

Article

# Teasing Apart the Effects of Dominance, Transfer, and Processing in Reference Production by German–Italian Bilingual Adolescents

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**Abstract:** This paper intends to test different accounts of bilingual reference production against the production of referring expressions in Italian by German-Italian bilingual adolescents. In particular, we investigate to what extent bilingual referring expressions involve transfer from one language to the other, result from processing and dominance variables, and are the outcome of a process of language change. We will show that each of these hypotheses makes a precise prediction about which referential strategy bilinguals should adopt. The production of referring expressions is examined in the context of a story-telling task. Based on the analysis of overspecified forms, clitic omissions, and agreement mismatches, as well as on correlations with dominance factors, we argue in favor of the relevance of dominance and processing factors for bilingual reference production. Finally, we verify the possibility of generalizing our conclusions to a different linguistic domain, concerning the expression of word order in main clauses.

**Keywords:** reference production; transfer; dominance; processing; language change; overspecified referring expressions; clitics; narratives

## 1. Introduction

When analyzing bilingual language production, it is common to observe the emergence of forms and form-function mappings that may differ from each of the bilinguals' two languages. For these emergent new forms several analyses have been proposed, which all share the effort of understanding how language is represented in the bilingual mind. The aim of our contribution is to test different hypotheses on language internal and external factors affecting bilingual language production, based on the analysis of referring expressions (REs, henceforth) as produced by German-Italian bilinguals in a story-telling task.

There has been a tradition of studies proposing a structural account of bilingual language production, based on the analysis of the linguistic features of the two languages in contact. All these studies start from the observation that bilinguals differentiate their two languages from early on (see, for example, [De Houwer 1990](#); [Francis 2011](#); [Lanza 2000](#); [Petitto and Kovelman 2003](#)). Moreover, transfer from one language to the other is a hallmark of bilingualism throughout the lifespan ([Döpke 2000](#); [Montrul 2010](#); [Sorace 2004](#)). The main theoretical contributions have investigated the structural (language-internal) conditions that render transfer possible. Following [Hulk and Müller \(2000\)](#) and [Müller and Hulk \(2001\)](#), if Language A has two morpho-syntactic exponents of a linguistic category and Language B allows for only one of these two options, transfer from B to A might (but does not need to) occur (see [Schmitz et al. 2012](#) for a reformulation of

this hypothesis in terms of complexity of syntactic derivations). For example, Nicoladis (2006) shows that French-English preschool bilingual children produce some inappropriate prenominal adjectives in French (Language A)—which has both prenominal and postnominal adjectives, albeit under different semantic conditions. This is interpreted as an effect of transfer from English (Language B), which allows only for the prenominal option (see also Section 1.1 for a discussion related to the domain of bilingual reference production). In other words, linguistic features that are associated with the representation of Language B are “injected” into the representation of Language A (Aboh 2015 for terminology). This analysis of transfer has been challenged in some recent studies. The main points of criticism concern the language conditions underlying the directionality of transfer, the idea itself that transfer is unidirectional and the role of “feature injection” as a mechanism affecting the occurrence of cross-linguistic structures (see, e.g., Lanza 2000; Serratrice 2013 for discussion). Liceras et al. (2012) show that in order for transfer at the syntax/lexicon interface to occur, the influencing language must be more transparent in terms of the morphosyntactic exponents of a given semantic distinction than the influenced language. For example, the fact that Spanish distinguishes between the copulas *ser* and *estar* (both meaning ‘to be’) may boost the acquisition of copula in English (which does not have this distinction) among English-Spanish bilingual children (see also Liceras and Fuertes 2016). Crucially, this theory predicts that the influencing language is the one with the greater number of morphosyntactic options, contrary to what is predicted by the abovementioned accounts by Müller and Hulk (2001) and Nicoladis (2006). Other studies have claimed that the bilinguals’ two languages interact with each other bidirectionally (Cook 2003; Francis 2011)—and not unidirectionally as stated by the accounts reviewed previously—and the notion of “feature-recombination” (and not feature-injection) appears to better account for this bidirectionality as well as for the possible emergence of a new linguistic system among bilinguals (Aboh 2015).

If, on the one hand, all the abovementioned studies claim that bilingual production is the result of language transfer at the underlying, representational level, other studies have argued for intact representations in both languages. The specific patterns of language production exhibited by bilinguals would be the result of their limited processing capacities. In particular, reduced processing resources might affect the integration of information across different linguistic domains and lead to non-native ways of language processing (see, for instance, the Shallow Structure Hypothesis by Clahsen and Felser 2006). For example, some studies have observed that bilinguals are generally slower at retrieving lexical items, due either to low frequency of usage (Gollan et al. 2008) or language competition (Bialystok et al. 2008). These processing difficulties have an impact on the mapping between abstract syntactic representations and the lexicon, and account for the production of incorrect or inappropriate forms with different types of structures, including verbal inflection (Prévost and White 2000), gender morphology (Hopp 2013), and referential expressions (Torregrossa et al. 2018). Another relevant example of such an approach is provided by the most recent elaboration of the Interface Hypothesis (Sorace 2011). In this case, the (optionally) inappropriate reference use by bilinguals is explained in terms of processing complexity, which is involved in the simultaneous integration of grammar and discourse information during reference production. Crucially, most of these studies share the idea that in production, bilinguals rely on default forms as a kind of repair strategy to counteract processing complexity (see the discussion in Section 1.1).

The divide between structural and processing accounts is not as dichotomous as is presented above. It is plausible to hypothesize that under a condition of processing complexity (e.g., integration of information from different domains or cognitive load) the system is more tolerant to transfer. For instance, it might not identify the ungrammaticality/inappropriateness of a certain string in one language, which is grammatical/appropriate in the other language (see Fernández et al. 2017 for discussion on this point). Moreover, the literature has shown that other factors (beyond processing and transfer) must be involved in bilingual language production. Each of these factors may interact with transfer and processing in different ways (Lanza 2000). In this paper, we consider the impact of dominance, intended as a broad construct, encompassing “a linguistic proficiency component,

an external component (input), and a functional component (context of use)” (Montrul 2016, p. 16). Several studies indicate that dominance (in this broad sense) is fundamental in shaping the course and outcome of language acquisition (e.g., Kupisch and Rothman 2016; Rinke and Flores 2014; Torregrossa et al. 2017; Tsimpli 2014; Unsworth 2013). However, with respect to the interaction of dominance with processing and transfer, the results are not always clear-cut. While it seems uncontroversial that dominance affects processing positively (Langacker 1990; Lanza 2000; Pliatsikas and Marinis 2013), the role of dominance in language transfer is still not clear. Some scholars attribute the emergence of cross-linguistic structures to dominance (Bernardini 2003; Nicoladis 2006; Yip and Matthews 2000), while others claim that transfer is an effect of bilingualism, independently of dominance (Fernández et al. 2017; Hsin et al. 2013; Müller and Hulk 2001).<sup>1</sup>

Language contact in bilingualism has often been considered as a trigger for language change (cf. Meisel 2011), since it may lead to the emergence of innovative form-function mappings or accelerate language change processes that are also attested (albeit at a much slower rate) in non-contact situations (Silva-Corvalán 1994). Transfer, processing, and dominance may act as catalysts of these language change processes (on the relation of language change with transfer, see Aboh 2015 and Thomason and Kaufman 1991; with processing, Fernández et al. 2017; with input and dominance, Meisel 2011). Therefore, we will also briefly discuss whether language change accounts for the results of our study (Sections 1.1 and 4).

We use reference production as a testing ground for understanding how transfer, processing, dominance and language change affect bilingual language production. In addition, we consider the production of word order in main clauses, in order to figure out to what extent the findings concerning reference use are generalizable to other linguistic structures. In the remaining of this section, we review previous attempts to analyze bilingual reference production in terms of the categories introduced in this section, and formulate the hypotheses of our study accordingly. Then, in Section 2 we introduce our own study.

### 1.1. Bilingual Reference Production at the Crossroad of Transfer, Processing and Dominance: A Review of Previous Studies

There is a tradition of studies investigating the acquisition of reference among monolinguals and bilinguals (see Serratrice and Allen 2015 for a general overview). Here, we focus on those dealing with the acquisition of null-subject and clitic languages. In the following review, bilingualism is intended in a very broad sense, including, among others, simultaneous and successive bilingual children, adult second language learners and attrited speakers. Instead of considering bilingualism as a categorical variable, we assume a continuum of bilingual language experience and proficiency (Surrain and Luk 2017 for a very similar view), and we operationalize this continuum by means of an index of degree of bilingualism (the Bilingual Index Score, see Section 2.2).

