful retrieval, thus providing some evidence against the blocking model. Primes also increased the number of TOTs, perhaps suggesting that TOTs sometimes represent increased activation relative to “don't know” states (see Meyer and Bock, 1992) rather than decreased activation relative to successful retrieval as suggested by the blocking hypothesis. That similar results were obtained in both bilingual (Askari, 1999) and monolingual (Meyer and Bock, 1992) studies of TOTs provides some empirical basis for concluding that TOTs are produced by similar mechanisms in both populations.

However, some interesting differences between TOTs in monolinguals and second language speakers have also been revealed. One study on TOT states for foreign language (FL) targets showed a higher proportion of other words (sometimes called *alternates*) that were related in sound to the target relative to the

number reported during TOTs for native language targets. This finding has been replicated in several languages, and has been interpreted as evidence that in earlier stages of word learning a wider range of fragmentary information is necessary to activate the target representation (Ecke and Garrett, 1998). Interestingly, an aspect of Askari's (1999) findings with more proficient bilinguals bears striking similarity to the characteristics of TOTs in FL learners. Askari (1999) reported that phonologically related primes induced the most TOT states in L2 (English), whereas semantically related primes induced the most TOTs in L1 (Farsi). The susceptibility of L2 targets in particular to phonological information suggests that the nature of the L2 target representations, even in relatively proficient bilinguals, may be similar to lexical representations in early phases of language acquisition in at least some respects. Alternatively, the time-course of TOTs in the less-dominant language, rather than the nature of the representations themselves, may be relevant. For example, TOTs in L2 may reflect halted retrieval in a later stage of processing relative to TOTs in L1, a stage that includes the activation of additional phonological specification. The differential influence of phonological and semantic cues on TOTs in L1 and L2 may prove to be useful in further tests of the blocking model after it has been expanded to distinguish between blocking effects at the semantic and phonological levels.

In the present study we explored the nature of bilingual retrieval failures with the goals of establishing whether bilinguals have more TOTs relative to monolinguals, and whether bilingual TOTs were qualitatively similar to monolingual TOTs. The bilinguals were tested in a "bilingual mode" (Grosjean, 1997), that is, using a task that demanded word retrieval in both languages. The nature of the task was chosen for two reasons. First, assuming that competition between lexicons does increase TOT rates, this outcome is most likely under conditions that demand access to both lexicons. Recently, Dijkstra et al. (1998) demonstrated that the same words that produced cross-language interference in one context (i.e., lexical decision in one language with cross-language distractors) produced facilitation when the task was changed (i.e., bilingual lexical decision). These data suggest that the presence or absence of interference across a bilingual's two languages can be highly dependent on the task's demands. If bilinguals did not experience more retrieval failures relative to monolinguals even in the dual-retrieval task, then this would provide rather compelling evidence against the notion that competition between lexicons plays a role in producing

TOTs. Such a finding would not only imply that the mechanism for selecting lexical targets in each language is language specific, but also that it is possible to switch from using one selection mechanism to the other on each and every trial without any increase in the number of retrieval failures. Given recent evidence suggesting that language switching has dramatic and adverse effects on bilinguals' ability to retrieve words (especially in the dominant language) such a finding would be truly remarkable (Hernandez and Kohnert, 1999; Kroll and Peck, 1998; Kohnert, Bates, and Hernandez, 1999; Meuter and Allport, 1999).

The second reason for choosing the dual-retrieval task was that pilot testing indicated that whenever bilinguals could not retrieve a word in one language, they frequently reported knowing it in the other language. This suggests that retrieval in both languages is automatic, and that it is not possible to force bilinguals to only think of words in a single language. Others have made similar anecdotal observations, and have suggested that sometimes bilinguals may consciously attempt to use the translation equivalent as a strategy for resolving the TOT (Askari, 1999). Thus, although retrieval in both languages appears to be automatic, it may have developed as a consequence of strategic processing. When a translation is available, it may cue retrieval (via shared semantic representation and activation), or a bilingual can easily resolve the TOT by consulting a cross-language dictionary, or by asking another bilingual.

## Method

### *Bilingual participants*

Twenty-five bilingual (or multilingual) speakers of Hebrew and English currently living in the USA volunteered and were paid a small amount (\$10/hour) for their participation. All participants completed the experiment in one to two hours. The bilinguals' ages ranged from 17 to 61, with an average of 35.8 (SD 14.3). Participants had lived an average of 15.4 years in the USA, and 17.8 years in Israel. All participants reported using both languages on a weekly or daily basis. Table 1 shows a detailed breakdown of participant characteristics. Some participants had difficulty choosing a dominant language, and reported that they preferred Hebrew in some domains and English in others; these bilinguals are listed as preferring "both" in Table 1. Also reported in Table 1 is the number of years each participant lived in Israel, the number of years they lived in the USA, the language(s) spoken at home during child-

Table 1. *Bilingual participant characteristics*

Age	Years lived in Israel	Years lived in USA	Language preference	Home language (age 0–18 yrs)	Current use of Hebrew (%)
17	12	5	Heb	Eng & Heb	50
18	4	14	Eng	Heb	25
18	12	7	Heb	Heb	40
19	14.5	4.5	Eng	Heb	50
19	8.5	10.5	Eng	Heb	25
20	10	10	Eng	Eng & Heb	<25
20	14	6	Heb	Eng & Heb	50
22	8	15	Eng	Heb	25
26	16	10	Eng & Heb	Eng & Heb	40
27	16	11	Heb	Heb	25
32	4	28	Eng	Heb	3
34	24	10	Eng & Heb	Eng & Heb	50
40	10	25	Eng & Heb	Heb	45
40	30	5	Heb	Heb	70
42	7	17	Eng	Spanish	25
44	15	4	Eng	Spanish	25
44	30	12	Heb	Heb	50
46	28	18	Eng & Heb	Heb	20
46	35	12	Eng & Heb	Heb	25
46	25	21	Heb	Heb	50
48	20	18	Eng	Polish & Heb	25
53	25	28	Eng	Heb	50
56	21	35	Eng & Heb	Heb	<25
58	24	31	Heb	Heb	<25
61	32	27	Heb	Heb	25

hood, and subjective estimates of the extent of their current use of Hebrew.

### *Monolingual participants*

Twenty-five age-matched monolingual participants volunteered and were paid a small amount (\$10/hour) for their participation. The age range of the monolingual participants was the same as the bilinguals (17 to 61), with an average age of 33.6 (SD = 12.3). The difference of 2.2 years in average age between groups was not significant ( $t < 1$ ). On a scale of 0 to 6, with 0 being no knowledge of a second language whatsoever, and 6 being a fluent speaker of a second language, the monolingual's average self-rated fluency in a second language was 0.7, and no participant rated his/her fluency higher than a 2.

### *Materials*

The mean frequency count for English targets was 10.1 (SD = 14.8) per million according to Kucera and Francis (1967), and 10.7 (SD = 15.1) per million according to the CELEX lexical database (Baayen, Piepenbrock, and Gulikers, 1995). Low frequency

words were selected by using a Hebrew–English dictionary to identify words with clear translation equivalents, and with few synonyms in either language (Webster's New World Hebrew–English dictionary, 1992). An attempt was also made to avoid using extremely rare words. Eighty definitions of these words (74 nouns, 5 adjectives, and 1 verb) were created to serve as experimental stimuli. For example, *a metal device that is thrown overboard for the purpose of holding a ship or boat in place*. To allow use of the same definitions with monolingual English participants, the definitions were written in English. In English, item length was distributed as follows: 19 (24%) one-syllable, 44 (55%) two-syllable, 15 (38%) three-syllable, and 2 (3%) four-syllable words. When translated into Hebrew, the items were distributed as follows: 5 (6%) one-syllable, 35 (44%) two-syllable, 30 (38%) three-syllable, and 10 (13%) words with four or more syllables. These distributions reflect the statistical regularities in each language (see section on *Syllable-guess accuracy*). A list of the items appears in the Appendix.

### *Procedure*

Each participant was tested individually, and was told that a TOT state is an experience in which a person attempts to recall a particular word that s/he is sure s/he knows, but cannot recall at the moment, and yet feels that recall is imminent. They were also told that sometimes during a TOT experience, a person may be able to report certain physical characteristics of the word (e.g., it starts with a “b”, or it sounds like “DA-da-da”). To verify that participants knew what a syllable was, before beginning the experiment each participant was asked to identify the number of syllables in a few practice words. Bilinguals were instructed to read the definitions and to try to produce the target word (e.g., *ogen* and its translation *anchor*) in Hebrew and in English, in whatever order the words came to mind. Twenty-one of the bilingual participants chose to speak mostly Hebrew in conversation with the experimenter, and four used mostly English. However, because of the bilingual nature of the task (and of the experimenter), code switches were frequent for all bilingual participants. Monolinguals reported the target in English only, and conversed with the experimenter in English only.

In the overwhelming majority of cases, each participant reported the target first in her or his more dominant language. If neither language was particularly dominant s/he reported the target first in the base language used to converse with the experimenter, and subsequently attempted to retrieve the

Table 2. Scoring criteria

<b>TOT-SR</b>	Self Resolved – target retrieved without a cue
<b>TOT-CR</b>	Cue Resolved – target retrieved with a cue
<b>TOT-OUR</b>	Other/UnResolved – TOT for non-target word
<b>TU</b>	Target Unclear – participant could not identify the word from the definition
<b>DREC</b>	Don't Recognize – participant reports not recognizing the word
<b>GOT</b>	“Got it” (as in Koriat and Lieblich, 1974) – target successfully retrieved

word in the other language. When retrieval difficulty was apparent, participants were first strongly encouraged to report anything that came to mind, and then were asked to make guesses about the target word (the number of syllables first, and then grammatical gender for Hebrew targets). If the TOT was not resolved, cues were provided in writing letter by letter until the participant was able to report the target word, or the entire word was presented (the latter rarely occurred). When the participant was unable to retrieve the word in either language both target words were cued in an order that was based on the participant's report of which word s/he thought would be retrieved first. After the word was retrieved or recognized, participants were asked to report whether that word was in fact the target they were attempting to find (only “yes” responses were ultimately coded as TOTs). In most TOT studies participants have simply been provided with the target word (Brown, 1991) rather than providing a cue. To compare our data to previous studies, the data from self-resolved and cue-resolved TOTs have been collapsed together unless otherwise indicated.

Table 2 shows a summary of the logic of the scoring criteria (which are described below). Participants' responses were recorded on a response sheet and were scored as follows. (1) a GOT was scored when the participant was able to retrieve the target word after reading the definition; (2) an SR (self-resolved) was scored when the participant indicated that s/he knew the word but could not retrieve it, and then subsequently retrieved the target word without any cue. Retrieval failures that were resolved in less than ten seconds were scored as a GOT rather than a TOT-SR because in these cases it is sometimes unclear if participants had finished reading or thinking about the definition. Using this scoring method, four Hebrew items and three English items from the bilingual TOT data, and eight English items from the monolingual TOT data were scored as GOTs rather than TOT-SRs. (3) A CR (cue resolved)

Table 3. Percentage of responses which fell in each scoring category

	Bilinguals in Hebrew	Bilinguals in English	Monolinguals in English
<b>TOT-SR</b>	5.4%	4.7%	2.6%
<b>n</b>	108	94	52
<b>TOT-CR</b>	10.0%	6.1%	2.5%
<b>n</b>	199	121	49
<b>TOT-OUR</b>	<1%	<1%	1%
<b>n</b>	4	3	10
<b>TU</b>	3.0%	3.8%	2.7%
<b>n</b>	59	76	53
<b>DREC</b>	5.4%	4.6%	<1%
<b>n</b>	108	91	7
<b>GOT</b>	75%	80.8%	91.5%
<b>n</b>	1522	1615	1829

was scored when the participant required a cue (first letter or more) to retrieve the target word. (4) An OUR (other/unresolved TOT) was scored if a participant was in a TOT state for a target word that differed from that intended by the experimenter. (5) A TU (target unclear) was scored when the participant was not in a TOT state, and reported that either the definition or its referent was unclear. (6) A DREC (don't recognize) was scored when the participant was unable to retrieve the target with any amount of cueing, and also when she or he retrieved the word with a cue but subsequently reported not having been sure of the word's meaning. The data from TU and DREC responses were used as control data.

## Results and discussion

### TOT incidence

The total number of responses that fell into each of the scoring categories, along with the percentage of total responses in each category for each participant group are listed in Table 3. Unless otherwise indicated, all t-tests reported below are two-tailed tests, and unless otherwise indicated, an alpha level of .05 was adopted throughout. A comparison of the monolingual data to the bilingual data for English targets shows that on average, bilinguals had a higher rate of TOTs  $t(48) = 4.07$   $p < .01$ , and also an increased number of DREC responses  $t(48) = 3.30$   $p < .01$ ; in fact, the number of DREC responses for monolinguals was extremely low (i.e., < 1%). These results indicate that relative to monolinguals, bilinguals had

more retrieval failures and also were familiar with fewer words. When TOT rates were calculated as a proportion of the number of words known to the participant i.e., #TOT/(total # of items minus #DREC), the difference between bilinguals and monolinguals was similarly robust  $t(48)=4.04$ ,  $p<.01$ . This analysis takes into account the difference in the number of opportunities to experience a TOT (Meyer and Bock, 1992) across participant groups. Despite knowing fewer words, the bilinguals experienced more TOTs relative to monolinguals. Importantly, bilinguals and monolinguals experienced equivalent numbers of TU responses  $t(48)=1.20$ ,  $p=.24$ , suggesting that the definitions were equally effective at eliciting a target word in each of the participant types.

**Variability** Another difference between the monolingual and bilingual data was the increased variability in the latter. This can be seen most easily by examining the standard deviations reported in Table 4, which presents the same data reported in Table 3, but expressed in terms of per participant averages. In the bilingual DREC and TOT data (both SR and CR), the standard deviations are quite large. A comparison of the range of total TOTs for bilinguals in English (total TOT range = 1–27) and monolinguals (total TOT range = 0–9) further emphasizes this point. Using a conventional diagnostic criterion for determining whether individuals deviated from the norm (i.e., two or more standard deviations greater than the mean for monolinguals), 15/25 (or 60%) of the bilinguals tested did not experience a greater number of TOTs relative to monolinguals. Even when allowing for less deviation (i.e., one standard deviation difference from the mean for monolinguals) there were still seven bilinguals (or 28%) who clearly did not experience more TOTs. Thus, some bilinguals did not report more TOTs relative to monolinguals despite being required to produce twice as many words while also switching back and forth from one language to another.

