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Are there biological gender differences at the early stages of first language acquisition when producing double object constructions and *to/for*-datives?[1]

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Abstract

This study examines whether biological gender differences appear in the early stages of acquisition in the case of English dative alternation (DA) structures (double object constructions (DOCs) and *to/for*-datives). Girls have been found to show faster syntactic development when compared to boys (Lovas, 2011). In the case of the acquisition of DA, an order in the emergence and in the incidence of English DA would entail a syntactic derivational status between DOCs and *to/for*-datives with one being the original structure and the other the derived one (Gu, 2010). However, analogous ages of onset and fairly similar frequency rates in the production could suggest the construction of two underived structures. We investigate whether biological gender differences appear in the case of DOCs and *to/for*-datives. We also investigate whether the exposure to English DA (adult input) results in differences between the girls' output and the boys' output. We analyze data from seven monolingual English girls and six monolingual English boys, and the adults that interact with them, as available in CHILDES. Our findings reveal that monolingual girls and monolingual boys pattern closely in the acquisition of the syntactic non-derivational relationship between DOCs and *to/for*-datives, as seen in their similar emergence. Biological gender differences are not seen either in the acquisition of the additional properties of *to/for*-datives given their later onset and their lower incidence when compared to DOCs. These production patterns also correlate with the frequency with which these structures are heard in the adult input.

Keywords: biological gender; double object; *to/for*-dative; emergence; adult input.

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1. Introduction

In this study, we carry out an analysis of English dative alternation (DA) structures from a biological gender approach. In particular, we investigate the longitudinal spontaneous production of the two types of DA constructions, namely, double object constructions (DOCs) (1a and 1c) that alternate as *to*/*for*-datives (1b and 1d) (Larson, 1988; Snyder and Stromswold, 1997), so as to elucidate whether monolingual English girls differ from monolingual English boys in the acquisition of these structures, as examined in the ages of onset[2].

(1) a. I gave Bruno that [DOC]
b. I gave that to Bruno [*to*-dative]

(2) a. David brought me some [DOC]
b. David brought some for me [*for*-dative]

In the case of the so-called ditransitive constructions (1) (Colleman and De Clerk, 2011; Goldberg, 1995), the verb 'gave' subcategorizes for two nominal arguments in DOCs (1a), namely, the indirect object (IO) 'Bruno' and the direct object (DO) 'that', and the nominal argument-DO 'that' as well as the prepositional complement 'Bruno' headed by '*to*' in *to*-datives (1b).

The second pair of English DA constructions involves monotransitive constructions (2) in which the verb selects a DO as well as an adjunct (A) (Marantz, 1993; Snyder, 2001). These two constituents can show a nominal form in DOCs (2a) in which the A 'me' is followed by the DO 'some' (2a), or two nominal forms in which the DO 'some' is followed by the A 'me' headed by the preposition '*for*' in the case of *for*-datives (2b).

Although ditransitive constructions do not share the same grammatical properties regarding the verbal subcategorization framework when compared to mono-transitive structures, constructions in (2) have been considered for analysis since the grammatical property at stake in the present study is the DA between prepositional and double object constructions.

We investigate how monolingual English girls' data and monolingual English boys' data can shed light on the possible biological gender differences (or lack thereof) in the acquisition of the syntactic status that relates the two English DA constructions. In particular, we examine the syntactic derivation between DOCs and *to*/*for*-datives (Dryer, 1986; Larson, 1988; Aoun and Li, 1989) or the lack of a syntactic derivational relationship, thus following a shared underlying construction (Snyder, 2001; Snyder and Stromswold, 1997) or two oppos-

2 The age of first occurrence has been considered as the acquisition measure of DOCs and *to*/*for*-datives (Snyder and Stromswold, 1997).

ing underlying representations (Mulder, 1992; Marantz, 1993). In order to provide an answer to these three possible syntactic scenarios, we will compare monolingual acquisition data across girls and boys, on the one hand, and across the three participants' groups (girls, boys and adult input), on the other hand.

To our knowledge biological gender on the monolingual children's acquisition of English DA has not been targeted in previous studies. We aim to fill this gap so as to shed light on whether monolingual English girls show an earlier development in the emergence of DA constructions, when compared to monolingual English boys' language development, as reported in earlier empirical works in the domain of motor movements (Nagy et al., 2007), lexical acquisition (Berglund et al., 2005; Eriksson et al., 2012) and syntactic development (Lovas, 2011). As discussed earlier, English DA will be investigated in child output and in adult input in order to determine whether the amount of exposure to English DA in the adults' speech is also a factor that causes differences between the monolingual English girls' output and the monolingual English boys' output in the use of the constructions under analysis.