Several studies have noticed that bilinguals speaking a null-subject/non-null-subject language combination tend to produce overt pronouns (in both subject and object position) in contexts, in which the use of a null or a clitic would have been more appropriate (i.e., when maintaining reference to a discourse referent). In other terms, they produce overspecified (i.e., redundant) forms. In this respect, bilinguals differ from age-matched monolinguals. This tendency has been observed in production and comprehension across different types of bilinguals and language combinations (Serratrice et al. 2004 on

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<sup>1</sup> Recent studies—mainly based on code-mixing data—have formulated more clear-cut hypotheses on the relationship between language dominance and transfer, assuming a definition of dominance that is based on linguistic criteria. The dominant language is the one with the most salient (alias most grammaticized) morphosyntactic features (e.g., gender in Spanish vs. English)—see Fernández-Fuertes and Licerias 2018 and Licerias et al. 2016. While this definition seems to account properly for young simultaneous bilinguals’ data, its predictive value for other types of bilinguals has not been assessed yet. Therefore, in this paper, we will consider dominance as a proxy for language experience and proficiency, which we believe is more relevant when analyzing language production by older bilingual children that have been exposed to a varying amount of input throughout the lifespan.

English-Italian bilingual children; Belletti et al. 2007 and Sorace and Filiaci 2006 on English near-native speakers of Italian; Tsimpli et al. 2004 on attrited Greek and Italian L2 speakers of English; Lozano 2016 and Tsimpli and Sorace 2006 on L2 Spanish and Greek, respectively). This pattern of production is predicted by the structural account formulated by Müller and Hulk (2001) (Section 1). Italian allows for both null (and clitics) and overt pronouns, while English can only resort to the overt pronoun option.<sup>2</sup> Therefore, bilinguals transfer the form that overlaps between the two referential systems (overt pronoun) from English to Italian. Later studies have proposed a formal account of the observed transfer. On the one hand, Serratrice et al. (2004) argue that Italian overt pronouns have a more complex feature specification than English ones, since the former are marked for discourse features such as [+topic-shift] and [+focus], while the latter are underspecified, being allowed in [ $\pm$ topic-shift] or [ $\pm$ focus] contexts. Following Müller and Hulk (2001) analysis, the simpler option (in English) is transferred to the language instantiating the more complex option (Italian). On the other hand, the account of Belletti et al. (2007) builds on Cardinaletti and Cardinaletti and Starke (1999) observation that Italian overt pronouns are strong forms (i.e., they realize the full noun phrase (DP) structure), while English overt pronouns are weak elements (i.e., compared to strong pronouns, they miss some functional layer). Due to transfer from English, Italian overt pronouns may be reanalyzed as weak elements and are thus allowed to appear in contexts that do not mark any topic-shift or focalization (see also Belletti and Guasti 2015, pp. 258–59).

Among structural approaches, not all theories predict the directionality of transfer to go from German (the non-null-subject language) to Italian (the null-subject language). In line with Licerias and Fuertes (2016), Italian is a more complex system than German, since it allows for two morphosyntactic exponents of subject constituents (i.e., null and overt pronouns), while German has only overt subjects. Therefore, cross-linguistic influence should occur from Italian (the most transparent system) to German (the least transparent one with respect to the phenomenon at stake), and not vice versa (see Section 1 for further details), contrary to what is predicted by the accounts reviewed previously. In support of this hypothesis, Licerias et al. (2012) found no overuse of overt subjects in Spanish by English-Spanish simultaneous bilinguals. Rather, the authors show that among young simultaneous English-Spanish bilinguals, the transparency of the Spanish system favors the acquisition of sentential subjects in English. We will refer to this last approach as the “morphosyntactic complexity account”.

The conclusions reached in previous studies are mainly based on the analysis of reference production in Italian or Spanish by Italian-English or Spanish-English bilingual speakers. More in general however, structural approaches to bilingual reference production predict that the pattern of cross-linguistic influence depends on the features of the two languages in contact. In this contribution, we analyze reference production by German-Italian bilingual adolescents. German patterns with English in that it is a non-null-subject language. German-Italian bilinguals should thus overproduce overt pronouns in subject position in Italian, as in the case of English-Italian bilinguals, or alternatively, if the morphosyntactic complexity account holds true, reference production in Italian should not be influenced by German. However, contrary to English, German allows for null objects. Müller and Hulk (2001) show that the latter property of German affects reference production in Italian by German-Italian bilinguals. The authors observe an overuse of ungrammatical object omissions in Italian by German-Italian bilingual children (aged between 1;8 and 6), as compared to mean length of utterance-matched monolinguals. Based on their structural account of cross-linguistic influence, Müller and Hulk claim that the children analyze sentences with a preverbal object clitic as containing an empty element in the canonical direct object position. The observation of null objects in

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<sup>2</sup> The distinction between overt pronouns and clitics might appear not as motivated as the distinction between null and overt pronouns, given that clitics are overt too (in the sense of being realized phonologically). In the case of clitics, we consider “overt” as synonymous for “strong”, in compliance with the distinction between clitics and strong pronouns reported in Cardinaletti and Starke (1999).

German provides support for this analysis. Thus, the overuse of null objects is interpreted as an effect of transfer from German to Italian.<sup>3</sup>

More recently, Sorace (2011) has recast the analysis of bilinguals' overuse of overt pronouns (in subject and object position) in terms of processing. She interprets overt pronouns as default options that bilinguals use, whenever they fail to integrate syntactic representations with discourse-pragmatic information in real time (Section 1). Within this line of research, Torregrossa et al. (2018) show that the production of default forms manifests itself in association with slow processing (i.e., slow lexical retrieval).<sup>4</sup> Finally, it should be pointed out that the omission of clitics by German-Italian bilingual children considered in the above discussion can also be analyzed as depending on processing variables. Mateu (2015) observes that the amount of clitic omissions in the production of Spanish monolingual children correlates negatively with their working memory capacity. Restrictions in working memory skills cause difficulty in computing complex structures (derived, for instance, by long-distance movement operations). Crucially, Mateu (2015) notices that clitic omissions tend to occur in association with complex verbs (i.e., simple vs. periphrastic forms) and sentences with a greater number of constituents. We refer to this kind of approaches as "computational complexity accounts" to distinguish them from Sorace (2011) theory.

In this contribution, we consider two sources of complexity related to the production of clitics. The former concerns the syntactic context in which the clitic occurs. Italian distinguishes between cases in which the position of the clitic is obligatory (e.g., preceding a finite verb as in (1) or following an infinitive verb as in (2)) and cases in which the position is optional, since the clitic may either precede the modal verb (3) or follow the infinitive verb (4), without any consequence on the interpretation (optional clitic climbing structures—OCC, henceforth).<sup>5</sup>

- |    |   |   |                             |
|----|---|---|-----------------------------|
| 1. | <i>Lo</i><br>CL-ACC.MASC.SG<br>'He wants it.'           | <i>vuole</i><br>want.3SG.PRES                 | (* <i>Vuole lo</i> )        |
| 2. | (di)<br>to<br>'To want it.'                             | <i>voler-lo</i><br>want-INF.-CL-ACC.MASC.SG   | (* <i>Lo volere</i> )       |
| 3. | <i>Lo</i><br>CL-ACC.MASC.SG<br>'He wants to take it.'   | <i>vuole</i><br>want.3SG.PRES                 | <i>prendere</i><br>take-INF |
| 4. | <i>Vuole</i><br>want.3SG.PRES<br>'He wants to take it.' | <i>prender-lo</i><br>take-INF.-CL-ACC.MASC.SG |                             |

In (3) the modal *vuole* '(s/he) wants' restructures with the embedded infinitive originating a monoclausal structure consisting of a complex predicate. On the contrary, (4) is a biclausal structure, in which the modal verb selects a sentential (CP) complement (Cinque 2004). This analysis implies that both structures are associated with greater syntactic complexity than sentences like (1) and (2).<sup>6</sup>

<sup>3</sup> The morphosyntactic complexity account makes no prediction concerning the production of object pronouns in Italian by German-Italian children, as far as we understand the proposal. The two languages are equally complex, since both allow for two morphosyntactic exponents of object pronouns, i.e., clitics and overt pronouns in Italian, and nulls and overt pronouns in German.

<sup>4</sup> The studies of Sorace (2011) and Torregrossa et al. (2018) differ in the assumption of which forms count as default, i.e., overt pronouns for the former, nulls for the latter. The type of form used as default might be an effect of the type of bilingualism taken into account. The investigation of Torregrossa et al. (2018) considers only (relatively) balanced bilingual children.

<sup>5</sup> In Italian, OCC can occur only with certain verbs, i.e., modal (e.g., *volere* 'to want'), aspectual (e.g., *finire* 'to finish') and motion verbs (e.g., *andare* 'to go'). Cf. Cinque 2004.