**Determining language dominance** Although the bilingual participants in this study reported being highly proficient in both Hebrew and English, even very proficient bilinguals often have a somewhat more dominant language. If most of the bilinguals were more proficient in Hebrew relative to English, then it would perhaps be less surprising that they experienced more TOTs in English (when compared to English-speaking monolinguals) because this finding could be attributed to characteristics of word retrieval in the less-dominant language. This possibility motivated an analysis comparing an English-

Table 4. Mean (and standard deviations in parentheses) number of responses in each scoring category for each participant group\*

	Bilinguals in Hebrew	Bilinguals in English	Monolinguals in English
<b>TOT-SR</b>	4.3 (3.5)	<b>3.8</b> (2.7)	<b>2.1</b> (1.8)
<b>TOT-CR</b>	8.0 (7.7)	<b>4.8</b> (4.2)	<b>2.0</b> (1.6)
<b>TOT-OUR</b>	0.2 (0.4)	0.1 (0.4)	0.4 (0.7)
<b>TU</b>	2.4 (2.4)	3.0 (3.2)	2.1 (2.1)
<b>DREC</b>	4.3 (7.0)	<b>3.6</b> (4.8)	<b>0.3</b> (0.7)
<b>GOT</b>	60.9 (15.9)	<b>64.7</b> (10.8)	<b>74.2</b> (3.6)

\* Significant differences between monolingual scores and bilinguals in English are highlighted in bold.

dominant subset of the bilinguals to an age-matched subset of the monolinguals.

Determining language dominance is not a straightforward task when testing bilinguals who have achieved native-like proficiency in both languages. As an objective measure of language dominance, the bilinguals were divided into groups as follows. For each bilingual a *difference score* was computed by taking the absolute value of the total number of GOTs (i.e., items retrieved without a cue) in Hebrew subtracted from the total number of GOTs in English. Bilinguals with a greater number of GOTs in English relative to Hebrew (n=10) were labeled English-dominant, and bilinguals who had a greater number of GOTs in Hebrew (n=15) were labeled Hebrew-dominant. Of the ten bilinguals classified as English-dominant using the objective criterion, eight had also indicated English to be their preferred language in the language history questionnaire, and only two had not. One of these had selected “both” as a preferred language but was able to name ten more items in English relative to Hebrew. The other chose Hebrew as a preferred language but named two more items in English than in Hebrew. The remaining nine out of ten of the English-dominant bilinguals had a difference score of 6 or more.

**English-dominant bilinguals** Despite a great reduction in power (15 out of 25 participants removed), the subset of bilinguals in our experiment who were relatively English-dominant (according to the objective

measure) still had a higher total TOT rate when compared with an age-matched subset of the monolinguals  $t(18) = 2.07$   $p = .01$  (this difference remained significant when the one participant with a difference score of only 2 was removed from the analysis). This result suggests that language dominance does not account for the increased rate of TOTs in bilinguals. In line with this suggestion, there was no significant correlation ( $r^2 = -.16$ ,  $p = .44$ ) between difference scores (see section above) and TOT rate. Interestingly, the difference in the number of DREC responses between this subset of bilinguals (average number of DRECs = 0.9, SD = 1.3) and monolinguals (average number of DRECs = 0.6, SD = 1.1) was no longer significant ( $t < 1$ ), as it had been when comparing the bilingual group as a whole to the monolinguals. This may simply reflect a reduction in power, or the fact that relative to DRECs, TOTs are more sensitive measures of word knowledge (i.e., recall is more sensitive than recognition).

**Super-bilinguals** To assess whether some bilinguals were able to overcome the effect of bilingualism perhaps because of unusually strong verbal ability we evaluated a group of “super-bilinguals”. This group included the ten bilinguals who had named the most words in both Hebrew and English. Despite their “super” status, these bilinguals still experienced significantly more TOTs relative to an age-matched subset of the monolinguals  $t(18) = 2.18$ ,  $p < .05$ . Thus, these bilinguals’ increased ability to name words in both languages did not translate into a reduction in TOT rate. Interestingly, although only three out of ten of these bilinguals chose Hebrew as their preferred language, nine out of ten turned out to be Hebrew-dominant (according to the objective criterion), thus language-dominance may have accounted for their increased TOT rate. On average, the super-bilinguals were older 46.3 (SD 11.1) relative to the remaining bilinguals 28.9 (SD 12.0), and hence, on average, had spent a greater number of years in Israel 25.1 (SD = 5.6) and the USA 18.7 (SD = 10.6). The remaining bilinguals averaged only 13.9 (SD = 12.0) years in Israel and 12.2 (SD = 6.8) in the USA. Thus, the super-bilinguals’ increased ability to name may simply be attributed to increased levels of exposure to words in the two languages, rather than to increased verbal skills.

#### **Comparability (or lack thereof) of the monolingual and bilingual tasks**

Before considering the implications of the increased TOT rate in bilinguals it must be emphasized that the bilinguals were tested in a bilingual mode whereas

monolinguals were obviously in a monolingual mode. It is possible that bilinguals would have reported similar numbers of TOTs had they only been asked to retrieve words in one language (although work in progress by the first author with a group of Spanish–English bilinguals suggests that the increased TOT rate is obtained even when bilinguals name in their dominant language alone). Similarly, it could be argued that monolinguals would also have experienced more TOTs had they been asked to retrieve 160 very low-frequency words instead of just 80. To examine whether fatigue may have contributed to the increased proportion of retrieval failures among bilinguals, the rate of GOTs in the beginning of the experiment was compared to the rate at the end. This analysis provided no support for the fatigue hypothesis; the mean GOT rate in items 1–20 was 15.1, and for items 61–80 it was actually higher, 16.5. Hence, although bilinguals may have experienced a greater rate of TOTs because of performing in a bilingual mode, it does not appear that fatigue played a role in producing this effect.

**Contingency analysis** To assess whether there was any evidence in the data that retrieving a word in one language reduced the probability of retrieving it in the other language, the bilingual data were subjected to the following contingency analysis. First, to obtain an estimate of how often each bilingual should have been able to name a word in both languages (YY) by chance, the percentage of words correctly retrieved in Hebrew was multiplied by the percentage correctly retrieved in English. This chance estimate of YY scores assumes that naming in one language was independent from naming in the other, and also takes into account the fact that YY scores are less likely for bilinguals who retrieved fewer words in either language. Each bilingual also received an actual YY score that was obtained by calculating the proportion of trials on which s/he actually did retrieve both the Hebrew and the English word. For example, if a person had named 80% of the words in Hebrew, and 60% of the words in English, then the maximum possible YY scores would be 60%, and by chance a YY score would have been expected on 48% of the total number of trials. The proportion of YYs expected by chance was subtracted from the actual YY score and these values were compared to zero. Negative scores were assumed to reflect inhibition (i.e., that naming in one language inhibits naming in the other language), and positive scores were assumed to reflect facilitation. The results of this analysis were overwhelmingly consistent; although the average actual minus chance score was rather small 0.02 (SD 0.03), in 24 out of 25 cases the scores were positive, indi-

cating facilitation (not inhibition). This difference was significant ( $p < .01$ ) using a t-test on the log odds ratio as recommended by Wickens (1993) for the analysis of contingency tables with dichotomous classifications indicating no evidence of competition between translations. The results of this analysis, however, cannot rule out the presence of an inhibitory process. It is still possible that there was competition between translations, but that the influence of this competition was smaller or weaker relative to other more powerful effects that operated in the facilitative direction. For example, word definitions that happened to be particularly effective for eliciting a single target word in one language may have been similarly effective in the other language. Thus, although the contingency analysis did not provide any evidence for competition between translations, it cannot be treated as conclusive evidence for the lack of such competition.

**And-Or scoring** One way to make the scoring for bilinguals and monolinguals more comparable (at least on quantitative grounds) is to score using a method that does not require bilinguals to produce twice as many words. To achieve this goal, the bilinguals' data were re-scored by giving bilinguals a score of 1 for naming an item in either one or both languages. This made the maximum possible score for bilinguals the same as that for monolinguals (i.e., equal to 80). The results of this analysis showed no trace of a difference between bilinguals and monolinguals ( $t < 1$ ); the average number of GOTs was exactly the same across groups (73.6). The only remaining between-group difference was in the degree of variability; the range of GOTs for bilinguals was 54–80 (SD = 6.8), and for monolinguals it was 67–79 (SD = 3.7). However, in comparison to scoring each language separately, the And-Or scoring method reduced the overall level of variability in the bilingual data (see below). These results indicate that when they are allowed to take advantage of their learning experiences in both language environments, proficient bilinguals are not distinguishable from monolinguals in their ability to name very low-frequency words.

Because they know approximately twice as many words, it could be argued that by chance bilinguals should actually have been able to produce more words relative to monolinguals using the And-Or scoring method. However, assuming that chance plays a relatively small role in the ability to name, the results of this analysis provide evidence against the view that there is a simple relationship between word frequency and the ability to name. According to this view, bilinguals should be able to name fewer items even if they are allowed to use word forms from both

languages, because neither set of word forms would be as frequent for bilinguals as they would be for monolinguals. Thus, this result suggests that the relationship between word frequency and retrieval is not a simple linear relationship at all frequency levels.

### Age effects

Above it was suggested that the increased TOT rate in bilinguals might be attributed to reduced exposure to low-frequency words in both languages. If this factor contributes to producing an increased rate of TOTs in bilinguals, then the same argument also should apply to younger age, thereby predicting an increased TOT rate in younger participants. Relative to older adults, young participants (both monolingual and bilingual) have also had fewer opportunities to use the word forms that they know. Thus, they should also experience an increased TOT rate.

The effect of age on word retrieval failures was assessed using regression analyses with age as a continuous independent variable and TOTs (in three forms) as the dependent variable. First, raw TOTs were used as the dependent variable, second, the proportion of TOTs ( $\#TOT/(\text{total} - \text{DREC})$ ), and third, the proportion of TOTs after undergoing a logits transformation, henceforth *logits % TOTs*, as recommended by Mosteller and Tukey (1977) for the analysis of proportional data. The analysis of raw TOTs is the easiest to interpret because of its simplicity, however, the analysis of %TOTs is preferable because it takes into account the fact that bilinguals had a greater number of DREC responses and therefore also had fewer opportunities to experience TOTs. Finally, the logits transformation is required because of the reduced range that is imposed on the dependent variable by using percentages. In this transformation, for each participant, the total number of TOTs was re-expressed as a logit which is the natural logarithm ( $\ln$ ) of the odds ratio using the following equation  $\ln(n+(1/6)) - [\ln(k-q-n)+(1/6)]$  in which  $n$  is the number of TOTs,  $k$  is the total number of trials, and  $q$  is the number of DRECs. The small start value of  $1/6$  is added because a logarithm is not defined for a value of zero (Mosteller and Tukey, 1977).

In the combined analysis (monolingual and bilingual subjects with English targets only) age was a significant predictor of TOTs  $r^2 = .08$ ,  $p < .05$  and %TOTs  $r^2 = .10$ ,  $p < .05$ , but after the logits transformation, the effect was only marginally significant  $r^2 = .07$ ,  $p = .07$ . Separate analyses of each participant group revealed that age was most robust as a predictor of retrieval failures among mono-

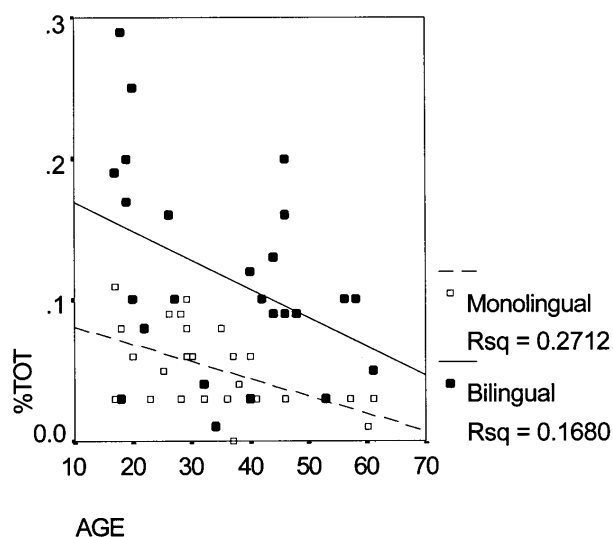


Figure 1. %TOTs plotted as a function of increasing age in monolingual and bilingual participants. As can be seen, age was a significant predictor of TOT incidence. The higher incidence of TOTs among young participants is consistent with the suggestion that increased TOT rates reflect the degree of experience with target word forms.

linguals in English and bilinguals in Hebrew. All three analyses produced significant results in both cases. The results for monolinguals in English were as follows: TOTs  $r^2 = .26$ ,  $p < .01$ , %TOTs  $r^2 = .27$ ,  $p < .01$ , and %TOTs logits %TOTs  $r^2 = .19$ ,  $p < .05$ ; and for bilinguals in Hebrew TOTs  $r^2 = .33$ ,  $p < .01$ , %TOTs  $r^2 = .35$ ,  $p < .01$ , and logits %TOTs  $r^2 = .19$ ,  $p < .05$ . In contrast, for bilinguals on English targets, only the analysis of %TOTs was significant  $r^2 = .17$ ,  $p < .04$ ; the analysis of raw TOTs  $r^2 = .13$ ,  $p < .08$  and logits %TOTs  $r^2 = .07$ ,  $p < .19$  were marginally significant.

In all cases, analyses using %TOTs as the dependent variable produced more robust results relative to those using the raw number of TOTs; this may reflect the fact that %TOTs takes into account the number of opportunities to experience a TOT. However, overall, bilinguals had more TOTs relative to monolinguals, thus the fact that age was a less robust predictor of TOTs in bilinguals probably could not simply be attributed to power. A more likely explanation is that other factors (e.g., language dominance) were more powerful as predictors of TOTs in bilinguals and the bilingual data was more variable as a consequence. The correlations between age and %TOTs for monolinguals and bilinguals are shown in Figure 1.