The remainder of this paper is structured as follows. Section 2 addresses the formal accounts on the syntactic relationship between DOCs and *to/for*-datives. Section 3 is concerned with earlier empirical works on the acquisition of English DA. Section 4 presents the study that has been conducted and includes the research questions (RQs) (section 4.1), the participants and corpora selection (section 4.2), the extraction and classification criteria that have been followed to search for DOCs and *to/for*-datives (section 4.3). We also present the data analysis (section 4.4) and the discussion of findings in the light of previous formal accounts and empirical works on English DA (section 4.5). Section 5 presents the conclusions and suggestions for further research.

2. A syntactic approach to the relationship between double object constructions and *to/for*-datives

There is no consensus in previous formal accounts regarding the syntactic properties that underlie and connect the two English DA constructions. More specifically, the debate lies in whether DOCs and *to/for*-datives are derivationally related to one another and, thus, one of the two English DA constructions is the derived structure from its source DA counterpart, or whether a syntactic nonderivational status occurs between DOCs and *to/for*-datives.

From the syntactic derivational approach, two standpoints appear. One of these views lends support to the derivation of DOCs from *to/for*-datives following a passive-like mechanism which is accounted for via an advancement rule based on relational grammar (RG) grounds (Dryer, 1986), or a determiner phrase (DP)-movement based on government and binding (GB) theory premises (Larson, 1988).

From a RG perspective, the derivational status of DOCs (3b) from *to/for*-datives (3a) has been accounted for by means of the advancement of the DO-2 over the IO-3. Because of this advancement, the IO-3 in the base structure assumes an adjunct (or *chômeur*) position in DOCs. Following the GB theory, DOCs (4b) have been argued to derive from *to/for*-datives (4a) via a DP-movement, that is to say, as an analogous process to the derivation of passives from mono-transitives (Larson, 1988).

(3) a. Pedro [$_{VP}$ gave$_i$ [$_{VP}$ his email address [$_{V'}$ [$_V$ t$_i$] to Aisha]]] [*to*-dative]
SU-1 DO-2 IO-3
b. Pedro [$_{VP}$ gave$_i$ [$_{VP}$ Aisha$_j$ [$_{V'}$ [$_V$ t$_i$] t$_j$ his email address]]] [DOC]
SU-1 DO-2 *chômeur*

[Haspelmath, 2006: 3]

(4) a. John [$_{VP}$ sends$_i$ [$_{VP}$ a letter [$_{V'}$ t$_i$ to Mary]]] [*to*-dative]
b. John [$_{VP}$ sends$_i$ [$_{VP}$ Mary$_j$ [$_{V'}$ [$_V$ t$_i$] t$_j$] a letter]]] [DOC]

[Larson, 1988: 353]

Contrastingly, DOCs have been analyzed as the source structure from which *to/for*-datives derive. This is the case of Czepluch's (1982) proposal that accounts for a case-related mechanism that differs from that proposed by case theory in the framework of GB theory. In DOCs (5a), two exceptional governors (namely, a null preposition and an empty verbal trace) assign accusative case and inherent accusative case to the IO and the DO, respectively, as per the empty category principle (Chomsky, 1981). These two constituents are allocated accusative case and dative case by the verb and by the preposition 'to', respectively, in *to/for*-datives (5b).

(5) a. John [$_{VP}$ gave$_i$ [$_{PP}$ [$_P$ e] Mary] t$_i$ [the book]] [DOC]
b. John gave the book to Mary [*to*-dative]

[Czepluch, 1982: 14]

Within the RG approach, Dryer (1986) puts forward an advancement rule to lend support to the derivation of *to/for*-datives from DOCs. In particular, the secondary object (SO) position of the DO in DOCs (6a) assumes a primary object (PO) position in *to/for*-datives (6b) causing, as a result, the IO (PO) in the base structure to be demoted to an adjunct (or *chômeur*) position in the derived construction.