<sup>6</sup> We refer to Bennati (2007), who shows that in the acquisition of these structures, L2-learners exhibit target like behavior only at near native levels. Moreover, several studies have shown that optional structures—like OCCs—are more difficult to

Another source of complexity that we take into account relates to the form of the clitic itself. [Belletti \(1999\)](#) claims that *ci*-clitics (i.e., locative clitics, meaning ‘there’) and *ne*-clitics (meaning ‘thereof’) have the structure of prepositional phrases, thus differing from accusative and dative clitics, which have the structure of determiners. Recent literature has shown that prepositions may represent a vulnerable domain in bilingual language acquisition ([Kupisch et al. 2014](#)). Therefore, the use of clitics having the same structure as prepositions might be challenging, too.

Let us return to the predictions related to bilingual reference production, with special focus on the German-Italian language combination. For subject position, both structural ([Hulk and Müller 2000](#)) and processing accounts ([Sorace 2011](#)) hypothesize that German-Italian bilinguals tend to produce overt pronouns in contexts where the use of a null would be more appropriate. The two theories differ only in how they analyze overt pronouns, i.e., as cross-linguistic structures or default options, respectively. Another possibility is that the production of subjects in Italian is not affected by cross-linguistic influence from German, as predicted by the morphosyntactic complexity account ([Licerias et al. 2012](#)). For object position, the picture is more complex. On the one hand, [Sorace \(2011\)](#) expects default overt pronouns to appear in object position as well, instead of clitics. On the other hand, both structural and computational-complexity accounts predict occurrence of clitic omissions, as a case of transfer from German to Italian ([Hulk and Müller 2000](#)) or as a performance-related effect ([Mateu 2015](#)). However, structural accounts expect omissions to occur independently of syntactic context, while for processing accounts omissions should be more visible in association with complex structures.

It should be noted that the reviewed theories do not make any explicit prediction with respect to the production of full DPs instead of nulls or clitics, which is also an instantiation of overspecification. In a recent contribution, [Torregrossa et al. \(2017\)](#) have analyzed reference production in Greek by 180 bilingual children speaking Greek in combination with Albanian, English, and German, respectively. The authors observe that full DPs are the majority of overspecified forms produced by the children. Moreover, the tendency to produce overspecified forms is more marked among bilinguals for which Greek is the non-dominant language. This use of full DPs cannot be interpreted as a transfer effect, since all the languages considered have full DPs. Nor are they “defaults” stemming from processing limitations, given that the system would rather resort to easier (alias more economic) forms like pronouns ([Almor 1999](#); [Burzio 1998](#); [Hendriks 2014](#)). The authors propose that overspecification is an effect of unbalanced dominance: if children do not fully master the syntactic options for reference production (i.e., pronouns), they tend to rely on “safer” pragmatic strategies (full DPs), which are usually not ambiguous.<sup>7</sup>

Finally, a last prediction is worth considering, namely whether the REs occurring in bilingual reference production (with particular reference to clitics) are the result of a process of language change. Several studies have indicated that in contact situation, clitics show a neutralization of morphosyntactic features (gender, number, etc.), so that a unique invariable form ends up being used in all contexts

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acquire than ‘categorical’ ones (e.g., [Zuckerman 2001](#)). In this inventory of syntactic structures, causatives should also be mentioned (see (i)). As in the case of OCCs, causatives involve complex predicate formation (as in *fa portare* ‘(s/he) makes somebody bring something’ in (i)), but no optionality in the position of clitic, which has to precede the verb.

- i. La nonna            *lo*                    fa portare            dal nipote  
 the grandma        CL.ACC.MASC.SG    make bring-INF    by the grandson  
 ‘The grandma makes the grandson bring it’.

<sup>7</sup> The production of full DPs instead of clitic pronouns in Italian has already been observed among English-Italian and German-Italian bilingual children ([Belletti and Guasti 2015](#), pp. 102–5 and reference quoted therein; [Serratrice 2007](#)). On the contrary, overt pronouns are rarely produced. The authors interpret the overproduction of full DPs as a strategy to avoid the use of object clitics, due to their complex morphosyntax. This analysis could be extended to the production of full DPs instead of nulls in subject position (as noted in [Torregrossa et al. 2017](#)), given that, for example, subject-verb agreement may not be fully mastered by some bilinguals. It should be noted that in the studies of [Serratrice \(2007\)](#) and [Belletti and Guasti \(2015\)](#), dominance is not taken into account as a factor motivating the overproduction of full DPs in object position, but it plays a crucial role in [Torregrossa et al. \(2017\)](#).

(Devlin et al. 2012; Zdrojewski and Sánchez 2014). Navarro et al. (2017) show that such neutralization instantiates a stage in the clitic doubling cycle (i.e., in language change involving clitic doubling structures), which may happen independently of language contact (Vega Vilanova et al. 2018). As has been pointed out in Section 1, language contact (between Italian and German, in our case) may accelerate this process.

The results of our study have implications for different accounts of bilingual reference production. Table 1 summarizes the predictions of each account for reference production in Italian by German-Italian bilinguals.

**Table 1.** Summary of the predictions related to reference production in Italian by German-Italian bilinguals.

Account	Prediction
a. Structural account (e.g., Müller and Hulk 2001)	overuse of overt pronouns in subject position and production of null objects (alias, clitic omissions)
b. Morphosyntactic complexity account (e.g., Licerias et al. 2012).	no overuse of overt pronouns in subject position (for objects, see footnote 3).
c. Processing account (Sorace 2011)	overuse of overt pronouns in subject and object position
d. Computational complexity account (Mateu 2015)	clitic omission in association with complex structures
e. Dominance-related account (Torregrossa et al. 2017)	overuse of full DPs in subject and object position
f. Language change account (e.g., Devlin et al. 2012)	use of invariable clitic forms

Additionally, we will test the hypotheses reported in Table 1 by analyzing evidence from another linguistic domain, related to use of word order in Italian. Döpke (1998) has shown that in German, English-German bilingual children tend to extend the use of the verb-object (VO)-order—which German uses with finite verbs—to non-finite final verbs—which instantiate the OV-order and do not allow for the VO-pattern. These data can be analyzed in terms of transfer from English—which has only the VO-order—to German—that allows for both orders (albeit in different contexts), along the lines of what has been proposed by the structural accounts reviewed in Section 1—see also Schmeißer and Jansen (2016) for a related account concerning the complexity of syntactic derivations. If this is the case, the verb-second (V2) property of German (which allows for subject-verb (S-V) and constituent-verb-subject (XP-V-S) word orders) should not be transferred to Italian (which is more consistently S-V)—see also Repetto and Müller (2010). Thus, the analysis of the production of word orders in Italian that may (or may not) comply with the V2-property of German allows us to understand which possibilities for transfer (in terms of directionality) may occur. Moreover, correlational analyses with variables such as dominance will indicate under which conditions these (unexpected) cross-linguistic structures occur.

## 2. Methods and Materials

### 2.1. Participants

We conducted the study in a German-Italian bilingual school in Cologne (Germany), which used German as the main medium of instruction and offered language classes in Italian (between 4 and 6 h per week). After receiving parental consent, we tested seventeen Italian-German adolescents (11 females). They ranged in age from 11;9 to 14;1 (mean age: 13;0). In order to assess the participants for language proficiency, we measured vocabulary and syntactic skills. Productive verbal abilities were tested in both languages by means of the last 30 items of the Boston Naming Test (a 60-item

instrument), which are used for children above 10 years (Kaplan et al. 1983).<sup>8</sup> As a proxy for syntactic proficiency, we calculated an index of syntactic complexity with reference to the narratives produced by the participants (cf. Section 2.3), by considering the subordinate/main clause ratio. As part of the participants' profiling, we calculated an index of dominance—as defined in Section 1—(Bilingual Index Score, BIS henceforth) for each participant, considering their degree of language exposure in German and Italian respectively, according to the procedure described in the following section.

## 2.2. Assessing the Bilingual Index Score

The calculation of BIS is based on a “cumulative” view of bilingual language experience, which considers the use of the bilinguals' two languages in different contexts (home, daycare, school) over time (now and in the past)—cf. Unsworth 2013. Each participant in this study was administered a questionnaire by means of a one-to-one interview. The questionnaire consisted of four main modules targeting each of the child's two languages: (i) home language history (amount of exposure before the age of six); (ii) early literacy preparedness (literacy input received prior to schooling); (iii) current literacy (language of schooling and literacy practices outside school, such as writing e-mails or letters, and reading books, comics or newspapers); (iv) current language use (language currently spoken with family members and friends)—cf. Bongartz and Torregrossa 2017; Mattheoudakis et al. 2016. For all modules, we assigned each language a score, which was the sum of the scores from the individual answers. For answers stating that both languages were used in equal proportion, we split the associated scores between the two languages. After normalizing the scores obtained in each language in percentage (i.e., the ratio between the language specific score and the total score of the module), we subtracted one language total (German) from the other (Italian): a positive score indicates dominance in Italian, while a negative score reflects dominance in German. The closer the score to zero, the more balanced the child in the corresponding module.