To determine whether age would contribute significantly as a predictor of word retrieval above and beyond the mono- vs. bilingual contrast, a hierarch-

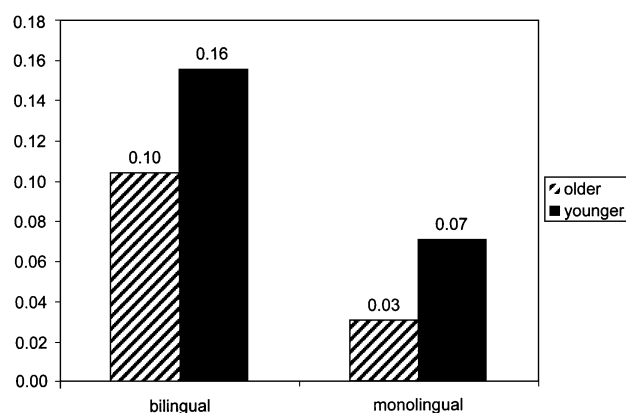


Figure 2. %TOTs for English targets in monolingual and bilingual groups after further dividing them into groups of young and old participants. As can be seen, young bilinguals experienced the highest incidence of TOTs.

ical multiple regression was carried out with bilingual/monolingual entered as a predictor on the first step, and age as a continuous predictor entered on the second step. This analysis confirmed the additive nature of these two variables in predicting both GOTs and TOTs (including raw TOTs, %TOTs, and %TOTs after the logits transformation). Both steps were significant at the  $p < .01$  levels for all dependent variables. The  $r^2$ s after the first step were .24 for GOTs, .27 for TOTs, .27 for %TOTs, and .22 for logits %TOTs. After age was added the  $r^2$ s increased to .40, .38, .39, and .31 respectively. To depict the additive nature of these effects, the average proportions of TOTs for the oldest and youngest monolinguals and bilinguals are presented in Figure 2. Youngest bilinguals ( $n=10$ ) reported significantly more TOTs than the ( $n=10$ ) youngest monolinguals  $t(18) = 3.21$ ,  $p < .01$ . The robust main effect of age on TOT incidence is consistent with the proposal that reduced exposure to word forms increases TOT rate, and suggests that this factor could be responsible (at least in part) for the increased rate of TOTs observed in bilingual participants.

Typically, older adults (not younger adults) are noted for their complaints of increased difficulty retrieving words, and hence many TOT studies have focused on older participants. However, when comparing participants in our study to those included in other TOT studies, it is important to note that "older" adults are typically in their late 60s or older, whereas our oldest participants were only 61. For example, the mean age for the group of older adults in the Burke et al. (1991) study was 71.0 ( $SD = 4.1$ ). Thus, our participants may be better described as young to middle-aged, and the data suggest that the relationship between age and TOT rates may be



better characterized as a U-shaped curve rather than as linear. However, different mechanisms would be necessary to explain each end of the U-shaped curve. The decrease in TOTs from young to middle-age participants might reflect frequency of use, and the increase in TOTs from middle-age to old-age has been explained as resulting from weakening of connections between semantic and phonological levels of lexical representation (Burke et al., 1991). These mechanisms may, however, be related. For example, older adults may require additional exposures to word forms to maintain the same degree of activation of phonological representations.

Another factor that may have contributed to the increased number of TOTs among young participants in the present study was the average frequency count of the target items used. As mentioned above, our target words were higher in average frequency relative to other TOT studies. Some evidence that is consistent with this view is that young participants in the Burke et al. (1991) laboratory study had an average number of DRECs (40.5) that was significantly higher than the number of DRECs in the older participant group (29.6). Thus, (at least in the laboratory) younger participants in that study were given fewer opportunities to experience a TOT. Consistent with this hypothesis, Burke et al. (1991) also completed a diary study in which participants recorded TOTs as they occurred naturally. In those data, younger participants did demonstrate a trend toward having TOTs for higher-frequency items relative to older adults; however, the effect was not significant. On one hand, diary studies are preferred because they resemble natural circumstances more closely. On the other hand, diary studies provide no manipulation of item frequency. Hence, to further characterize the relationship between TOT incidence and word frequency it may be helpful to carry out experimental studies manipulating a broader range of word frequency than has typically been used.

### *Frequency effects*

To explain an increased rate of TOTs in bilinguals without positing increased competition for activation across translation equivalents, it is necessary to show that decreased practice with word forms results in higher TOT rates. Consistent with this notion, TOTs are more common for low-frequency words (Brown, 1991), and in younger participants, as reported in the previous section. However, beyond this very general notion, the relationship between word frequency and TOT rate is not yet specified. For example, very high-frequency words might be expected to produce no TOTs in either bilinguals or monolinguals (or

younger and older adults) because virtually all the targets would be retrieved easily. Similarly, extremely rare words would be expected to produce no TOTs in either group because the targets would simply be unknown. In fact, if monolinguals know more words that are very low frequency, then certain stimulus materials may (paradoxically) produce a higher rate of TOTs among monolinguals (because the bilinguals would not know the words at all, whereas the monolinguals would know them, but not be able to retrieve them easily). With these considerations in mind, it could be argued that the comparison of TOT rate across subject groups is only justified if TOT rates in bilinguals and monolinguals are compared across levels of word frequency that produced the maximum number of TOTs in each.

The effect of word frequency on the number of TOTs is typically not assessed in experimental investigations of TOTs because of the need to obtain sufficient TOTs to allow other analyses to take place. The low average frequency count of items used is necessary because the bulk of TOTs occur for low-frequency words. For example, the items in Burke et al. (1991) had an average frequency of 2.18 per million with a range of 0–33 (Kucera and Francis, 1967). The target item frequencies in Kohn et al. (1987) ranged from 0 to 17, with an average of 1.47 (Kucera and Francis, 1967).

In an attempt to begin characterizing TOT states for higher-frequency words, the average frequency count of the items used in the current study was higher, 10.1 (SD = 14.8), and the range was broader, 0–72 (Kucera and Francis, 1967). The total number of TOTs observed for bilinguals (in both Hebrew and English) reflected TOT rates similar in magnitude (i.e., 15.4% and 10.8% respectively) to those reported in other laboratory-induced TOT studies, in the order of 13% (Brown, 1991). In contrast, the monolingual participants produced an overall TOT rate of only 5.1%. It thus appears that the higher average frequency count of our target items created reduced opportunities for monolinguals to experience TOTs as evidenced by more correct responses.

To evaluate the role of word frequency in producing retrieval failures in English within the frequency range tested in the present study, a number of regression analyses were carried out. Word frequency from the CELEX lexical database (Baayen et al., 1995) was entered as a continuous independent predictor variable in separate regression analyses using TOTs, %TOTs, and logits %TOTs (see the explanation above in the section entitled *Age effects*) as dependent variables. The results of the combined analysis, which included both the monolingual and the bilingual data, indicated that word frequency was a

significant predictor of TOTs; fewer TOTs were reported as word frequency increased. However, the amount of variance explained by word frequency was very small  $r^2 = .03$ ,  $p < .05$ . Separate regressions with the bilingual data only  $r^2 = .07$ ,  $p = .02$ , and the monolingual data only  $r^2 = .01$  ( $F < 1$ ) suggested that word frequency was more robust as a predictor of TOTs among bilinguals. The interaction between monolingual/bilingual status and word frequency as a predictor approached significance in the analyses of TOTs  $r^2 = .15$ ,  $p = .14$ , %TOTs  $r^2 = .16$ ,  $p = .10$ , and logits %TOTs  $r^2 = .16$ ,  $p = .09$ .

Although it only accounted for a small proportion of the variance, word frequency was still a significant predictor ( $p < .05$ ) when it was entered on the second block of a hierarchical multiple regression with the monolingual/bilingual contrast entered on the first step. The total variance explained for the combined model was  $r^2 = .15$ ,  $p < .01$  using raw TOTs,  $r^2 = .16$ ,  $p < .01$  using %TOTs, and  $r^2 = .16$ ,  $p < .01$  using logits %TOTs. The correlations between word frequency and %TOTs for monolinguals and bilinguals are shown in Figure 3.

The significance of word frequency as a predictor of TOT incidence for bilinguals, but not monolinguals, suggests that the words (or most of them) used in this study were above a certain frequency level, or *frequency threshold*, above which monolinguals were equally unlikely to experience a TOT for all words. This conclusion is consistent with the available literature on word frequency and TOT incidence in monolinguals. Only two laboratory studies of the TOT phenomenon have systematically varied word frequency. In one study, it was shown that lower frequency words produce more TOTs (Harley and Bown, 1998). However, the high frequency items in that study were extremely high frequency (>100 per million, mean = 270 in one experiment and mean = 164 in the other). In contrast, in a second study that also varied frequency systematically there was no effect of target frequency (Heller, 1992). However, in that study the “high frequency” targets only ranged from 17 to 48 per million words, with an average of 31. Thus, it appears that words within a certain range may be equally good at eliciting TOT states. This range, has an as yet unidentified lower level, and an upper limit that is roughly 48 per million according to Heller (1992) and 72 per million according to the present study. Within this restricted range, other factors (such as recency of use or age of acquisition) may exert a greater influence on the probability of a TOT response. On the whole then, word frequency has limited use for predicting TOT incidence simply because the vast majority of TOTs occur in a restricted frequency range, within which frequency is

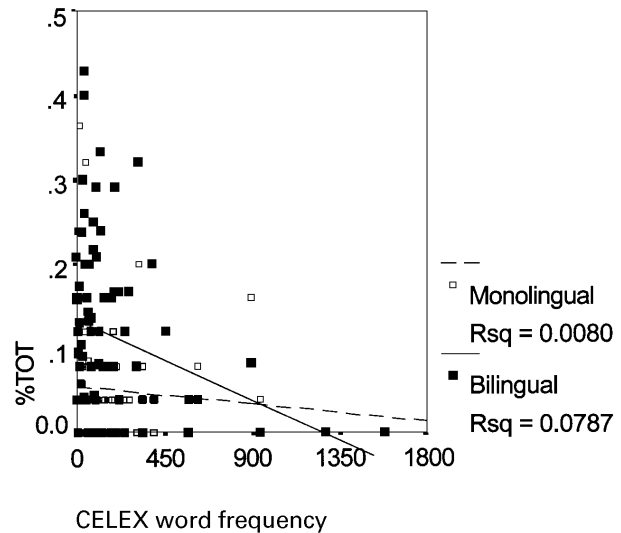


Figure 3. %TOTs for English targets plotted as a function of increasing word frequency. As can be seen, word frequency was a significant predictor of TOT incidence in English, but the effect was most robust among bilingual participants.

not a good predictor of TOT rate. In naturalistic settings (i.e., diary study) Burke et al. (1991) found that a large proportion (47%) of TOTs reported were for extremely rare words (frequency count of zero). Words with frequency counts higher than 84 accounted for only 11% of TOTs.

To further explore the relationship between word frequency and TOT incidence, the items were divided into four groups using a quartile split with the highest frequency words at one end, and the lowest frequency words at the other. The average word frequency counts per group were 1.11, 4.12, 8.53, and 28.96 per million respectively. As indicated by the regression analyses reported above, bilinguals, but not monolinguals, showed a consistent trend toward decreasing TOTs from the lowest to the highest frequency category. Post hoc comparisons in each frequency category revealed significant differences in TOT incidence between monolinguals and bilinguals in the lowest three frequency categories (all  $p < .01$ ), but at the highest level the difference was no longer significant  $t(48) = 2.09$ ,  $p = .04$  after applying a Bonferroni adjustment (.013) to the alpha level. The latter result is also consistent with the notion of a frequency threshold. It suggests that bilinguals also have a frequency threshold, and that beyond a particular frequency level (in this case 11–88 per million words) bilinguals and monolinguals are equally likely to experience TOTs. The results of this analysis are shown in Figure 4.

Given that the relationship between word fre-

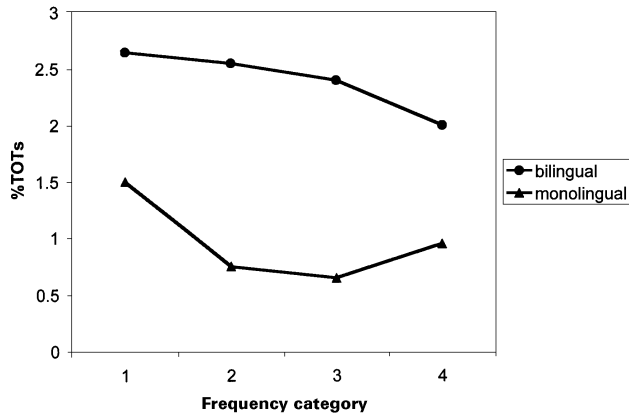


Figure 4. %TOTs for English targets across word frequency groups (1 = lowest frequency group, and 4 = highest frequency group). The difference in TOT incidence between monolinguals and bilinguals was significant at all levels of word frequency except the highest frequency category.

quency and TOT likelihood appears not to be linear, it becomes more difficult to predict exactly how bilingualism and TOT incidence should interact with word frequency. Future studies including naturally occurring TOTs may be helpful. For example, under normal circumstances bilinguals may not attempt to retrieve words within a frequency range that causes them to have more TOTs. They may opt to say higher-frequency synonyms instead, to use a translation (when talking to other bilinguals), or to use circumlocution to avoid such words; this could be a conscious strategy, an unconscious process, or both. In this case, the increased rate of TOTs in bilinguals would be observed only in the laboratory.

### TOT quality

**TOT resolution with or without cue** Despite the overall differences in TOT rates across groups, when viewed as a proportion of the total number of TOTs, that is,  $SR/(SR + CR)$ , bilinguals were equally likely to self-resolve a TOT (48.7%) as monolinguals (51.9%) ( $t < 1$ ). This finding is surprising because increased TOT rates (e.g., as observed in older adults) have been associated with a lower rate of spontaneous retrieval, lower production of alternate words, and less access to partial information about the target form (Burke et al., 1991). This correlation was assumed to reflect a common mechanism underlying the rate of TOTs, the ability to access partial information about the target, and the likelihood of resolving the target without a cue (a.k.a. “pop up” retrieval). Because monolinguals and bilinguals demonstrated comparable rates of self-resolve but

different rates of TOTs, an alternative account is necessary. One way to account for this discrepancy is to suggest that when a TOT did occur in either a monolingual or a bilingual, similar mechanisms mediated TOT resolution. This finding would also be expected if (as discussed above) TOTs occur when the degree of activation in lexical representations falls within a particular range. For bilinguals, a greater number of lexical representations would be within this range; thus bilinguals would have more TOTs. However, equal rates of resolution would be expected across subject groups because the occurrence of TOT would be indicative of a particular level of activation, a level that is equally susceptible to cues that might trigger spontaneous resolution in both bilinguals and monolinguals.