In previous studies, we have shown that the four modules contribute to bilingual language proficiency to different degrees (Torregrossa et al. 2017). Based on the analysis of 180 children (40 Greek-Albanian, 30 Greek-English, and 110 Greek-German),<sup>9</sup> we extracted the relative weight of each module, employing a linear regression model with difference in vocabulary score between the two languages as dependent variable and difference scores corresponding to the four modules as independent ones. The weights corresponded to the  $\beta$ -values of the linear regression ( $R = 0.67$ ,  $R^2 = 0.45$ ,  $p < 0.001$ ) and indicated the extent to which the difference values in each module predicted the difference in language proficiency.<sup>10</sup> The regression analysis indicated that the most relevant factor was current literacy (weight: 0.29), followed by current language use (weight: 0.23), home language history (weight: 0.12) and early literacy preparedness (weight: 0.02), respectively.

In order to calculate BIS for each participant of the present study, we first added the difference values related to their vocabulary scores and the four modules of the questionnaires to the regression model built from our previous dataset (from which we extracted the weights). After observing that this addition did not lead to any change in the  $R$ -square value nor in the abovementioned  $\beta$ -values, we used the same weights as reported above. We derived the individual BIS as the weighted sum of the difference values corresponding to each module of the questionnaire, according to the following formula (where  $w$  indicates the weight and  $n$  the score for each module of the questionnaire).

$$\text{BIS} = (w_{\text{current\_lit}} \cdot n_{\text{current\_lit}}) + (w_{\text{current\_lang}} \cdot n_{\text{current\_lang}}) + (w_{\text{history}} \cdot n_{\text{history}}) + (w_{\text{early\_lit}} \cdot n_{\text{early\_lit}})$$

<sup>8</sup> The Boston Naming Test was originally designed for English, and later adapted to German and Italian with the reduced versions designed by Merten (2004) and Riva et al. (2000), respectively.

<sup>9</sup> This dataset has been collected and analyzed within the THALES project (principal investigator: Ianthi Maria Tsimpli) and the CoLiBi project—Cognition, Literacy and Bilingualism in Greek-German-speaking children (principal investigators: Christiane Bongartz and Ianthi Maria Tsimpli).

<sup>10</sup> The analysis relied on the assumption that vocabulary skills are a proxy for language proficiency (see Treffers-Daller 2013; Treffers-Daller and Rogers 2014 for a similar view).



Again, a negative number indicated dominance of language experience in German, while a positive one dominance in Italian.

Table 2 reports the means and standard deviations for vocabulary scores in German and Italian, their differences, syntactic proficiency in Italian (alias syntactic complexity in the Italian narratives) and BIS.

**Table 2.** Descriptive statistics for Italian and German vocabulary, their difference, syntactic proficiency and BIS. The values related to vocabulary scores are reported in raw numbers.

Measure	Mean	SD
Italian vocabulary	11.7	6.3
German vocabulary	14.6	3.7
Difference in vocabulary	−3	8.5
Italian syntactic proficiency	0.29	0.22
Bilingual Index Score (BIS)	−0.08	0.25

The profiling measures adopted in the present study cross-validate each other, since we found strong correlations between BIS and difference in vocabulary ( $\beta = 0.88$ ,  $R^2 = 0.78$ ,  $p < 0.001$ ), BIS and syntactic complexity ( $\beta = 0.67$ ,  $R^2 = 0.49$ ,  $p = 0.003$ ), and difference in vocabulary and syntactic complexity ( $\beta = 0.70$ ,  $R^2 = 0.49$ ,  $p = 0.002$ ).

### 2.3. Materials

We analyzed the production of REs in Italian in the context of a story-telling task. Stories were elicited by using the Edmonton Narrative Norms Instrument (ENNI)—Schneider et al. 2005. The Edmonton Narrative Norms Instrument includes six picture stories, divided into three groups of increasing complexity. The stories in each group were designed to be structurally equivalent. For our task, we used the most complex ones (A3 and B3) counterbalancing among participants. Each story consists of 13 pictures with no text, representing a series of events involving two major characters (an elephant girl and a giraffe boy in A3, and a dog girl and a rabbit boy in B3) and two minor ones (of different gender, too).

We administered the task as a sequence of Power Point slides on a computer screen. The participants had to choose one of three envelopes appearing on the screen. Although all envelopes contained the same story (either A3 or B3), the participants were told that each envelope contained a different story (Serratrice 2007). Then, the participants looked at the story-pictures two by two. Finally, once the 13-picture synopsis had appeared on the screen, they had to tell the story to the investigator, who did not have access to the pictures. The stories were audio-recorded and then transcribed into CHAT format (MacWhinney 2000) by an Italian native speaker and were later checked by another native speaker. Disagreement were resolved by listening to the audio recordings together with a third person (the first author of this study). The final corpus consists of 17 Italian narratives.

### 2.4. Procedure

Participants were tested individually at their school by the first author, who is a native speaker of Italian, and a German native speaker research assistant. The testing occurred in two separate sessions (one or two days apart), one for Italian and one for German, counterbalancing the order. For Italian, children first completed the vocabulary test and then told the narrative (either A3 or B3). Subsequently, they told a second narrative (A3 or B3) under increased cognitive load. In the German session, participants were first administered the vocabulary test, then the questionnaires, and finally were asked to tell a narrative in German from the second group of the ENNI stories (i.e., A2 or B2). In the present study, we will consider neither the Italian narratives produced under cognitive load nor the German narratives (but see Torregrossa and Bongartz).

## 2.5. Analysis of the Narratives

### 2.5.1. Identifying Overspecified Referring Expressions

The use of REs is dependent on the activation (alias accessibility, salience) of its referent in discourse (Ariel 1990; Arnold 2010). An active referent is, for instance, one that has been mentioned recently. Furthermore, referents that are mentioned in subject position are usually more active for subsequent reference than those occurring in object position (Carminati 2002; Papadopoulou et al. 2015). Finally, additional discourse factors are involved in the activation decay of a referent. For instance, if a character intervenes between two mentions of a referent, the referent loses some of its activation. This effect is even more visible if the intervening character matches in gender with the referent (Arnold et al. 2000; but see Arnold and Griffin 2007 for a discussion of this idea). The use of REs reflects the activation of a referent at a given point in discourse. For example, in Italian, reduced forms (i.e., nulls in subject position and clitics in object position) tend to encode, in a scaled cline of activation, higher degrees of a referent's activation than overt pronouns and full nouns.

The present analysis aims to identify uses of REs departing from the correspondence between high activation of a referent and form reduction (i.e., overspecified uses of REs). First, we will assess the activation of a referent based on the linguistic and discourse factors considered above. Then, we will focus on those discourse contexts in which the speakers produce overt pronouns or full DPs, even if the use of a reduced form (a null or a clitic) would have been more appropriate. Table 3 is an excerpt of our analysis (see also Torregrossa et al. 2018). The first column contains the transcription of the narrative, together with its English translation. Unit of analysis is the clause, defined by the occurrence of a verb. If a unit contains more than one RE (U1), it is repeated as many times as the number of REs it contains. The second column (CHAIN) assigns an index to each character (1 for the giraffe boy, 2 for the elephant girl and 3 for the helicopter<sup>11</sup>). We analyzed how the type of RE used (see column (3)) depends on the grammatical role of the referent's previous mention (alias antecedent, column (5)) and the number of characters intervening between the referent's previous mention and its current mention. For the grammatical role of the antecedent, we distinguished between subject (SUBJ) and non-subject (OBJECT). For instance, the antecedent of *la giraffa* ('the giraffe'), i.e., the full DP in subject position in (U4), is the full DP *la giraffa* ('the giraffe') in (U3) occurring in subject position as well. For the number of intervening characters, we distinguished between characters of the same (S) or different (D) gender. For example, the two mentions of the helicopter in (U3) and (U4) respectively are separated by an intervening character of different gender ('the giraffe'). Likewise, the two mentions of the elephant in (U1) and (U4) are separated by two characters, one of the same ('the helicopter') and one of different gender ('the giraffe'). Occurrence of one character of same gender is sufficient for using the label *S* following the number of intervening characters.<sup>12</sup>

<sup>11</sup> We included reference to both animate (e.g., the elephant and the giraffe) and inanimate characters (e.g., the helicopter). However, we decided not to include every inanimate character occurring in the stories, but to focus only on the most salient ones (i.e., the ones that are part of a reference chain).

<sup>12</sup> This kind of coding of REs has been evaluated against a set of data taken from different languages (Italian, Greek and German) and types of speakers (adults and bilingual and monolingual children). All the data were elicited by using the ENNI stories and are, thus, comparable with each other (see, e.g., Torregrossa et al. 2015; Torregrossa et al. 2018). In previous work, we coded REs also for the antecedent's syntactic position (i.e., in a main or subordinate clause) and for distance between REs and their antecedent. Our decision to consider, for this study, only a subset of features depends on the observation (based on tentative analyses) that argument role of the antecedent and number of intervening characters (once the gender of the referents is taken into account) are the most relevant factors for referent's activation.

**Table 3.** Example of coding. The story is told by a 12-year-old German-Italian bilingual speaker (F1). Units containing more than one referring expressions are repeated as many times as the number of referring expressions they contain.

Units	Transcription (1)	Chain (2)	Type (3)	Gramm (4)	Ant-Gramm (5)	Characters (6)
U1	C'era <b>un elefante</b> e una giraffa [There was an elephant and a giraffe]	1	INDEF	SUBJ	INTRO	INTRO
U1	C'era un elefante e <b>una giraffa</b> [There was an elephant and a giraffe]	2	INDEF	SUBJ	INTRO	INTRO
U2	<b>che</b> stavano vicino [ / / ] che stanno vicino a una piscina. [who were near [ / / ] who are by a swimming pool]	1 + 2	RELPRO	SUBJ	SUBJ	0
U3	<b>La giraffa</b> aveva un bel aerocottero [The giraffe had a nice helicopter]	2	DEFDP	SUBJ	SUBJ	1D
U3	La giraffa aveva <b>un bel aerocottero</b> [The giraffe had a nice helicopter]	3	INDEF	OBJECT	INTRO	INTRO
U4	e ehm <b>la giraffa</b> non voleva dare l'aerocottero all'elefante [and ehm the giraffe did not want to give the helicopter to the elephant]	2	DEFDP	SUBJ	SUBJ	1D
U4	e ehm la giraffa non voleva dare <b>l'aerocottero</b> all'elefante [and ehm the giraffe did not want to give the helicopter to the elephant]	3	DEFDP	OBJECT	OBJECT	1D
U4	e ehm la giraffa non voleva dare l'aerocottero <b>all'elefante</b> [and ehm the giraffe did not want to give the helicopter to the elephant]	1	DEFDP	OBJECT	SUBJ	2S

We analyzed the contexts in which a full DP or an overt pronoun occurred. Based on the coding reported in Table 3, we identified all discourse contexts in which these forms are overspecified. For example, when maintaining reference from subject to subject position with either one intervening character (of same or different gender) or none at all, a null can be used to refer unambiguously to the referent. U4 exemplifies this configuration. The full DP *la giraffa* ('the giraffe') could be replaced by a null without causing ambiguities. Likewise, in the same unit, the use of the clitic *lo* ('it') would have been more appropriate than the full DP to refer to the helicopter. The configuration at stake involves maintaining reference from object to object position, with one intervening character of different gender. Another example of overspecified use of a RE is shown in (5), in which the full DP *il gioco* ('the toy') could be replaced by the clitic *lo* ('it'). Here, we observe a switch from subject to object position and an intervening character of same gender (the big elephant).

5. a. U1 (F5: 12;5)  
 E *il gioco* è nell'acqua  
 and the toy be.3SG.PRES in the water  
 'And the toy is in the water.'
- b. U2  
 E il grosso elefante prende *il gioco*  
 and the big elephant take.3SG.PRES the toy  
 'And the big elephant takes the toy.'

After identifying all discourse contexts that are possibly associated with an overspecified use of a full DP, we counted, for each speaker, how many overspecified REs they used, normalizing the result for the square root of the amount of REs produced.

### 2.5.2. Analysis of Clitics

First, we counted how many clitics were used by each speaker, normalizing the result for the total amount of REs produced in each narrative. Then, we analyzed the syntactic configurations in which the clitic appeared, distinguishing between obligatory (simple finite and infinite verbs, auxiliary + past participle constructions and causatives) and optional clitic climbing contexts (see Section 1.1). Furthermore, we identified all instances of clitic omission, describing the type of structure in which the omission occurred or the type of clitic that was missing. Finally, we considered all cases of mismatch in morphosyntactic features (gender, number and case) between the clitic and its full DP associate.

### 2.5.3. Syntactic Complexity and Word Orders in Main Clauses

For each narrative, we calculated a subordination ratio, by dividing the number of subordinate clauses for the total number of units contained in the narrative. We used this measure as a proxy for the participant's syntactic proficiency. Furthermore, we classified each main clause based on the word order pattern it instantiated. In particular, we were interested in understanding whether the V2-grammar of main German clauses can be transferred to Italian.

## 3. Results

Table 4 reports the amount of nulls, clitics, overt pronouns and full DPs occurring in the narratives. Our analysis is based on this dataset.

**Table 4.** Raw frequencies of nulls, clitics, overt pronouns, and full noun phrases (DPs) occurring in the narratives.

Type of Referring Expression	Frequency
Nulls	98
Clitics	59
overt pronouns	13
full DPs	128

### 3.1. Production of Clitics

Table 5 shows the distribution of clitics across the different syntactic contexts introduced in Section 1.1. Most clitics occur (in isolation or in a cluster) in contexts where their position is obligatory, i.e., preceding finite verbs in obligatory CC constructions (simple verbs—(1) and (3)—and auxiliary + past participle constructions—(2)) or following infinitive verbs (4). Optional CC structures are also produced, with a tendency in favor of the clitic climbing option ((6) and (7) in Table 5).

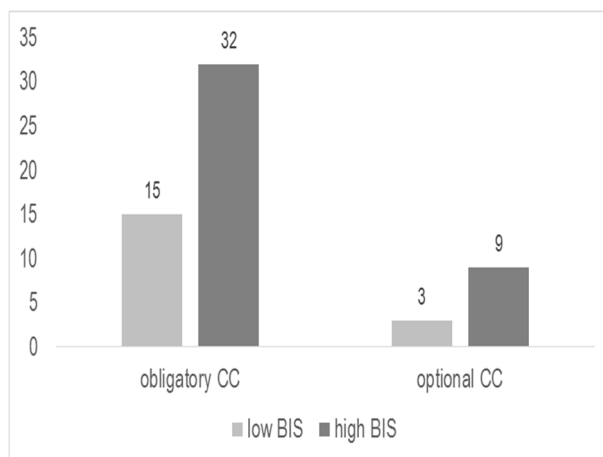
**Table 5.** Raw frequency of clitic pronouns in different syntactic contexts.

Syntactic Configuration	Example	Frequency
a. clitic + verb	(1) <i>La dà alla giraffa.</i> CL.ACC.FEM.SG. give.3SG. to the giraffe (2) <i>È le ha chiesto.</i> and CL.DAT.FEM.SG. AUX.3SG. asked	26
b. cluster + verb	(3) <i>glie-lo ridà alla giraffa.</i> CL.DAT.FEM.SG.-CL.ACC.MASC.SG. give back.3SG. to the giraffe	16
c. verb + clitic	(4) <i>a prender-lo.</i> to take.INF. CL.ACC.MASC.SG.	3
d. causative	(5) <i>e lo ha fatto volare.</i> and CL. ACC.MASC.SG. AUX.3SG. made fly	2
e. OCC_low	(6) <i>quindi non può comprar-lo.</i> therefore NEG can buy.INF.-CL.ACC.MASC.SG.	4
f. OCC_high	(7) <i>il coniglio lo vuole prendere.</i> the rabbit CL.ACC.MASC.SG. want take	8

OCC: optional clitic climbing.

The aim of the correlational analyses reported here is to understand which factors affect the production of clitics by bilingual children. The rate of produced clitics correlates positively with BIS ( $R^2 = 0.27, \beta = 0.52, p = 0.031$ ) and vocabulary score ( $R^2 = 0.26, \beta = 0.51, p = 0.035$ ). The regression with syntactic proficiency does not reach significance ( $R^2 = 0.18, \beta = 0.43, p = 0.08$ ).

Given the relevance of BIS for clitic production, we divided the participants into two groups as a function of BIS. Those whose BIS was less than  $-0.075$  (the mean value of the participants' BISs) were classified as low BIS ( $n = 9$ ), while those whose BIS was greater than  $-0.075$  were classified as high BIS ( $n = 8$ ). Figure 1 shows that high-BIS bilinguals tend to produce a greater amount of clitics than low-BIS bilinguals in both obligatory and optional CC contexts.



**Figure 1.** Raw frequencies of clitics occurring in obligatory and optional clitic climbing (CC) contexts across two groups of participants identified based on Bilingual Index Score (BIS): high- and low-BIS bilinguals.

In the next two sections, we will identify which referential strategies the participants (especially the ones with low BIS) use instead of producing clitics. While Section 3.2 refers to the use of overspecified forms, Section 3.3 considers the cases of clitic omission.

### 3.2. Production of Overspecified Forms

Table 6 reports the results related to the production of overspecified forms. We distinguish between overspecified overt pronouns and full DPs appearing in subject and object position, respectively. A Fischer's Exact test reveals that there is no association between type of overspecified form (overt pronoun vs. full DP) and syntactic position (subject vs. object) in which it appears ( $p = 0.634$ ). In other terms, overt pronouns on the one hand and full DPs on the other appear in subject and object position to the same extent.