This result provides some empirical evidence that it does not make sense to assume that the increased TOT rate in bilinguals reflects a “deficit”, as has been suggested to account for the increased TOT rate observed in older adults (Burke et al., 1991), rather it is a consequence of their unique experience. It could be argued that differences between bilinguals and monolinguals might be observed with a more sensitive measure of resolve time (e.g., time in milliseconds), or perhaps natural resolution times (which were truncated in the present study by the presentation of a cue). On the other hand, the fact that bilinguals were able to self-resolve their TOTs as often as monolinguals, despite the administration of a cue within a very short interval is compelling.

**Number of syllables** Previous studies have demonstrated that participants have greater access to partial information about the target form when in a TOT state in comparison to non-TOT control states and in comparison to estimates of chance levels of guessing accuracy (Brown, 1991). If TOTs in monolinguals and bilinguals are mediated by similar mechanisms, then bilinguals should have had comparable ability to report partial characteristics of target word forms. To test this hypothesis, the participants’ syllable guesses in TOT and control (i.e., DREC and TU) states were compared and, as predicted, produced similar findings between the two groups of subjects. For both groups, TOT guesses were more accurate relative to control states. The number (and proportions) of correct and incorrect guesses for English and Hebrew targets are reported in Table 5 (the Hebrew data are discussed in the next section).

The syllable guesses and actual syllable lengths for each TOT target and control word were compared using Pearson bivariate correlations as suggested by Koriat and Lieblich (1974). These comparisons showed significant positive correlations for guesses

Table 5. Percentage correct and number of guesses for each word length for each target length for syllable guesses in total TOTs and control states

<i>Monolinguals in English</i>						
response	target length	length guessed			% correct	
<b>TOT</b>		1	2	3	4	57
	1	<b>5</b>	5	2	2	
	2	2	<b>25</b>	8	1	
	3	2	8	<b>7</b>	—	
	4	—	—	—	<b>3</b>	
<b>control</b>		1	2	3	4	25
	1	<b>1</b>	3	2	—	
	2	—	<b>6</b>	11	2	
	3	—	2	<b>1</b>	2	
	4	—	1	1	—	
<i>Bilinguals in English</i>						
response	target length	length guessed			% correct	
<b>TOT</b>		1	2	3	4	43
	1	<b>4</b>	7	12	2	
	2	3	<b>32</b>	28	6	
	3	1	7	<b>20</b>	7	
	4	—	2	1	<b>1</b>	
<b>control</b>		1	2	3	4	21
	1	—	9	10	1	
	2	—	<b>10</b>	12	3	
	3	—	5	<b>1</b>	—	
	4	—	1	—	—	
<i>Bilinguals in Hebrew</i>						
response	target length	length guessed			% correct	
<b>TOT</b>		1	2	3	4	42
	1	—	1	3	—	
	2	3	<b>43</b>	30	4	
	3	—	35	<b>26</b>	1	
	4+	1	7	12	<b>2</b>	
<b>control</b>		1	2	3	4	39
	1	<b>1</b>	2	2	—	
	2	1	<b>8</b>	7	2	
	3	—	9	<b>11</b>	2	
	4+	—	3	3	—	

made during TOT states for English targets in both bilinguals  $r^2 = .20$ ,  $p < .02^1$  and monolinguals  $r^2 = .31$ ,  $p < .01$ . In contrast, guesses made during control

<sup>1</sup> The statistical significance of these correlations is to be interpreted with caution because of the “fragmentary data problem” (Brown, 1991); there were a number of participants who had an opportunity to make a syllable guess for a TOT target but not a control-state target, and vice versa. An additional problem is that there were more TOTs relative to control states, thus there was more power to detect a significant correlation for TOT targets. The analyses were also carried out over items (collapsing

states were not significantly correlated with the actual syllable length values for bilinguals  $r^2 = -.16$ ,  $p = 0.25$  or monolinguals  $r^2 = .22$ ,  $p = .22$  (there were fewer guesses made for control states, hence the correlation of .20 was significant, whereas the latter .22 was not). The contrast between guesses made during TOT and control states is consistent with the interpretation that TOTs represent a state of partial activation of the target word form (Brown, 1991), and suggests that access to partial information in bilingual and monolingual TOT states could be mediated by similar mechanisms. Further, as suggested by the comparable rates of self-resolve, this result also requires that TOT incidence and TOT quality be explained by appealing to at least partially non-overlapping mechanisms. To the extent that cross-language competition may (or may not) increase the number of TOTs in bilinguals, the data do not provide any evidence to suggest that this competition also influences qualitative aspects of the TOT phenomenon.

**Accessing partial information in Hebrew** To our knowledge no previous studies have evaluated participants’ ability to guess characteristics of Hebrew TOT targets (but see Faust et al., 1997 for data on overlapping characteristics between Hebrew TOT targets and their alternates, suggesting implicit access to such information). In this study we asked participants to make explicit guesses about two characteristics of Hebrew TOT targets, the number of syllables and grammatical gender.

Overall, bilinguals’ syllable guesses for Hebrew TOT targets were similarly accurate to those for English TOT targets. However, the accuracy of guesses made in control states for Hebrew targets were also quite good, and the correlations between actual and guessed numbers of syllables were not significant for either TOT targets  $r^2 = .05$ ,  $p = .70$  or control states  $r^2 = .09$ ,  $p = .24$ . Koriat and Lieblich (1974) also reported a very high accuracy rate (38%) for syllable guesses made in control states (although accuracy for guesses made in their TOT states was much higher, at 80%). They pointed out that the chance of guessing the number of syllables correctly is high because the range of choices is not very broad; although speculative, this same argument may provide some explanation for the high accuracy rates in guesses made during control states for Hebrew

across participants), and the same results were obtained; however, the item analyses are problematic for the same reasons. Nevertheless, it is important to note that because TOTs and control responses are infrequent, none of the correlations that were calculated were dominated by the data from any one or two participants. Moreover, the results are generally quite consistent with those reported previously in other similar investigations.

Table 6. *Distribution of number of syllables in Hebrew and English stimulus items, random samples of one hundred words in Hebrew and one hundred words in English; all participants' guesses collapsing across all response types (TOT and control data), and participants' percentage accuracy for guesses made in Hebrew and English during TOT states*

	Number of Syllables (%)			
	1	2	3	4
Hebrew stimulus items	6	44	38	13
100 random Hebrew words	3	63	27	7
Bilinguals' – all guesses in Hebrew	4	48	44	8
Bilinguals' % correct guesses TOTs in Hebrew	0	52	44	17
English stimulus items	24	55	15	3
100 random English words	20	34	29	17
Bilinguals' – all guesses in English	25	50	25	4
Bilinguals' % correct guesses TOTs in English	23	50	55	29
All monolingual's guesses in English	19	53	19	9
Monolinguals' % correct guesses for TOTs in English	33	68	41	50

targets in this study. The data shown in Table 6 are consistent with this interpretation. Table 6 shows the syllable distribution of one hundred Hebrew and one hundred English words selected at random, and other data showing participants' overall tendency to guess word length (whether in a TOT or not). Relative to English, Hebrew has a greater proportion of words that are two or three syllables long, and participants do seem to have access (whether implicit or explicit) to this knowledge.

**Gender-guess accuracy** In Hebrew, and many other languages, nouns are divided into grammatical gender classes that determine phonological agreement marking on other words (e.g., articles, adjectives, and/or verbs) that must agree with these nouns. A number of recent studies conducted in Italian have provided evidence that participants in a TOT state are able to report the grammatical gender of the target (Badecker, Miozzo, and Zanuttini, 1995; Miozzo and Caramazza, 1997; Vigliocco, Antonini, and Garrett, 1997). The authors of these studies have interpreted these data as further evidence that a lexically specific representation is active during a TOT state. According to this interpretation, participants in a TOT state for Hebrew targets should also have access to the grammatical gender.

Table 7. *Bilinguals' percentage correct grammatical gender guesses in Hebrew*

	Gender Guess Accuracy (%)
TOT-SR	65
TOT-CR	51
Control	59

There are two genders in Hebrew. Most feminine nouns are explicitly marked with a suffix (*-ah*, *-et*, or *-it*) and unmarked nouns are typically masculine. There is a small number of irregular feminine nouns which are not marked with a suffix (1.3%), (Gollan and Frost, in press). However, with just one exception, all the nouns used in this study were regularly marked for gender (the one irregular word *gefen* accounted for only 5 out of 214 of the total gender guesses). In our random selection of 52 nouns in Hebrew (see previous section on syllable guesses), there was no apparent difference in the number of masculine vs. feminine nouns: 48.1% (n=25) were masculine and 51.9% (n=27) were feminine. Similarly, the gender guesses showed no apparent bias for guessing masculine (47.6% of guesses) or feminine (52.3% of guesses), suggesting that participants had access (whether explicit or implicit) to distributional properties of the language when making their guesses.

Six of the gender guesses were eliminated because they were for targets that can be either masculine or feminine (three guesses for the target *mevaker*, the Hebrew word for *critic*, and three for adjective targets such as *tsarud*, the Hebrew word for *hoarse*). In the remaining data there were a total of 108 gender guesses made in TOT-CR states, 37 in TOT-SRs, and 69 guesses in non-TOT control items. The accuracy of gender guesses made in TOT-SRs and TOT-CRs is presented in Table 7. As can be seen, access to grammatical gender in Hebrew was not better in TOT states relative to control data. In fact, collapsing across all TOTs there was an overall trend in the wrong direction  $z < 1$  (i.e., gender-guess accuracy in TOTs overall was only 55%, and in control states it was 59%).<sup>2</sup> Although there was a

<sup>2</sup> The z-statistic was adopted here for the sake of comparability because it was used by Vigliocco et al. (1997), and because insufficient data were available to allow the use of an alternative method such as that employed by Caramazza and Miozzo (1997). In the latter study, t-tests were used by including only subjects or items who contributed at least one data point to both TOT and control conditions. A disadvantage of this approach is that it can require considerable data to be left out of the analysis. We note, however, that the z-statistic is also problematic for the same reasons discussed above regarding the use of correlations to assess syllable guess accuracy.

trend toward better gender-guess accuracy in TOT-SRs than those that required a cue, this difference was also not significant  $z = 1.18$ ,  $p = 0.24$ . This is rather unlike the data discussed above for TOTs in Italian, in which the ability to correctly guess gender ranged from approximately 71% to 84%.

The absence of access to partial information about Hebrew targets (i.e., the number of syllables and the grammatical gender) was unexpected and is difficult to interpret without data from monolingual Hebrew speakers. It may reflect something about the nature of the Hebrew language, the nature of bilingual TOT states, and/or some interaction between the two. For example, it has been assumed that participants' ability to access the number of syllables during TOTs for English targets reflects a characteristic of lexical retrieval mechanisms from the English lexicon (e.g., an addressing mechanism for the word form, as in Butterworth, 1989, 1992, and Garrett, 1984). However, as mentioned above, in Hebrew, the number of syllables in each word does not distinguish words from one another as well as it does in English. Hence, number of syllables may play a role in the retrieval of English, but not Hebrew, words.

Similarly, the lack of access to gender may also be attributed to unique features of Hebrew vs. Italian. In both Italian and Hebrew, nouns are often preceded by the definite article "the". However, in Italian, this article is gender-marked but in Hebrew it is not. Similarly, adjectives, which are gender-marked in both languages, can occur prenominal in Italian but not in Hebrew. For this reason, it may be unnecessary to have access to grammatical gender as early in the process of lexical retrieval in Hebrew, and TOTs may occur at a stage in retrieval that is prior to gender access in Hebrew, but after gender access in Italian. Thus, the relative absence of prenominal gender markers in Hebrew may be the critical difference. The explanations, however, are merely speculative and these results will not be discussed further. Additional studies are needed to establish the reason for the cross-linguistic difference.

### General discussion

In this study, the TOT states of proficient Hebrew-English bilinguals were compared to TOTs in a group of age-matched monolingual English-speaking controls. The results indicated that bilinguals were more likely to experience TOTs, and also to report not knowing a word (i.e., DREC) when presented with the entire word form, or after producing the word form with a cue. The increased TOT rate was observed for the bilingual group as a whole, and in two subsets of the bilingual group including bi-

linguals who were English-dominant and bilinguals who had named the most words in both languages (i.e., super-bilinguals). As a group, bilinguals also demonstrated a greater degree of variability. At the single-subject level between 40 and 72% of bilinguals experienced more retrieval failures relative to monolinguals (depending on whether a 2 or 1 SD cut-off was used). Interestingly, differences between bilinguals and monolinguals disappeared when bilinguals were allowed to name using words from both languages (And-Or scoring), suggesting that bilinguals do not require an equal number of exposures to word forms to be able to produce them efficiently.

A number of factors that may have contributed to the increased TOT rates in bilinguals were considered, including: (1) general fatigue due to retrieving twice as many words; (2) the fact that 15 out of 25 of the bilinguals were relatively Hebrew-dominant; (3) reduced frequency of exposure to words in each language; and (4) competition for activation between translation equivalents. The latter may also have been enhanced by the dual nature of the task; bilinguals retrieved words in both Hebrew and English thereby switching languages on every trial. The first two reasons were ruled out. TOT rates did not increase towards the end of the experiment (in fact they decreased), suggesting that fatigue also could not account for the effect, and English-dominant bilinguals also demonstrated a higher TOT rate suggesting that language dominance alone could not account for the effects.

Thus either, or both, of the remaining two factors could have produced the increased TOT rate in bilinguals. Two accounts of bilingual lexical retrieval for production agree that activation spreads automatically from the conceptual level to lexical-semantic and lexical-form representations in the two languages. The models diverge, however, as to whether representations across languages compete for selection (Hermans et al., 1998) or not (Costa et al., 1999). If it could be demonstrated more conclusively that competition for selection across translation equivalents does in fact increase TOT rates, then this would have further implications both for models of TOT more generally and for models of bilingual lexical retrieval. Such a finding would suggest that blocking does influence TOT rate, and further that semantically related words can function as blockers. This is because (as was noted in the Introduction) competition for activation across languages appears to be limited to the semantic level (Hermans et al., 1998).