**Table 6.** Raw frequencies of overspecified overt pronouns and full DPs in subject position and object position.

Syntactic Position	Overt Pronouns	Full DPs
Subject position	3	12
Object position	2	17
Total	5	29

First, we consider the use of overspecified forms in object position (where the use of a clitic would have been more appropriate). The children produced a greater number of full DPs than overt pronouns ( $\chi^2(1, N = 19) = 11.84, p = 0.001$ ). The normalized amount of produced overspecified forms correlates negatively with BIS ( $R^2 = 0.34, \beta = -0.58, p = 0.04$ ) and vocabulary score ( $R^2 = 0.35, \beta = -0.59, p = 0.03$ ), but the correlation with syntactic proficiency does not reach significance ( $R^2 = 0.25, \beta = -0.50, p = 0.08$ ). We ran these correlations based only on 13 children (out of 17), since four children did not produce REs for reference maintenance in object position.<sup>13</sup>

Considering the total amount of overspecified forms in both subject and object position produces a very similar picture. In this case, the analysis is based on all 17 children. The amount of overspecified full DPs exceeds the amount of overt pronouns ( $\chi^2(1, N = 32) = 15.13, p < 0.001$ ). The regression analyses shows that the lower BIS and vocabulary score, the greater the frequency of overspecified forms (for BIS:  $R^2 = 0.38, \beta = -0.62, p = 0.008$ —see also Figure 2; for vocabulary score:  $R^2 = 0.35, \beta = -0.60, p = 0.01$ ). The correlation with syntactic proficiency is not significant ( $R^2 = 0.18, \beta = -0.42, p = 0.09$ ).

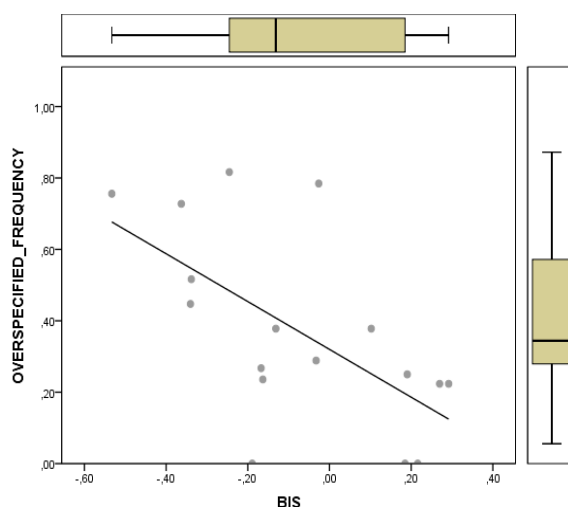
### 3.3. Omission of Clitics

Table 7 reports all cases of clitic omission (seven in total). While low-BIS children omit clitics in association with syntactically complex structures (one omission with a causative and two omissions with OCCs), high-BIS children omit prepositional clitics (*ci* 'there' and *ne* 'thereof'). Therefore, it seems

<sup>13</sup> The REs in object position contained in the following narrative excerpt—produced by F2 (age: 13;2, BIS:  $-0.13$ )—are used to introduce referents (e.g., *un aeroplanino* 'a small airplane toy' in (ii) and *l'amico, l'altro amico elefante* 'the friend, the other elephant friend' in (vi)) and there is no instance of RE used to maintain reference in object position. Therefore, this narrative excerpt cannot verify the hypothesis concerning the use of overspecified forms in object position. Incidentally, it should be noted that in (vii) the participant omits the accusative masculine singular clitic pronoun *lo*, which refers to the airplane.

i.	C'era una giraffa e un elefante	[there was a giraffe and an elephant]
ii.	E quella giraffa c'aveva un aeroplanino.	[and that giraffe had an airplane toy]
iii.	E poi c'era l'elefante,	[and then there was the elephant]
iv.	che voleva giocare.	[who wanted to play]
v.	Però poi l'aeroplanino è caduto in acqua.	[but then the airplane toy fell into the water]
vi.	E poi l'elefante ha chiamato l'amico // l'altro amico elefante	[and then the elephant called the friend // the other elephant friend]
vii.	e Ø ha preso con una [with help: rete],	[and took with a [with help: net]]
viii.	dove si pulisce l'acqua [ . . . ]	[where you clean the water]

that clitic omission is not generalizable to all syntactic contexts, but appears specifically with certain structures, depending on the children’s degree of language experience (high vs. low BIS).



**Figure 2.** Dispersion graph between BIS and the normalized frequency of overspecified forms (overt pronouns and full noun phrases).

**Table 7.** Cases of clitic omission occurring in the narratives. The first column indicates the subject that produced the sentence, the second her BIS, and the fourth the type of structure in which the clitic is missing or the type of clitic that is missing.

Child	BIS	Sentence	Type of Structure
F2	−0.13 (low BIS)	(1) E ∅ ha preso con una [ . . . ] [and has taken ∅ with one [ . . . ]]	AUX + past participle
F3	−0.34 (low BIS)	(2) Un coniglio ∅ voleva mettere al carrello. [A rabbit wanted to bind ∅ to the cart]	OCC
F4	−0.36 (low BIS)	(3) e ∅ fa volando [and makes ∅ flying]	Causative
M4	−0.53 (low BIS)	(4) e ∅ vole prendere [and wants to take ∅]	OCC
M3	−0.03 (high BIS)	(5) e in pratica loro ∅ volevano uno nuovo [and basically they wanted one new ∅ (of it)]	NE-clitic
F8	0.018 (high BIS)	(6) però non ∅ arriva [but not ∅ arrives (there)]	CI-clitic
M6	0.19 (high BIS)	(7) che ∅ ha fatto il nodino/il fiocchetto [that ∅ has tied the knot/the bow (there)]	(1) CI-clitic
		(8) se ∅ potrebbe avere due [if he could have two (of them)]	(2) NE-clitic

### 3.4. Agreement Mismatches

The analysis of agreement mismatches aims to identify the possible emergence of a generalized clitic form, which may indicate that a process of language change is underway (Section 1.1). Table 8 contains all instances of agreement mismatches between a clitic and its full DP associate that occur in our corpus of narratives. Most of agreement mismatches relate to gender (feminine instead of masculine form). One case mismatch (3) and one number mismatch (1) are present, too. The syntactic context in which the clitic appears may influence the occurrence of agreement mismatches: some occur within subordinate clauses, others in association with OCC, and still others with ditransitive verbs.

**Table 8.** Cases of agreement mismatches between a clitic and its corresponding referent, which occur in the narratives. The first column indicates the subject that produced the sentence, the second her Bilingual Index Score, and the fourth the type of structure in which the agreement mismatch appears, together with the type of agreement mismatch (gender, number, case). The symbol ‘>’ indicates ‘instead of’.

Child	BIS	Sentence	Type of Structure/Type of Mismatch
M1	−0.16 (low BIS)	(1) <i>che lo vende, i palloni</i> <i>that it.ACC.MASC.SG. sells, the</i> <i>balloons.MASC.PLUR.</i>	subordinate clause with clitic right dislocation (masc. acc. sing. > masc. acc. plur.)
F4	−0.36 (low BIS)	(2) <i>e la (l’aereo) dà alla giraffa</i> <i>and it.ACC.FEM.SG. (the airplane.MASC.SG.)</i> <i>gives to the giraffe</i>	ditransitive verb (fem. acc. sing. > masc. acc. sing.)
M5	−0.11 (low BIS)	(3) <i>e l’ ha fatto una treccia (al pallone)</i> <i>and it.ACC.MASC.SG. has tied a bow</i> <i>(to the balloon)</i>	ditransitive verb (acc. masc. sing. > dat. masc. sing.)
M6	−0.17 (low BIS)	(4) <i>e la (l’aereo) sta provando per</i> <i>prender-la</i> <i>and it.ACC.FEM.SG. (the airplane.MASC.SG.)</i> <i>is trying to take it.ACC.FEM.SG.</i>	OCC (fem. acc. sing. > masc. acc. sing.)
F1	−0.03 (high BIS)	(5) <i>che il // l’elefante la</i> <i>(l’aeroplanino) toccasse</i> <i>that the // the elephant it.ACC.FEM.SG. the</i> <i>airplane.MASC.SG. touches</i>	(5) subordinate clause with subjunctive (fem. acc. sing. > masc. acc. sing.)
		(6) <i>e le (la giraffa e l’elefante)</i> <i>voleva aiutare</i> <i>and them.ACC.FEM.PL. (the giraffe.FEM.SG.</i> <i>and the elephant.MASC.SG.) wanted to help</i>	(6) OCC (fem. acc. plur. > masc. acc. plur.)
F6	0.10 (high BIS)	(7) <i>perché la butta là dentro (il pallone)</i> <i>because it.ACC.FEM.SG. throws there inside</i> <i>(the balloon.MASC.SG.)</i>	subordinate clause (fem. acc. sing. > masc. acc. sing.)

### 3.5. Word Orders and Constituent-Verb-Subject-(Object) Structures

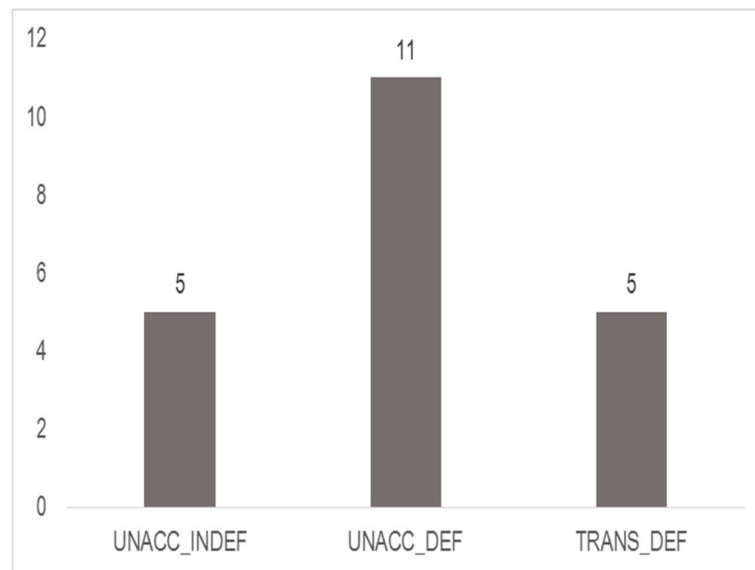
The analysis of word order patterns occurring in main clauses is not central to this paper. However, it is useful to understand whether our considerations related to bilingual reference production can be extended to a different linguistic domain. As claimed in Section 1.1, we are mainly interested in the production of sentences whose word order complies with a German V2-syntax. Table 9 reports the frequency (in raw numbers) of all word orders that appear in root contexts. While the word orders in (a.)–(e.) are incompatible with a V2-grammar, the word orders in (f.) and (g.) are consistent with V2. However, the superficial SV(O) order can be licensed by both a V2 and a non-V2 grammar, while (at least) some of the structures described in (g.) can only be generated by a V2-grammar.



**Table 9.** Word orders occurring in root contexts in the narratives. While the orders (a.)–(e.) are incompatible with a verb-second (V2) grammar, the orders (f.) and (g.) are consistent with V2. In the description of the different structures (first column), the constituents in parentheses may occur or not. When a slash separates the two constituent types, either one can appear (abbreviations used in the Table: *neg*: negation; *cl*: clitic).

Word Order	Example	Frequency
a. presentative	(1) C'erano due conigli, un maschio e una femmina (M2) [There were two rabbits, a male and a female]	19
b. (neg) cl-V(O)	(2) La dà alla giraffa (F4) [CL.ACC.FEM.SG. gives to the giraffe] (3) Non l' ha fatta (M5) [NEG. CL.ACC.FEM.SG. has made]	27
c. (neg) V (O/S)	(4) ha chiesto (M6) [has asked] (5) è arrivato un coniglio [has arrived a rabbit] (6) ma non aveva i soldi [but NEG had the money]	58
d. S (neg/cl) VO	(7) Il papà l' ha aiutati [the father CL.ACC.MASC.PL. has helped] (8) però iddo non aveva cinque euro [but that one NEG had five euros]	22
e. XP SV(O)	(9) Poi la giraffa si arrabbia [Then the giraffe gets mad] (10) Poi l'elefante ha chiamato l'amico // l' altro amico elefante [Then the elephant has called the friend the other friend elephant]	12
f. SV(O)	(11) Il maschio ha visto ehm un negozio [the male has seen ehm a shop] (12) e il coniglio va [and the rabbit goes]	74
g. XP VS(O)	(13) E dopo arriva la mamma [and then comes the mother] (14) E poi ha visto il maschio un altro coniglio [and then has seen the male another rabbit]	21

Figure 3 looks closer at the type of verb-argument configurations instantiated by XP-V-S-(O) structures (g. in Table 9). With unaccusative verbs followed by an indefinite subject, XP-V-S is the unmarked word order. However, if the verb is transitive and followed by two arguments (XP-V-S-O) or if the verb is unaccusative and the subject is definite (XP-V-S<sub>DEF</sub>), the word order XP-V-S is not allowed in Italian (Vernice and Guasti 2015). In these cases, XP-V-S configurations can be analyzed as proper V2-structures. Neither BIS, nor difference in vocabulary scores (between Italian and German), nor syntactic proficiency correlates with the amount of produced non-target XP-V-S-(O) structures (for BIS:  $R^2 = 0.01$ ,  $\beta = -0.12$ ,  $p = 0.64$ ; for difference in vocabulary scores:  $R^2 = 0.001$ ,  $\beta = -0.023$ ,  $p = 0.93$ ; for syntactic proficiency:  $R^2 = 0.001$ ,  $\beta = -0.04$ ,  $p = 0.89$ ).



**Figure 3.** Raw frequencies of different verb-argument configurations instantiated by constituent-verb-subject-(object) structures. UNACC\_INDEF: unaccusative verb followed by an indefinite subject; UNACC\_DEF: unaccusative verb followed by a definite subject; TRANS\_DEF: transitive verb followed by two definite arguments.

#### 4. Discussion

The occurrence in bilingual language production of forms and form-function mappings that cannot be attributed to either of the bilinguals' two languages can be interpreted in different ways. In particular, we identified two main theoretical positions: according to the former, contact between two languages affects language-specific syntactic representations (via transfer or language change processes; cf. Müller and Hulk 2001; Serratrice et al. 2004; Vega Vilanova et al. 2018). For the latter, phenomena occurring in bilingual language production are the result of processing variables, which implies that (at least for some phenomena) language knowledge remains unaffected by bilingual experience (Sorace 2011; Torregrossa et al. 2018). We also left open the possibility that other variables (such as dominance) may account for bilingual language production besides (or in interaction with) language knowledge and processing. In this contribution, we decided to focus on reference production because of its interface nature, which involves both language-specific syntactic mastering of REs and cognitive processes, such as (discourse) updating and attention to one or the other character.

The results of this study show that bilinguals tend to produce full DPs in contexts in which the use of nulls or clitics would have been the most appropriate option.<sup>14</sup> This result is in accordance with widespread evidence concerning the use of overspecified REs among bilinguals (see the overview presented in Sorace and Serratrice 2009 and references in Section 1.1). However, the analysis of the type of overspecified forms that are actually used sheds some new light on the factors affecting this pattern of production. The bilinguals considered in this study produce very few instances

<sup>14</sup> One could argue that our study does not fully support this conclusion, since a monolingual control group is missing. The identification of overspecified DPs reported in this paper is based on a data-coding process that has been tested against several languages and validated for interrater agreement (e.g., Torregrossa et al. 2015; Torregrossa et al. 2017). Therefore, we are confident that our analysis includes only those full DPs that one could substitute with nulls or clitics without generating ambiguity. More in general, the present study shows that it is possible to account for (some aspects of) bilingual language production without resorting to monolingual control groups (Kupisch and Rothman 2016), which is done based on correlational analyses (between use of overspecified DPs and language experience in our case). It is not excluded that overspecification may occur in monolingual language production, too, due for instance to cognitive factors (see Arnold 2010 and references quoted therein). However, such cognitive constraints are supposed to influence monolingual and bilingual language production alike (cf. Torregrossa et al. 2017 for an analysis of how overspecification and underspecification result from the interaction between language experience and cognitive variables among different groups of bilinguals).