One way research on bilinguals could provide more conclusive evidence about the influence (or lack thereof) of semantic blockers on TOT rate would be

to compare TOT rates in bilinguals across single- and dual-language task conditions. An increased TOT rate under dual-language conditions would suggest that translation equivalents do compete for selection, and that competition at the semantic level affects TOT rate. Such data would also have implications for models of bilingual lexical production. According to Hermans et al. (1998), language-specific production is achieved top-down by a mechanism that alters the level of activation in lexical representations in each language. By this view, competition between languages is maximized during tasks that require the retrieval of words in both languages, and hence dual-language tasks should produce a higher rate of retrieval failures. In contrast, in the model proposed by Costa et al., activation flow and lexical selection are modular. Thus, assuming that activation flows to representations in both languages to an equal extent in single- and dual-language tasks, the language-specific selection mechanism should function equally well regardless of the number of times a switch is made from one language to the other. Some additional time would be required to switch from one selection mechanism to the other, but, the ultimate success or failure of the selection mechanism should not be affected because it functions in isolation from lexical activation.

Above it was argued that the dual-language task alone (requiring bilinguals to retrieve all the items in both languages) was unlikely to be the sole explanation for the increased TOT incidence among bilinguals. This argument was based on anecdotal evidence suggesting that when retrieving very low-frequency words (as in a TOT study) bilinguals often seem to involuntarily retrieve words in the unintended language. This anecdotal observation is consistent with recent research on bilingual word production suggesting that both languages are active (at least to some degree) even during monolingual tasks (for reviews see Kroll and De Groot, 1997; Brysbaert, 1998; Francis, 1999; Gollan and Kroll, 2001). If this is the case, competition for activation is present even without requiring bilinguals to retrieve words in both languages, and hence the increased TOT rate in bilinguals relative to monolinguals should be expected even when bilinguals are tested in a single language only. The results of the contingency analysis that showed no evidence of cross-language inhibition (retrieving a word in one language did not reduce retrieval rate in the other language) are also consistent with the suggestion that the dual-language task was not responsible for the increased TOT rate. However, as noted above, this result cannot be interpreted as conclusive evidence against the blocking explanation because other, more powerful, effects

that operated in the facilitative direction may have been present and could have counteracted any inhibitory effects that might also have been present. For example, word definitions that were particularly good may have increased the chance of successful retrieval in both languages.

Although competition between translation equivalents should not be ruled out as a possible explanation for the increased TOT rate in bilinguals, it is not necessary to assume it to explain the observed results. Rather, the increased TOT rate may be attributed to bilinguals' relatively lower number of exposures to word forms in either language. Some evidence consistent with this hypothesis was that younger participants (both monolingual and bilingual) who, like bilinguals, have had less exposure to word forms, also experienced a higher rate of TOTs. Also consistent with this account was the lower TOT rate among monolinguals in this study relative to other studies, which (as already noted) may have resulted from a higher rate of correct retrieval. In addition, word frequency was a robust predictor of TOTs among bilinguals but not monolinguals. The differential response of TOT rates in bilinguals and monolinguals to word frequency is consistent with the proposal that monolingual frequency counts systematically overestimate the degree of exposure that bilinguals have had to word forms.

If TOTs are most likely to occur after a given degree of exposure to words, and there is a frequency range within which TOTs are most likely to occur, then the materials used in this study may have been outside this range for monolinguals and within it for bilinguals. The only way to rule this possibility out would be to determine the frequency range at which bilinguals and monolinguals have the most TOTs, and to compare TOT rates in each group across these ranges. If bilinguals have more TOTs relative to monolinguals when they are compared across stimuli that yield the maximum number of TOTs in each, then an alternative explanation (e.g., increased competition for activation) would be required to account for the increased TOT rate.

It should be noted that the frequency-based account of the difference between bilinguals and monolinguals is the simplest account of the increased TOT rate because it can also explain why bilinguals reported knowing fewer words relative to monolinguals (DREC). The blocking model cannot account for both of these findings together (i.e., increased TOTs and fewer words recognized) and thus would likely have to incorporate a frequency-based account as well (the same is true of the meta-cognitive models described below). A challenge for the frequency-based account is to explain why bilinguals did not show a

greater incidence of retrieval failures even when And–Or scoring was used. This finding demonstrates that, relative to monolinguals, bilinguals do not require an equal number of exposures to words to be able to retrieve them efficiently. In addition, at least within the rather restricted range tested in this study, word frequency accounted for only a very small proportion of the variance in TOT incidence across the two participant groups. Because the vast majority of TOTs occur for very low-frequency words, the importance of word frequency as a predictor of TOTs is inherently restricted; below certain frequency levels other factors will need to be considered. For example, the word *zebra* is quite low frequency. However, work in progress by the second author showed that *zebra* did not induce any TOTs, perhaps because it was acquired early in life, and as such may retain a frequency rank that cannot easily be displaced (for a discussion of frequency rank see Forster, 1992). Finally, it is possible that TOTs may be observed in the laboratory for words in a broader frequency range relative to the range in naturalistic settings. For example, a detailed TOT-inducing stimulus (with many cues in it) may cause participants to attempt retrieving words in the laboratory that they would never attempt to produce under normal circumstances, and this too could interact with bilingual status.

As mentioned above, the nature of cross-language competition between lexicons in bilinguals is currently under debate in research on language production. We have argued that the data in the current study are equally consistent with models that posit cross-language competition and with those that do not. This conclusion appears to be at odds with that suggested by Askari (1999), who argued that her results provided “striking support for the single-store [i.e., cross-language competition] bilingual memory model” (p. 208). Askari’s conclusion was based on the finding that the proportion of correct responses was greatest when the prime was in a different language than the target, and the suggestion that a dual-store model would predict that only within-language primes should have been effective. One problem with this conclusion is that most current models of bilingual memory posit shared semantic stores (Kroll, 1993; Kroll and de Groot, 1997; Francis, 1999), thus cross-language primes could cue retrieval via this shared level of representation. Moreover, this account does not provide a reason why cross-language primes were more effective relative to within-language primes. Indeed, the argument for an integrated lexicon would have been much more convincing had no differences between within- and cross-language primes been found. The difference alone (regardless of direction) begs for a more complex interpretation.<sup>3</sup>

The data in the current study suggest that once TOT states occur, they are qualitatively similar across groups. That is, bilinguals were equally likely to resolve a TOT without a cue, and both participant groups demonstrated increased access to partial information (in the form of an ability to guess the number of syllables of English targets) in TOTs relative to control states. Burke et al. (1991) attributed all aspects of their data to the same mechanism. That is, a transmission deficit in older adults produces an increased TOT rate, decreased access to partial information, and increased target resolution times. In this respect, any account of the bilingual data must contrast rather notably with those proposed to explain the increased TOT rates in aging individuals. This is perhaps not surprising when considering that, unlike older adults who are proposed to have a deficit in the activation of phonology (Burke et al., 1991), bilinguals do not have an impairment; rather the nature of their experience with language differs from that of monolinguals.

The apparent interaction between TOT rate, TOT quality (resolution and access to partial information), and participant type further suggests that TOT rate and TOT quality are mediated by (at least partially) non-overlapping mechanisms. Interestingly, neither the blocking nor the partial-activation accounts of the increased TOT rate in bilinguals can account for this dissociation. If competition for activation or reduced exposure to word forms increased TOT rate, why did it not also reduce the likelihood of TOT resolution and of reporting partial information about the target form accurately? These findings can be explained by incorporating the additional assumption that TOTs occur when lexical representations are at a particular level of activation (as discussed above). Thus, although bilinguals and monolinguals would have TOTs for different words (e.g., with bilinguals having TOTs for relatively higher-frequency words), once a TOT occurred it would be equally likely to resolve or produce access to partial information in both participant types.

Another possible explanation is that the TOT feeling is not caused by, as has often been assumed, the partial activation of the target word (for a review

<sup>3</sup> For example, within- and cross-language primes may have influenced retrieval via distinct mechanisms, perhaps (although not necessarily) because of their representation in separate networks. Within-language primes would also be expected to be less effective in resolving TOT states if, in addition to functioning as cues, they (but not cross-language primes) could sometimes function as lexical competitors. In contrast, competition across lexicons (i.e., assuming dual-store model) may be less likely because it is inhibited or limited by some other process that is perhaps strengthened by the fact that bilinguals tend to speak one language at a time.



see Schwartz, 1999). Instead, some have argued that the partial information available in a TOT state is part of a variety of cues that can be activated in memory during the retrieval process, that these are independent of lexical activation itself, but that they (along with other memory traces) produce the TOT feeling. This model of the TOT phenomenon was developed in the framework of meta-cognitive models, and is especially useful for explaining the dissociations that sometimes occur between retrieval and the TOT feeling (Schwartz, 1999). This model could account for the increased TOT rate among bilinguals as resulting from an increased confidence that the word is known due to having retrieved the word in the other language. A virtue of this model is that it attributes different causes to TOT incidence (which did show a bilingual–monolingual difference) and TOT resolve (which did not show a bilingual–monolingual difference). A potential problem with this model is that it only accounts for bilinguals' increased report of the TOT feeling. It cannot explain why the retrieval failures themselves occur more often in bilinguals relative to monolinguals.

### Conclusions

The data in this study are consistent with both models of bilingual language production that do and those that do not posit competition for lexical selection across languages. Models that do not posit competition for selection across languages must attribute the higher TOT rate in bilinguals to their relatively decreased level of experience with word forms in either language. That more TOTs were observed among younger participants is consistent with this notion. However, the results of And–Or scoring also imply that bilinguals do not require the same number of exposures to word forms as monolinguals to be able to retrieve them efficiently. Moreover, the results of this study suggest that word frequency has limited predictive power for TOT rate, and that the relationship between word-frequency and TOT rate is not linear. Finally, the results also suggest that different mechanisms are needed to explain TOT incidence, TOT resolution (with and without an external cue), and access to partial information during a TOT state. For example, TOT resolution may be triggered by random cues in the environment (see James and Burke, 2000).

Further studies are needed to determine whether similar effects would be obtained in more naturalistic settings (e.g., in a diary study), using target words with a broader frequency range, if bilinguals were tested in a single language at a time, and if only bilinguals who were native speakers of both languages

were tested. A direct comparison of TOT rates in bilinguals across dual- and single-language task conditions would also help to determine more conclusively whether cross-language competition for activation contributes to the increased TOT rate in bilinguals. An adequate account of the higher TOT rate for bilinguals than for monolinguals will also require a more complete understanding of TOT incidence, resolution, and quality. For example, if cross-language competition for activation contributes to the increased TOT rate in bilinguals then semantic (not just phonological) competitors may act as blockers. In addition, this finding along with data from other studies (Meyer and Bock, 1992; James and Burke, *in press*) would provide support for the notion that internally activated alternatives produce different results (i.e., blocking) relative to externally provided related words (i.e., facilitation). Bilinguals may ultimately provide an important source of constraints for modeling language production that would otherwise be unavailable from monolinguals alone.

### Appendix

alarm	iron
anchor	jar
apricot	jaundice
armpit	jury
attic	mane
bachelor	mason
basement	mercury
bay	mold
beehive	mortgate
broom	nostril
canteen	opaque
cherry	orchard
chicken pox	ostrich
colander	parachute
compass	pedestrian
critic	pharmacist
cult	pineapple
dandruff	pinecone
decode	porcupine
dump	pump
dusk	quench
echo	rabies
evolution	rake
expert	ransom
expired	refugee
eyelid	rower
farmer	safety pin
fertile	shovel
fig	spinach
fireplace	stethoscope
flexible	syringe
footprints	tar
funnel	tattoo
germ	telegram
giraffe	tire

goal	trainee
grater	tunnel
hammer	vine
hoarse	volcano
honeymoon	zoo

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## Tense morphology and verb-second in Swedish L1 children, L2 children and children with SLI\*

GISELA HÅKANSSON  
Lund University

*This paper compares the development of tense morphology and verb-second in different learner populations. Three groups of Swedish pre-school children are investigated longitudinally; ten L1 children, ten L2 children and ten children diagnosed with Specific Language Impairment (SLI). Data was collected twice, with an interval of six months. The results at Time 1 reveal a significant difference between normally developing L1 children on the one hand and L2 children and children with SLI on the other. The L1 children use verb-second correctly in topicalized declaratives, whereas both L2 children and children with SLI use structures with the verb in third position (XSV structures) as an intermediate step towards verb-second. There is a clear development between the two data collection sessions for the L2 children and the children with SLI, diminishing the difference between them and the unimpaired L1 children. The similarity that is found between L2 children and children with SLI in this study bears important implications for the discussion of the role of transfer in L2 research and for the question of a defective linguistic representation in SLI research.*

The acquisition of verb-second in L1 and L2 acquisition has been a matter of debate in the literature on language acquisition for some time. Especially within the UG framework this has been a hot topic, as is witnessed by the large number of journal articles and book volumes that have been devoted to this subject. It has been suggested, and is generally assumed, that this is a case where syntax and morphology interlock, i.e. only finite verbs raise to the verb-second position. Interestingly enough, there seems to be a difference between L1 learners and L2 learners in this respect. For example, the acquisition of subject–verb agreement has been found to coincide with the acquisition of verb-second in L1 children but not in L2 acquisition (e.g. Clahsen and Muysken, 1989). Most research has dealt with German (Clahsen and Muysken, 1986, 1989; Eubank, 1992; Meisel and Müller, 1992; Meisel, 1994) but there are also studies on Swedish (Platzack, 1992, 1996). Since Swedish is a verb-second language without subject–verb agreement, the discussion has been about finiteness and verb-second in the Swedish studies.

The verb-second phenomenon has attracted con-

siderable interest not only in language acquisition research, but also only in research on language disorders. Although the vast majority of studies on children with Specific Language Impairment (children with SLI) report morphological deficits, e.g. tense markings (Rice and Wexler, 1996), there are also indications that, in verb-second languages, word order constitutes a specific problem for these children. Studies of German children with SLI (Grimm and Weinert, 1990; Clahsen, 1991; Clahsen, Bartke, and Göllner, 1997) show that these German children do not have problems with tense, but with verb agreement morphology. Some of these children also exhibited problems with verb-second. For Swedish children with SLI, who do not have to worry about the agreement issue since Swedish does not have subject–verb agreement, verb-second problems are reported to be the most typical characteristic of SLI grammar (Håkansson and Nettelblatt, 1993, 1996; Hansson and Nettelblatt, 1995).

Surprisingly, although there is considerable evidence that phenomena associated with finiteness, such as word order and verb morphology, constitute fruitful areas for research in unimpaired and impaired first language acquisition, as well as in second language acquisition, there are only a handful of studies where comparisons between these three different groups of children are actually made (e.g. Håkansson and Nettelblatt, 1993, 1996; Paradis,

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1999; Penner, in press; Paradis and Crago, 2000). On the contrary, L1, L2 and SLI children are traditionally studied within quite different frameworks, with different research questions in mind. For example, the study of L2 acquisition often entails the issue of transfer; and target structures are chosen with the purpose of comparison between the L1 and the L2. The study of children with SLI, on the other hand, typically deals with the question of whether the children have representational deficits or processing problems, and the most striking errors in production and comprehension are analysed.

Another important difference between L1 and L2 research on the one hand and SLI research on the other hand is that the perspective is developmental in L1 and L2 research and the learners are followed over time in longitudinal studies. This is rare in studies on children with SLI, where data is usually only collected on a single occasion. There are, however, some exceptions to this tendency. Håkansson, Nettelbladt and Hansson (1991) conducted a longitudinal study comparing the grammatical structures in spontaneous speech in Swedish L1 children, L2 children and children with SLI (see also Håkansson and Nettelbladt, 1993, 1996). The results from this study showed interesting similarities between L2 children and children with SLI in the acquisition of verb-second.

The present study takes these results on word order as a point of departure and expands the analysis to include tense marking on verbs. More precisely, the focus of the investigation concerns the relation between verb-second and tense marking in three groups of Swedish pre-school children recorded on two different occasions. The paper is organised in the following way. First, a short overview of the theoretical predictions and some relevant aspects of Swedish grammar will be given. Then the empirical data on the acquisition of tense marking and verb-second in Swedish by L1 children, L2 children and SLI children will be described. The results are given as group means from the two different recording occasions. Finally, the theoretical impact of comparing various sorts of language development within the same framework is discussed.

### Processability Theory

As the theoretical framework for the study, a theory of L2 development called Processability Theory (Pienemann, 1998a, b) is used. The choice of a psycholinguistic theory of second language development in order to analyse L1 children, L2 children and children with SLI is not an uncontroversial one. It implies that the children with SLI will be treated as

Table 1. *Hierarchy of processing procedures* (Pienemann and Håkansson, 1999)

Processing procedures	Structural outcome
5. Subordinate-clause procedure	Main and sub clause
4. S-procedure	Inter-phrasal information exchange
3. Phrasal procedure	Phrasal information exchange
2. Category procedure	Lexical morphemes
1. Word or lemma access	Words

having developing grammars, just like the other children. This perspective stands in sharp contrast with the more traditional treatment of language disorders as cases of deficits, in particular representational deficits (e.g. Clahsen, 1991; Rice and Wexler, 1996).

Processability Theory (henceforth PT) assumes that there is a predictable sequence of acquisition for the procedural skills that are needed for language processing. Each level in the developmental sequence serves as a prerequisite for the next, higher level. The theory relates to Levelt's (1989) model of language production, particularly the part of the model that deals with the grammatical encoding of a message. One very critical feature in the learner's development of the grammar is the concept of "unification of grammatical features" from Lexical Functional Grammar (Bresnan, 1982). According to PT, language development is seen as a gradual construction of the mental grammar. Each stage in the development is built upon the automatization of the preceding stages. The learner's task is to build up his or her own grammar by testing hypotheses about the target language. The precise procedures needed for the processing of each stage in the development are described in Table 1.

As a first step in this developmental route the learner identifies and acquires the *words* of the target language (level 1). The next step is to categorise the lexicon and list the diacritic features of the lexemes in the lexicon. This is the level of *lexical morphology* (level 2). Lexical morphology is a necessary prerequisite for *phrasal morphology* (level 3) to be processable. The processing of phrasal morphology allows the learner to unify the features of head and modifier in a phrase. When phrasal morphology is automated, *inter-phrasal morphology* is processable (level 4). This step implies that the grammatical functions of the words in a clause will be accessible and feature unification between phrases will be possible. At this

Table 2. *Processing hierarchy of Swedish structures (after Pienemann and Håkansson, 1999)*

Processing prerequisites	Exchange of information	Outcome Swedish grammar
5. clause boundary	main and sub. clause	subordinate clause word order
4. S-procedure	inter-phrasal information	<b>verb-second</b>
3. phrasal procedure	phrasal information	NP, VP agreement
2. category procedure	lexical morphology	<b>tense markings; past, present</b>
1. word/ lemma	words	

level the rule that regulates subject–verb inversion is processable. Finally, when main clause word order rules are automated, the hierarchical relation between main and subordinate clauses is processable and the learner can apply different grammatical rules in *main and subordinate clauses*.

### Grammatical structures in Swedish

The sequences in which the target language develops are described in a non-language-specific manner in the section above. In Pienemann and Håkansson (1999) Swedish grammar was translated through Lexical Functional Grammar into a hierarchy of processing complexity. In this section I will give a short description of the Swedish structures that have been selected for this study.

The following two Swedish structures will be analysed:

- Tense marking: verbal suffixes expressing present and past tense
- Verb-second: subject-verb inversion in topicalized declaratives

Table 2 summarises Swedish morphology and syntax and illustrates how tense marking and verb-second fit into the larger picture of the processability hierarchy. The structures selected for this study are printed in boldface.

### Tense marking

As mentioned above, Swedish differs from e.g. German and Dutch in not having subject–verb agreement on the verb. The verbs are only marked for tense. In traditional terms, however, inflected verbs are usually labelled finite verbs, also in Swedish. This implies that the relation between verb morphology, finiteness and verb-second is not as straightforward as in languages where the verbal morpheme fulfils a subject–verb agreement function. In other words, it is possible to distinguish finiteness from tense marking,

since finiteness is expressed by verb-second (cf. Meisel, 1994; Platzack, 1996), but tense by a verbal suffix. Thus, the tense marker can be assumed to be a diacritic feature which is a part of the verb. This separation of tense from finiteness carries important implications for the PT predictions. If the tense suffix is to be regarded as a lexical suffix, it can be expected to appear *before* the processing of finiteness is possible, since the tense marking in itself does not involve any exchange of grammatical information between constituents, but it is only a diacritic feature in the lexicon. In this paper, I will follow the suggestion that it is possible to distinguish finiteness from tense and I will use the term *tensed verbs* for verbs which exhibit morphological endings.

Tense marking is quite consistent and salient in Swedish. There are three different weak conjugations, one class of strong verbs and one class of irregular verbs. The suffixes in the different conjugations have slightly different, phonologically determined forms for present (stem + *-r* or stem + *-er*) and past tense (stem + *-de*, or stem + *-te*). Strong verbs typically exhibit vowel shift (*umlaut*) and irregular verbs have idiosyncratic forms.

### Verb-second

At the PT level of S-structure, the different grammatical functions of the constituents in the clause are identified and finiteness is used. Here, we commonly find subject–verb agreement, i.e. exchange of information between NP and VP. However, since Swedish lacks overt subject–verb agreement, the processing of this level is realised as subject–verb inversion. This is obligatory in yes/no questions, wh-questions where the subject is not questioned and in topicalised declaratives.

The Swedish word order rules are illustrated in example (1) a declarative clause, (2) a topicalised declarative clause with the adverb in first position, and (3) a topicalised clause with the object in first position.

- (1) NP<sub>subj</sub>-V<sub>tense</sub>-NP<sub>obj</sub>-ADV  
*Han köpte en bok igår*  
 he bought a book yesterday  
 “He bought a book yesterday”
- (2) ADV -V<sub>tense</sub>-NP<sub>subj</sub>-NP<sub>obj</sub>  
*Igår köpte han en bok*  
 yesterday bought he a book  
 “Yesterday he bought a book”
- (3) NP<sub>obj</sub>-V<sub>tense</sub>-NP<sub>subj</sub>-ADV  
*En bok köpte han igår*  
 a book bought he yesterday  
 “Yesterday he bought a book”

### The acquisition of Swedish grammar

We will now proceed to the research on the acquisition of Swedish grammar. The different research areas, L1 research, L2 research and SLI research, are presented in separate sections.

#### L1 acquisition

There is surprisingly little research on L1 acquisition of Swedish verb-second. In the early accounts of children acquiring Swedish as a first language, there is no mention at all of verb-second (e.g. Lange and Larsson, 1977; Plunkett and Strömquist, 1992). These studies focussed on the relative order of appearance of different sentence elements, e.g. whether subjects and verbs came earlier than adverbials, not on the specific ordering of elements within a sentence. In more recent studies, however, verb-second has been explored in a systematic way (e.g. Håkansson, 1989, 1992, 1997a, b; Santelmann, 1995; Platzack, 1996; Josefsson, 1999). These studies unanimously show that L1 children use inversion in topicalised clauses from the age of around two years, i.e. from the earliest multiword utterances (Santelmann, 1995, 182).

Tense suffixes on verbs emerge around the same time, e.g. at the age of two years. There is, however, an interesting difference between morphology and verb-second in the patterns of acquisition. Verb-second is used correctly as soon as topicalised clauses occur, and very few errors are found in the children's speech. The verbal morphology seems to be used in a more optional way and there is a gradual development from little use to full proficiency (Santelmann, 1995; Platzack, 1996).

#### L2 acquisition

In contrast to research in L1 acquisition, verb-second has been the main issue in research on Swedish as a second language, involving a large number of em-

pirical studies (see Pienemann and Håkansson, 1999 for an overview of studies). The acquisition of verb-second in Swedish was first discussed in terms of a problem area in Hyltenstam's study of adult L2 learners (Hyltenstam, 1977). Hyltenstam elicited sentences with a preposed adverb using a written test given to 160 informants with 35 different first languages. The informants participated in Swedish language courses in the southern part of Sweden. Tests were administered on two occasions, with an interval of five weeks. On the first occasion, 143 learners produced non-target sentences, and on the second occasion 84 learners still used the non-target XSV structures instead of XVS (V2) structures. Subsequent studies of spontaneous speech production have confirmed the findings that subject-verb inversion is highly problematic in adult L2 learners (e.g. Hammarberg and Viberg, 1977; Bolander, 1988) as well as in child L2 learners (Håkansson, 1992; Håkansson and Nettelbladt, 1993, 1996).

Similarly, in a study of the acquisition of Swedish as a foreign language in Switzerland, Naumann (1997) reported that the most common error made by the students was the non-inversion after a preposed adverb. This finding is particularly interesting, since the learners have the same inversion rule in their first language, Swiss German. Naumann concludes that L1 transfer seems to play only a minor role in the acquisition of verb-second.

Let me add a note on the L1-L2 distinction. This distinction is not an unproblematic one. It has been suggested that L1 acquisition takes place before the age of three years (McLaughlin, 1987), whereas the L2 learner acquires the target language after the age of three years. (This is the definition that will be used for the selection of informants in the present study.) However, children who are exposed to the language before the age of three also sometimes behave like L2-learners. Thus, in studies of simultaneous bilingualism, some children have been found to acquire one of their languages as a weaker language and the other as a stronger language. In Schlyter and Håkansson (1994) bilingual children with Swedish as one of their two languages were compared to monolingual L1 children and to L2 children acquiring Swedish after the age of three years (i.e. successive bilinguals). Three of the simultaneous bilinguals had been defined as having Swedish as their weaker language in an earlier study (Schlyter, 1993). The children with Swedish as the weaker language showed the same problems as did the successive bilinguals and used non-inverted clauses (XSV) to the same degree. Interestingly, XSV structures were also reported in a study on internationally adopted children. If the children were adopted after the age of



four years they had problems with V2, but not if they were adopted earlier (de Geer, 1992).

### *Children with SLI*

Children with SLI constitute a special group among young monolingual children. Otherwise no different from unimpaired children, they have problems acquiring their first language. It is often claimed that these children have general problems with grammatical morphology (e.g. Clahsen, 1991; Gopnik, 1994; Rice and Wexler, 1996, 1997; Clahsen et al., 1997; Leonard, 1998). English children with SLI seem to have most difficulties with tense markings (e.g. Rice and Wexler, 1996, 1997), and German children with SLI are reported to have problems with both subject–verb agreement and word order (e.g. Clahsen, 1991; Clahsen et al., 1997). Unlike German unimpaired children, some of the impaired children placed finite verbs in final position, a position which is usually reserved for infinitives. However, the problems are different in Swedish children with SLI. In their case, it is the problems with word order that are found to be the most common feature (Nettelbladt, Sahlén, Ors and Johannesson, 1989; Håkansson and Nettelbladt, 1993, 1996; Hansson and Nettelbladt, 1995).

Importantly, tense marking in verbs, which is a frequently reported problem area in English-speaking children with SLI, and which has even been suggested to be the clinical marker of SLI (Rice and Wexler, 1996), is not a particular problem area to Swedish children (cf. Hansson, 1997) nor to Norwegian children with SLI (Simonsen and Bjerkan, 1998). There are, however, large typological differences in how tense markings are used in different languages, and cross-linguistic comparisons between children with SLI should therefore be interpreted with caution. For example, Paradis and Crago (2000) have shown that both French L2 children and children with SLI have problems with tense markings. Their error patterns differed however: the SLI children preferred infinitives, whereas the L2 children preferred the present tense as a substitute for past tense.

Furthermore, simple and complex tenses may be acquired differently. Some Swedish children with SLI who use simple tense without problems have great problems when it comes to complex tenses (Håkansson, 1998). Finally, studies of German children (Penner and Hamann, 1998) have shown that children may also acquire different types of tenses differently. They found an asymmetry in the tense markings of German language impaired children. These children marked internal tense when there was a salient anchoring in time, but they failed to mark tense when there was no overt time referent, or when

there was a relationship between two events. Examples such as these call for deeper and more sophisticated cross-linguistic investigations into which different types of tense markings are problematic to impaired children. They also question the idea of having tense as a general clinical marker for impaired children.

### *Earlier comparisons among verb-second in L1, L2 and SLI*

In a predecessor to this study (reported on in Håkansson and Nettelbladt, 1993, 1996), data were collected from six L1 children, six L2 children and six SLI children in spontaneous speech situations. Each child was recorded several times, with longer intervals for SLI children and shorter intervals for L1 and L2 children. Interestingly, the results showed that the L1 children followed a developmental path that was different from the other children's. The L2 and SLI children used uninverted clauses after preposed elements, i.e. XSV clauses, before they were able to use inversion. The L1 children, on the other hand, used inversion as soon as they started using preposed adverbs. In other words, there was no evidence of a stage with XSV structures in their production, whereas there were plenty of examples of this structure in the L2 and SLI children.