of overt pronouns (see Table 6). This pattern of production is not predicted by the structural accounts à la Müller and Hulk (2001), but it rather supports the morphosyntactic complexity account (Licerias et al. 2012), at least as far as the absence of cross-linguistic influence from German to Italian is concerned (see Table 1). Also, the observation that full DPs (instead of overt pronouns) are mostly produced can hardly be interpreted in terms of transfer from German to Italian. Full DPs are in fact available in both languages. Rather, our measure of dominance (expressed in terms of BIS) motivates most of the variation in the use of overspecified forms: the more dominant in German bilinguals were, the more overspecified forms they produced in Italian (Figure 2). We consider dominance as a complex measure encompassing vocabulary proficiency and language experience in both languages (see Sections 1 and 2.2). Torregrossa et al. (2017) found the same (negative) correlation between use of overspecified full DPs and language experience and interpreted this result in terms of a reduced mastery of the syntactic options for reference and a consequent reliance on pragmatic strategies (see also reference to Serratrice 2007; Belletti and Guasti 2015, footnote 5). Here, we propose a refinement of this hypothesis, based on the observation that our measure of syntactic proficiency does not account for variation in the use of overspecified forms (Section 3.2). We argue that the bilinguals' abstract syntactic representations are intact (at least, for the phenomenon at issue here). However, the automatization (alias proceduralization) of this grammatical knowledge is not necessarily fully developed, because of reduced language experience (Ellis 2005; Paradis 2009). In the absence of such automatization, the use of full DPs may be considered as a strategy to ensure accuracy (despite redundancy), when performing a complex task like reference. This hypothesis is more compatible with processing accounts (like the one formulated by Sorace 2011)<sup>15</sup> than with structural accounts of bilingual reference production. It could be claimed, for instance, that more complex structures—such as the ones at the interface between discourse and syntax—are more resistant to automatization processes. In this sense, our account establishes a link between existing processing accounts and language experience (dominance) variables. Moreover, it makes two strong testable predictions. First, greater language exposure should enhance the production of the syntactic options for reference available in the language. This is in line with some recent studies that have emphasized the role of quality and quantity of input in determining (in)complete acquisition of linguistic phenomena (see Kupisch and Rothman 2016; Treffers-Daller et al. 2007; Tsimpli 2014). Second, the use of overspecified full DPs should be observable across bilinguals with other language combinations than the ones considered in this study, including bilinguals speaking two non-null subject languages (e.g., English-German) or two null subject and clitic languages (e.g., Italian-Spanish).<sup>16</sup>

The results of the analysis concerning clitic production are consistent with the conclusions drawn above. The production of clitics reflects dominance in Italian (see Figure 2), but not necessarily greater syntactic proficiency in this language: Syntactic proficiency is indeed not a good predictor of the amount of produced clitics (Section 3.1). The previous analysis of overspecified forms shows that children usually produce full DPs instead of clitics. However, this is not the whole story, since we also found a few occurrences of clitic omission, appearing in the production of both bilinguals with low and high BIS. While the former may omit clitics with OCC structures, the latter encounter difficulties with prepositional clitics. In Section 1.1, we showed that all these structures involve some degree of complexity. Therefore, this set of data complies with the predictions of computational-complexity accounts (see Table 1 in Section 1.1) that clitic omission appears only in certain syntactic contexts.

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<sup>15</sup> However, Sorace (2011) claim that overt pronouns are default forms that counteract complex computations at the syntax-discourse interface cannot be maintained, since it does not comply with the observation that bilinguals tend to produce a greater amount of full DPs. Nor is it plausible that full DPs act as default forms (see the discussion in Section 1.1).

<sup>16</sup> The overuse of full DPs (instead of clitics and null subjects) has already been observed in the production of REs in Greek by Greek-Albanian bilingual children, who are dominant in Albanian (see Torregrossa et al. 2017). Greek and Albanian are both null subject and clitic languages.

Moreover, we found no evidence of transfer of null objects from German to Italian, contrary to the predictions formulated based on Müller and Hulk (2001).<sup>17</sup>

Another phenomenon that can be observed in our data is the presence of (a few) agreement mismatches between clitics and their full nominal phrase associates (Table 8). Based on these occurrences, it is difficult to identify a pattern consistent with the hypothesis that clitics are the outcome of a process of language change accelerated by language contact between Italian and German (see Section 1.1). If this were the case, all cases of agreement mismatches should have involved a unique clitic form, as shown in Section 1.1. However, Table 8 shows that, although the use of a feminine singular form instead of a masculine singular seems to be the most frequent mismatch, other kinds of forms (e.g., masculine singular or feminine plural) can appear, too. Moreover, as in the case of clitic omissions, there seems to be a correspondence between presence of mismatch and complexity of the syntactic structure in which it occurs (Section 3.4), which suggests that agreement errors are motivated by limited processing resources.

The analysis of clitics strengthens our previous claim that the bilinguals in our study are equipped with abstract grammatical representations of the Italian referential system (null subjects, clitics, etc.). Grammatical knowledge does not seem to be affected by either transfer, language change or “incomplete” acquisition (as suggested, in the last case, by the absence of correlation between amount of produced clitics and syntactic proficiency). Rather, the pattern of clitic production exhibited by bilinguals seems to be primarily determined by performance (i.e., processing) and dominance variables.<sup>18</sup>

In order to test whether this conclusion (related to the impact of performance variables on bilingual reference production) can be extended to other linguistic phenomena, we reported the results of a tentative analysis for different word orders produced in Italian. Interestingly, the bilinguals produce XP-V-S<sub>def</sub>, as in (6), and XP-V-S-O structures (see also Table 9), as in (7), which are available in Italian only as marked word order strategies<sup>19</sup>. Such structures are compatible with a V2-grammar.

- |    |                                   |               |            |                |
|----|-----------------------------------|---------------|------------|----------------|
| 6. | Poi                               | so'           | andati     | quelli         |
|    | Then                              | AUX.3PP.PRES  | gone       | those          |
|    | 'Then those have gone.'           |               |            |                |
|    |                                   |               |            |                |
| 7. | Poi                               | chiede        | la femmina | alla giraffa   |
|    | Then                              | ask.3.SG.PRES | the girl   | to the giraffe |
|    | 'Then the girl asks the giraffe.' |               |            |                |

Sentences like (6) and (7) can hardly be analyzed as the result of processing variables, contrary to what has been observed above for clitics. Crucially, the participants were also asked to produce a narrative under cognitive load (Section 2.4). Such condition should have enhanced the production of V2-structures, if this were motivated by limited processing capacity. However, our analysis shows that this is not the case (Torregrossa and Bongartz). Thus, the most viable hypothesis is to interpret V2-structures as the outcome of transfer from German to Italian. In Section 1.1, we observed that

<sup>17</sup> It should be pointed out that the analysis of Müller and Hulk (2001) was formulated based on the production of very young bilinguals. Thus, transfer effects might still be visible in the early phases of bilingual language development, but cannot account for bilingual language production in later stages of acquisition.

<sup>18</sup> As suggested by one of the reviewers, another piece of evidence that grammatical knowledge is unaffected among the bilinguals considered in this study is the fact that in our corpus of narratives, we did not find any occurrence of “redundant” full DPs involving a violation of Principle C of Binding Theory. In other terms, the production of overspecified full DPs always occurs *across* clauses, not *within* clauses (or better said, not within the c-command domain of the antecedent). This observation is particularly relevant in view of the proposal by Balaban et al. (2016) to disentangle syntactic and discourse factors constraining the repetition of full DPs.

<sup>19</sup> Postverbal subjects may be licensed by a narrow-focus interpretation on the subject (followed by “emarginazione” (margination) of the object in the case of XP-V-S-O structures; see, a.o., Belletti 2004). In these contexts, the subject constituent is associated with intonational prominence. It should be pointed out that the narrow focus interpretation is not supported by the discourse context at stake. We will not discuss the possibility that in fact the bilinguals intended to express narrow focus, but did not master the prosodic means to mark it.

when an SVO-language (like English, French, or Italian) and a V2-language that allows both VO- and OV-structures (like German) are in contact, transfer from the former to the latter should be observed. However, our data reveal exactly the opposite pattern. Although the dataset is too small to drive any generalization (see Figure 3), the type of transfer at stake here does not seem to be motivated by “feature-injection”, according to the mechanism identified by Müller and Hulk (2001), but rather “feature recombination”, in line with Aboh (2015)—see the discussion in Section 1.<sup>20</sup> We leave to future research the understanding of the conditions and mechanisms triggering this recombination. Based on our data, we can only conclude that dominance does not seem to motivate it (see the correlation analysis presented in Section 3.5).

Independently of how to account for the emergence of new word-order patterns, the comparison between the analysis of REs and word orders underscores the methodological importance of considering different sources of evidence before drawing any conclusion on bilingual language production. Based on our analysis, a processing account may explain bilingual production of REs (and potentially linguistic phenomena at the syntax-discourse interface), but does not necessarily hold for other aspects of language, such as language properties related to narrow syntax (e.g., word order). Moreover, our contribution underscores the need to investigate bilingual language production by undertaking a fine-grained linguistic analysis—which takes into account the linguistic nature of the investigated phenomenon as well as cross-linguistic differences between the two languages in contact—coupled with a careful profiling of bilingual speakers—in terms of language experience and proficiency.

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<sup>20</sup> It may be observed that a V2-grammar is not a necessary condition for XP-V-S orders. For example, Italian allows such structures in correspondence with the phenomena observed under footnote 16, *wh*-questions, frontings and unaccusative verbs followed by indefinite subjects (cf. Meisel et al. 2013 for discussion). However, as far as we know, the structural account by Müller and Hulk (2001) does not make any prediction concerning a situation in which two ambiguous languages (like German, which has VO and OV, and Italian, with VO and XP-V) enter in contact.

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