The interpretation was that the L1 children were helped by their shorter utterances when adverbs emerged. The MLU of the L1 children at the onset of adverb preposing was much shorter than the MLU of the L2 children. We have no information of early adverb preposing by SLI children, but we know that SLI children still use XSV structures with quite long utterances. The task may be regarded as more complex when the utterances contain more words. A reasonable hypothesis is that the grammar is easier to deal with when lexical development goes hand in hand with grammatical development. In other words, the language development in L2 and SLI children can be characterised as being out of synchrony, since they use long but linear utterances (cf. Menyuk and Looney, 1976).

### *Summary of earlier research on Swedish verb-second*

Summarizing, there is a large body of studies on verb-second in Swedish. Most studies have investigated verb-second in L2 learners, bilingual children and children with language impairment. These groups seem to have particular problems in acquiring verb-second. It is striking that violations of verb-second in topicalized declaratives, i.e. in the form of XSV structures, have only been reported in studies

Table 3. *Studies on the acquisition of Swedish verb-second*

Population	XSV-structures	Study
Monolingual unimpaired children	no	Lange and Larsson, 1977; Plunkett and Strömquist, 1992; Håkansson, 1992, 1997a, Santelmann, 1995
Monolingual children with SLI	yes	Håkansson, Nettelblatt and Hansson, 1991; Håkansson and Nettelblatt, 1993, 1996
Simultaneous bilinguals		Schlyter, 1993; Schlyter and Håkansson, 1994
Swedish stronger	no	
Swedish weaker	yes	
Internationally adopted		de Geer, 1992
< 4 yrs	no	
> 4 yrs	yes	
Successive bilinguals	yes	Håkansson, 1992; Håkansson and Nettelblatt, 1993, 1996
Adult L2 learners	yes	Hyltenstam, 1977; Bolander, 1988; Naumann, 1997

on these learners, never in unimpaired monolingual L1 acquisition. Table 3 gives an overview of studies of the acquisition of Swedish word order.

### A longitudinal study of L1, L2 and SLI

I will now proceed to describe the empirical study of grammatical development in Swedish pre-school children. This study forms part of a larger investigation on production and comprehension of Swedish grammatical structures (cf. Håkansson, 1997a, b, 1998; Håkansson and Hansson, 2000). The part of the study that will be dealt with here focuses on the occurrence of verb-second and tense morphology in the children's production on two different occasions, with an interval of six months.

### Hypotheses

The following hypotheses will be tested:

- (i) The Swedish grammar will develop according to the predictions from PT: tense before verb-second.
- (ii) All children will follow the same route.

### Data

Ten unimpaired L1 children, ten L2 children and ten children with SLI were chosen as subjects. The impaired children had been independently diagnosed as SLI by speech therapists well before the experiment, and their general language performance was well below age expectations.

A group of younger unimpaired L1 children was chosen as control to the impaired children. Since the aim is to find early developmental stages, and not to define SLI, we chose not to use unimpaired age-mates as control. Instead, we aimed at finding unimpaired children as young as possible to match the grammatical levels of the children with SLI. The results from a pilot study showed that if the same elicitation material was to be used, the children in the control group should not be younger than three years of age at the beginning of the study.

The L2 children were mainly refugee children arriving in Sweden from the war in former Yugoslavia. Children over the age of three years at the arrival were chosen as informants (cf. discussion above). When the data collection started they had spent approximately four months in Sweden.

The ages of the children at Time I varied between three years and one month (3;1) to six years and three months (6;3). The age of the L1 children was between 3;1 and 3;7 years, the age of the children with SLI was between 4;0 and 6;3 years, and the age of the L2 children was between 3;6 and 6;0 years. Table 3 gives names, ages at Time I and first languages of the children involved. At Time II all children were approximately six months older.

### Matching

In comparisons between unimpaired and impaired children, different matching techniques are discussed in the literature, with age match or language match being the most common ones. In this study, we used language match. This means that the children's language is matched according to the results from comprehension and production tests. The tests turned out not to be very suitable for the L2 children, possibly because of the culture-specific vocabulary, and we can see that these children score much lower than the others, especially in the production test. Table 4 gives the test results from the three groups before the data collection started.

The production test, The Lund Test of Phonology and Grammar (Holmberg and Stenkvist, 1983) includes plural forms and genitive markings of nouns, comparison markers on adjectives, tense markers on verbs, pronouns, prepositions and placement of nega-

Table 4. Names, ages and L1s of the informants at Time I

L1 children		SLI children		L2 children		L1
name	age	name	age	name	age	
9	3;1	Filip	4;0	Agnes	3;6	Albanian/Bosnian
15	3;1	Josef	4;3	Rosita	3;7	Albanian
5	3;2	Greg	4;6	Leila	3;11	Arabic
13	3;3	Hans	4;7	Ursa	3;11	Arabic
12	3;5	Hillevi	4;8	Kenan	4;6	Bosnian
10	3;5	Kris	5;4	Eddie	4;10	Albanian
6	3;5	Fabian	5;10	Bekim	5;11	Albanian/Bosnian
7	3;5	Robert	5;11	Rizzi	5;11	Albanian/Bosnian
8	3;6	Tony	6;0	Benita	6;0	Albanian
2	3;7	Henrik	6;3	Bushra	6;0	Arabic

Table 5. Results from the production and comprehension tests

Test	Maxi- mum	L1		SLI		L2	
		mean	SD	mean	SD	mean	SD
Lund Grammar Test	46	31.5	5.7	29.5	6.6	14.7	4.5
Swedish Comprehension	46	32.3	5.3	35.5	6.9	25.3	5.0

tion. In other words, there is a heavy bias towards morphology, and only one structure related to verb-second is used, namely placement of negation.

The results for production show that the L1 children are within normal age expectations. The results for the children with SLI place them in the same group (3;0–3;6 years) i.e. they perform like children one to two years younger. The L2 children have a mean score of 14.7, which is below the norm for 2;6–3;0 years (their mean is 20.3). Their greatest problems lie in adjectival comparatives, placement of negation, and especially in prepositions, where practically all of the L2 children fail.

For comprehension, the Swedish Test of Language Comprehension, SIT (Hellquist, 1989), was used. This test includes different tense forms of verbs, pronouns, prepositions, conjunctions and placement of negation. The results for comprehension show that the children with SLI perform slightly better than the L1 children, but there is no significant difference between them. The L2 children have more problems. Summarising, the L1 children and the children with SLI were quite equal in proficiency, measured by these tests, with the L2 children lagging behind. (In

this context, it is important to keep in mind that the children with SLI are two years older than the L1 children.) This is the starting point for the present study.

### Elicitation and analysis

Each child participated in test sessions with an adult. Structures that were regarded as relevant for the different levels of processability were chosen, and tests were designed to create obligatory contexts for these structures.

In order to obtain data on tense marking, the child was asked to comment on pictures or activities. From pictures, the investigator triggered past tense by asking for example: “What did these children do yesterday?”<sup>1</sup> In the action test, the investigator put objects in different places and asked “What did I do?” Instead of looking for deviations from the norm, a distributional analysis was undertaken. This means that *all* instances of tense suffixes on the verbs in the test material were scored as tense markings, irrespective of whether they were target-like or not. In other words, occurrences of overgeneralizations on irregular verbs were counted as active morphology (e.g. *skri-va-de* instead of *skrev* “wrote”). Most children used past tense suffixes. However, there were also examples of past participles being used in place of past tense. These suffixes were counted as efforts to produce past morphology (e.g. *skriv-it* “written” instead of *skrev* “wrote”), although past participles have to be accompanied by an auxiliary (*har skrivit* “has written”) in order to be a grammatical structure in the target language. To summarise, all verbs that had a suffix indicating past tense forms were counted in relation to obligatory contexts.

To investigate occurrence of verb-second, subject-verb inversion after a topicalised adverb was chosen as the target structure. The results from earlier studies showed that the earliest contexts for subject-verb inversion were clauses with topicalised time adverbials. Therefore, this type of structure was elicited. Short narratives were used as elicitation material. The investigator read three short stories together with the child, and then the child was encouraged to retell the stories. If needed, the investigator prompted topicalisation by saying, “What happened then?” or “And . . . ?” The total sum of given contexts for topicalisation was 28 instances.

<sup>1</sup> It has been pointed out to me by a referee that it may be problematic to use wh-questions in the elicitation, since children with SLI often have problems with this type of question. Since the children in this study give appropriate answers to the wh-questions I assume that they have interpreted the questions correctly.

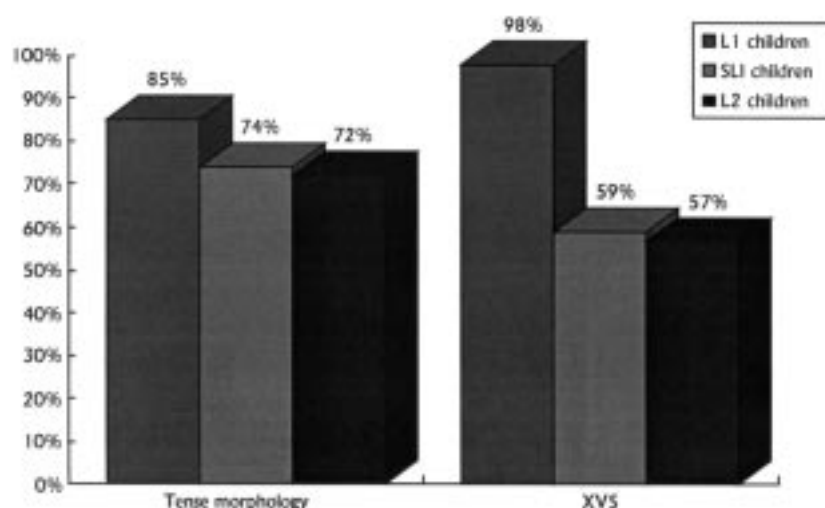


Figure 1. Verb-second (XVS structures) and tense marking at Time I in L1 children, children with SLI and L2 children (the results are measured in percentage of occurrences out of obligatory contexts)

Only one of the children (number 12, an L1 child) hit this target, and for the other children the number of contexts varied. The L2 children, in particular did not use much topicalisation. Avoidance of topicalisation (e.g. saying “They fell then” instead of “Then they fell”) may be a sign of the child’s not being able to produce subject–verb inversion. It is, however, very difficult to create contexts where not using topicalisation can be regarded as ungrammatical. Therefore, only the number of topicalised sentences were counted as obligatory contexts in the scoring. All occurrences of inverted structures were compiled as percentages out of obligatory contexts.

#### ***Results from the comparison of verb morphology and verb-second***

Figure 1 shows the results from the comparison of verb morphology and verb-second (XVS) at Time I in L1, L2 and SLI children. As is shown in the figure, no obvious relation between use of tense marking and verb-second can be seen. Such a connection, which has been found in some previous studies of German and Swedish (e.g. Clahsen and Muysken, 1989; Platzack, 1992, 1996) cannot be found in this Swedish data, not in the L1, L2 or the SLI group. Instead, the results show significant differences between tense marking and verb-second in all groups. Interestingly, we find opposite tendencies in the L1 group when compared to the L2 and the SLI groups. While the L1 children seem to find it easier to use verb-second than to mark tense ( $p < 0.03$ ), the L2 children and the children with SLI use tense marking

to a higher degree than verb-second (to a non-significant degree).

The results for the L1 children confirm earlier results by Santelmann (1995), who found that the verb was placed correctly in second position immediately after the children’s first use of multiword utterances, whereas tense markings on verbs were more gradual in nature. However, this contradicts what was predicted by PT. According to PT, tense marking is a prerequisite for verb-second, and it is therefore expected to be automatised to a higher degree than verb-second. This is precisely what is shown in the results from the L2 children and the children with SLI. Since PT mainly deals with L2 acquisition it is not surprising that the Swedish L2 children behave according to the predictions, but the data from the children with SLI is novel and interesting. A similarity between L2 children and children with SLI has been found in earlier studies on the acquisition of Swedish word order (Håkansson and Nettelbladt, 1993, 1996), but this is the first time development of morphology and word order have been compared.

Thus, the PT predictions fit with the outcome from two of the groups, SLI and L2, but not with the L1 group. We have here a case where it is the “normal” L1 acquisition that needs further explanation and not the “non-normal” SLI and L2.

#### ***Comparison of L1, L2 and SLI at Time I***

As is shown in Figure 1, the largest difference between the L1 group and the two others, L2 and SLI, is the application of subject–verb inversion in

Table 6. Results from the elicitation on verb-second and tense marking at Time I

Subject-verb inversion		Tense marking	
L1 > L2	p < 0.0005***	L1-L2	ns (p < 0.09)
L1 > SLI	p < 0.001**	L1-SLI	ns (p < 0.12)
L2-SLI	ns (p < 0.9)	L2-SLI	ns (p < 0.9)

topicalised declaratives at Time I. The L1 children very rarely violate the rule that places the verb in second position in clauses with topicalised adverbs. The L2 children and the children with SLI, however, produce a lot of examples with the verb in third position, i.e. XSV-structures. It is worth noting that they also produce examples of the correct inverted structure. In other words, while the L1 children have obligatory verb-second in topicalised declaratives, the L2 children and the children with SLI use verb-second only optionally.<sup>2</sup>

The difference in use of subject-verb inversion between the L1 and L2 children is statistically significant. Also, the difference between the L1 and SLI children is highly significant. However, there is no significant difference between SLI and L2 children, which may come as a surprise, considering that L2 children are bilinguals acquiring a second language, and SLI children are monolingual L1 learners as the L1 children. For tense, there is only a non-significant difference between the three groups of children. The levels of statistical significance, based on an unpaired t-test, are shown in Table 6. Before we go into discussing the interpretations, I will give some examples from the typical language production in each of the three groups.

Three examples of clauses with preposed adverbs from the different groups may illustrate the difference in the children's performance. In example (4), the L1 child uses inverted word order after the preposed adverbs, and the verbs are used correctly, in present or past form.

(4) L1 number 2, boy, age: 3;1

Adult: *Och sen?*  
and then?  
“And then?”

<sup>2</sup> Since finiteness is expressed by verb-second in Swedish one might claim that this is a case of optional infinitives (cf. Rice and Wexler, 1997).

Child: *Och sen är han törstig*  
and then be-PRES *he thirsty*  
“and then he is thirsty”

Adult: *Och sen är han törstig, ja*  
and then be-PRES *he thirsty, yes*  
“and then he is thirsty, yes”

*Och sen?*  
and then?  
“And then?”

Child: *Och sen spillde han*  
and then spill-PAST *he*  
“and then he spilt”

The next example, example (5), is produced by one of the L2 children, Eddie. He gives three examples of non-inversion after preposed adverbs, i.e. XSV structures. Observe that all his verbs are marked for past tense, with overgeneralisations of the regular suffix to the irregular verbs.

(5) L2 child: Eddie, boy, age 4;10, L1 Albanian

Adult: *Och vad gjorde barnen?*  
and what did the children  
“And what did the children do?”

Child: *Nu dom badade*  
now they swim-PAST  
“Now they went swimming”

*Nu han togde det*  
Now he take-PAST it (“tog-de” instead of the irregular “tog”, *took*)  
“Now he took it”

*Och nu dom sede* (“se-de” instead of the target “sydde” *sewed*)  
and now they sew-PAST  
“And now they sewed”

The last example, example (6), is taken from the data from one of the SLI children, Robert. Also in this excerpt, there are XSV structures, i.e. clauses with non-inversion after preposed adverbs. As for the use of verb suffixes, one of the verbs (*trilla* “fall”) belongs to a verb conjugation in which the verbs keep the same form in infinitive, present and past tense in casual speech. This means that we cannot determine whether this verb is tense marked or not. In the two other clauses, however, the verb has the correct present tense form (the modal *vill* “want”, and the copula *är* “is”).

(6) SLI child Robert, boy, age 5,11

Adult: *Och då*  
and then  
“And then”

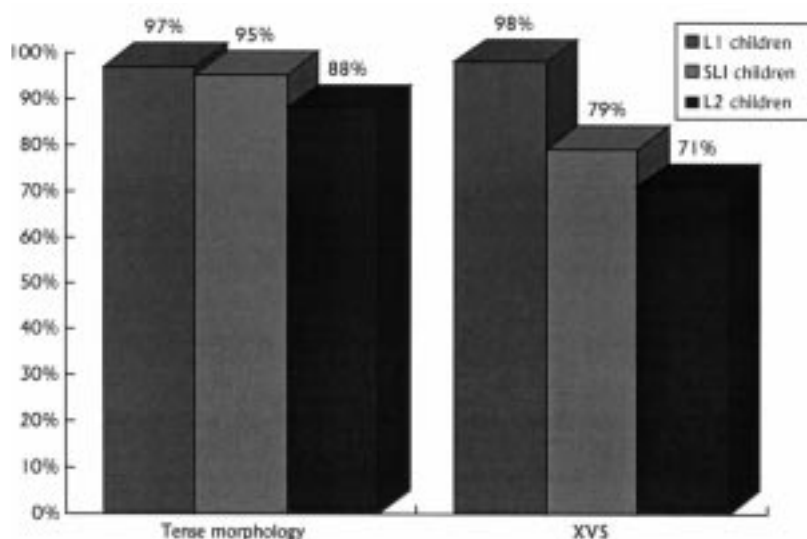


Figure 2. Verb-second (XVS structures) and tense marking at Time II in L1 children, children with SLI and L2 children (the results are measured in percentage of occurrences out of obligatory contexts)

Child: *Sen han trilla här*  
then he fall here  
“Then he fell here”

*Och sen han vill inte vara i den pottan*  
and then he will not be in that pot  
“And then he does not want to be in that pot”

*Och sen han är i där*  
and then he be-PRES in there  
“And then he is in there”

### *A developmental perspective: from Time I to Time II*

At the second data collection session, after six months, all the children produce more correct structures, and the differences between the groups have diminished. The development is rather small in the L1 children because of the ceiling effect, but both the L2 children and the children with SLI have improved their productive skills considerably (from 57% to 71% correct verb-second for the L2 children; from 59% to 79% for the children with SLI). Figure 2 shows the results. Observe that there are no longer statistically significant differences between the groups, although there are still some differences to be found.

### **Discussion**

Processability Theory assumes no difference between L1 and L2 acquisition. Both types should involve the gradual automatization of grammar in the formulator. PT provides us with a tool to study in great

detail the gradual stages through which language develops. The predictions that the learners were to proceed from markings on lexical morphology to marking of the hierarchical relations at the sentence structure were confirmed for L2 and SLI children.

Problems with verb-second have been reported in earlier studies on L2 learners as well as in studies on children with SLI. What explanations have been offered before to account for this? Let us look at some earlier accounts of L2 and SLI.

### *Explanations of L2*

Explanations of L2 are often based on assumptions about transfer from the L1. This is true also in studies of the acquisition of verb-second. The discussion often concerns the amount of transfer that can be detected: Is the learner using the first language as the initial hypothesis of the second language (Schwartz and Sprouse, 1994) or is the learner only transferring a minimal part of the first language (Vainikka and Young-Scholten, 1994)? No agreement has yet been reached on this question.

The directionality of transfer found in some studies is intriguing. There are a large number of studies evidencing the difficulties in the acquisition of verb-second by speakers of non verb-second languages. In the ZISA project (Meisel, Clahsen and Pienemann, 1981), learners with a Romance language background were followed longitudinally when acquiring German as L2. Their results point at a clear developmental pattern in the acquisition of the German word order rules, starting with canonical SV

word order and with XSV as a second stage. In his study of Swedish as L2, Hyltenstam (1977) found that the acquisition of subject–verb inversion constituted a long-lasting problem for the learners, the majority of whom had an XSV language as L1. Only 3 learners out of a total number of 160 had a verb-second language as L1 (German). The finding that these learners produced the same errors as the others with respect to word order is interesting and agrees with the findings in Naumann (1997) that even learners with a verb-second language as L1 make verb-second errors.

However, there are only a few studies showing that the verb-second phenomenon is transferred. On the contrary, in a study on Danish children learning English as L2, Færch (1984) found that there were only very few examples of the Danish XVS rule being transferred into the children's English, in comparison to other phenomena. Faerch explains this difference by referring to markedness conditions, assuming that verb-second is the more marked word order. A study along the same line is the study by Rahkonen (1993), where the acquisition of Swedish verb-second by Finns was compared to the acquisition of Finnish XSV word order by Swedes. There was a significant difference between the number of errors made by the Finns (learning the verb-second) and the number of errors made by the Swedes (learning the XSV). Rahkonen concluded that it is easier to leave the verb-second structure and start using the unmarked XSV, than to do the opposite.

To summarise, there seems to be a consensus that verb-second is a long-lasting problem for L2 learners. There is, however, no consensus on the explanation behind this fact. If the L2 learners have an L1 that is not verb-second, transfer from L1 is used as the explanation of the problem (e.g. Schwartz and Sprouse, 1994; Vainikka and Young-Scholten, 1994). If the learners' L1 is also a verb-second language, the problematic nature of the acquisitional task has been explained as the influence of another language, e.g. English (Naumann, 1997), or as being due to typological markedness (Rahkonen, 1993; Færch, 1984). The results from the present study, that verb-second is acquired late not only in L2 learners but also in children with SLI, suggest that other explanations may be needed to account for the parallel development of these two groups.

### *Explanations of SLI*

Explanations of SLI have been following three main lines: the impairment is said to lie in a deficient linguistic representation, learning deficit, or in difficulties in processing the input. The representational

deficit hypothesis has been suggested by e.g. Gopnik (1994) and Rice and Wexler (1996, 1997). Their claim is that children with SLI have impairments in one subcomponent of the language system, for example the tense marker. This claim cannot be used to account for the resemblance between L2 and SLI found in this study. Firstly, the nature of the problem – a tense deficit – was not found at all. Secondly, the L2 children in this study cannot be characterised as having representational deficits, since they have a fully functioning first language.<sup>3</sup> The problems that the Swedish SLI children show with applying verb-second are more compatible with the hypothesis put forward by Penner and Hamann (1998). They propose that there is an underspecification of the CP-shell which makes verb-second, wh-questions, subordination and certain tense markings vulnerable in German children with SLI. Interestingly, verb-second, subordination and wh-questions belong to the structures that are predicted to appear at a late stage according to PT. These two proposals have, in fact, much in common, the important difference being that PT has a dynamic developmental perspective whereas Penner and Hamann (1998) assume that the children with SLI have a grammar in stagnation. The results from the group of SLI children in this study, who increased their use of verb-second from 59% at Time I to 79% at Time II, show that they are in fact able to acquire structures belonging to the CP-shell. Additional evidence comes from a study on relative clauses including the same children (Håkansson and Hansson, 2000), which showed that subordination is a vulnerable structure for children with SLI, as the children had selective problems with this structure. Still, most of the children exhibited an increasing use of correct relative clauses. In other words, the C-domain (realised in finiteness, verb-second, subordination) constitutes a particularly vulnerable area for the children with SLI, as for the L2 children, but most of the children develop from Time I to Time II.

The third explanation, “processing problems”, has been dealt with in terms of auditory processing. Leonard (1989, 1998) suggests that children with SLI have perceptual limitations and therefore, they have problems in perceiving elements of low phonetic substance. This explanation may hold for the difficulties with English third person -s, but certainly not for the difficulties that Swedish SLI children have in using verb-second. Word order problems are of a

<sup>3</sup> Moreover, L2 adults have also been found to pass through exactly the same developmental stages as the SLI children and L2 children in this study (cf. Pienemann and Håkansson, 1999).

different kind. Is it possible to cover both these problem areas within the same explanation?

In fact, Leonard's proposal (1989) that processing and not representational deficits is the source of the problem in these children, is partly compatible with the results from the present study. Firstly, the fact that SLI children resemble L2 children may be explained by processing difficulties in both groups. It is plausible that L2 children also have problems in perceiving those elements in the target language that have low phonetic substance. In contrast to Leonard, however, I would like to suggest that the processing difficulties not only take the form of perceptual limitations, but also surface in the limitations of automated grammatical processing in the formulator.

### The explanatory value of PT

It is striking that exactly the same grammatical phenomenon, namely verb-second, is problematic for L2 children and children with SLI, but not for young L1 children. This similarity cannot be explained by reference to transfer or to general language deficits. The developmental perspective, on the other hand, makes it possible to compare the groups. L1 children, L2 children and children with SLI are all language learners, and they are developing towards the target grammar. Pienemann (1998a, 17) claims that L1 learners as well as L2 learners follow developmental paths that are within the constraints defined by PT. Because of their different initial hypotheses, the L1 learners have a more economical and successful development than the L2 learners. The results from the present study suggest that sometimes even L1 children may choose the less successful path, namely if they are language impaired. One possible explanation for the successful path in the L1 children is that the lexical and the grammatical development go hand in hand in their case (cf. Bates and Goodman, 1999). These children simply do not use multiword utterances until they master the corresponding grammatical structures. Recall Santelmann's claim that Swedish L1 children use verb-second as soon as they start using multiword utterances. In PT terms we could say that they reach the S-structure level and leave the phrase level as soon as the lexicon has expanded and adverbs can be preposed in the clauses. The L2 and the SLI children, however, continue to stay at the phrasal level and line up the phrases after each other instead of joining them at the S-structure level. Their clauses can be described as consisting of a succession of the phrases [ADV]<sub>ADVP</sub> [S]<sub>NP</sub> [V]<sub>VP</sub> instead of [ADV-S-V]<sub>S</sub>.

If we take a closer look at the structures that are on top of the processability hierarchy and which are

predicted to be acquired later, we find that these late structures are in fact exactly the structures that have been found to be vulnerable in children with SLI and problematic to L2 learners. They belong to the processing of the S-structure. Thus, there may in fact be a common denominator for grammatical problems in L2 children and children with SLI: the processing of the S-structure. If this is correct, we could expect that:

- Verb-second, the grammatical expression for S-structure to differentiate main clauses from subordinate clauses, will be problematic in languages with verb-second.
- Sentence functions such as subject, verb and objects are not obligatory, and may be missing.
- Subject-verb agreement is problematic.

Along the same lines, if the lower level, such as lexical and phrasal morphology are processable, we can expect that:

- Person markings on verbs occur when they have semantic value, i.e. in pro-drop languages.
- Other verb markings occur when they are semantically valid.

In fact, this is exactly what we find in the literature on children with SLI in typologically different languages. For Italian, subject-verb agreement, being at the lexical level, does not seem to constitute a problem, whereas clitic pronouns marking objects are found to be problematic (Leonard, Bortolini, Caselli, McGregor and Sabbadini, 1992). The same goes for Hebrew. Verb markings are not problematic, but definite accusative case markers are difficult (Dromi, Leonard and Shteiman, 1993; Rom and Leonard, 1990).

The suggestion that the S-structure is a major problem in L2 children and children with SLI has a lot in common with the proposal of a C-shell problem (Penner and Hamann, 1998). There is, however one major difference. The perspective in PT is developmental, and it predicts the order of emergence of grammatical structures. This is what makes the comparison L1-SLI-L2 interesting. The present study has shown that, when treated as having grammars in development and compared with L2 children, the children with SLI are found to follow one of the paths in the acquisition of Swedish, namely the same path as the L2 children. The dissociation between tense and verb-second in the children with SLI, which looks "unnatural" if compared to L1 children, is in fact in line with the development found in L2 children. In the results from the traditional Swedish language tests, the children with SLI were comparable to monolingual children two years younger.



However, when structures typical to bilingual children were tested, another pattern emerged and the children with SLI showed the same profile as L2 children. This shows that a theory of second language development may shed new light on language development in other learner groups, and suggests that not only structures found in younger monolingual children should be used in the testing of children with SLI, but also structures found in the productions of bilingual children.

### Conclusions

Two important conclusions can be drawn from this study:

- (1) There is no direct relationship between tense morphology and verb-second in the acquisition of Swedish in any of the learner groups. This implies that tense can be acquired separately from finiteness in Swedish.
- (2) The similarities that were found between L2 children and children with SLI challenge previous accounts of these learner groups. The results question both the importance of transfer in L2 acquisition and the deficit representation view of language disorders and suggest that there is a developmental schedule that must be followed.

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