(6) a. John [$_{VP}$ gave$_i$ [$_{VP}$ Mary [$_{V'}$ [$_V$ t$_i$] the book]]] [DOC]
SU IO (PO) DO (SO)
b. John [$_{VP}$ gave$_i$ [$_{VP}$ the book$_j$ [$_{V'}$ [$_V$ t$_i$] t$_j$ to Mary]]] [*to*-dative]
SU-1 DO-2 *chômeur*

[Dryer, 1986: 821]

An alternative mechanism that provides insights into the derivational account of *to/for*-datives from DOCs focuses on the DP-movement of the DO from a verbal complement position in DOCs (7a) to the specifier of the small clause (SC) in *to/for*-datives (7b) so as to be assigned accusative case by the verb 'gave' (Aoun and Li, 1989; Koizumi, 1994). This is caused by the lack of case assigning properties of the empty verb (e) in the source DA construction. Thus, the IO in DOCs takes an adjunct position in *to/for*-datives, akin to the status assigned to *by*-phrases in the derivation of passives from mono-transitives.

(7) a. I $[_{VP1}$ $[_{V}$ gave $[_{SC}$ Mary $[_{VP2}$ [e a book]]]]] [DOC]
b. I $[_{VP1}$ $[_{V}$ gave $[_{SC}$ a book$_i$ $[_{VP2}$ $[_{VP3}$ e t$_i$] to Mary]]]] [*to*-dative]

[Aoun and Li, 1989: 163]

Non-derivational accounts to English DA have argued for the formation of a common underlying structure (Snyder and Stromswold, 1997; Snyder, 2001), as captured by the complex predicate parameter (Snyder, 2001), or the formation of two structures that differ in the status of the head that they project (Mulder, 1992; Marantz, 1993). According to the complex predicate parameter (Snyder, 2001), DOCs and *to/for*-datives constitute a natural syntactic class that depends on a shared parametric property, that is, the two English DA constructions are argued to be construed under an SC structure (Larson, 1988; Marantz, 1993) or a complex predicate structure that resemble a single verb from a semantic perspective (Koizumi, 1994; Den Dikken, 1995).

Marantz (1993) and Mulder (1992) propose that the head that projects DOCs and *to/for*-datives differs between the two English DA constructions. Marantz (1993) argues that while DOCs (8a) are projected by a null applicative affix, *to/for*-datives (8b) stem from a verbal head. In the case of Mulder's (1992) proposal, an empty verb that denotes possession and an empty non-causative verb project the construction of DOCs (9a) and *to/for*-datives (9b), respectively.

(8) a. $[_{IP}$ $[_{DP}$ Elmer$][_{I'}$ $[_{I}$ past$][_{VP}$ $[_{DP}$ Hortense$][_{V'}$ $[_{V}$ give$_i$+APPL$][_{VP}$ $[_{DP}$ the porcupine$][_{V'}$ $[_{V}$ t$_i$]]]]]]] [DOC]
b. $[_{IP}$ $[_{DP}$ Elmer] $[_{I'}$ $[_{I}$ past] $[_{VP}$ $[_{DP}$ the porcupine] $[_{V'}$ $[_{V}$ give] $[_{PP}$ to Hortense]]]]] [*to*-dative]

[adapted from Marantz, 1993: 120]

(9) a. I $[_{VP}$ gave $[_{SC}$ John ϕ_{HAVE} the book]] [DOC]
b. I $[_{VP}$ gave $[_{SC}$ the book ϕ to John]] [*to*-dative]

[Mulder, 1992: 69]

Considering the debate on the syntactic (non)derivational relationship between DOCs and *to/for*-datives, we aim to analyze the emergence and the incidence of these structures to elucidate whether there are biological differences in the monolingual English children's acquisition of these constructions. As will be discussed in section 4.1, an order effect in the ages

of onset and in the production would entail a delay in the maturational development in one of the two structures under analysis since grammatically more complex and, thus, derived structures are expected to show a delay in their emergence (Borer and Wexler, 1987), and possibly lower frequency rates in the production, when compared to less complex and, thus, nonderived constructions. An alternative scenario would imply the similar emergence, and possibly the rather analogous production, of the two English DA constructions. These data could suggest that DOCs and *to/for*-datives are not syntactically derived from one another.

3. On the acquisition of double object constructions and *to/for*-datives

To date, there are no previous studies that consider biological gender differences regarding the monolingual acquisition of English DA. The empirical works that deal with this type of structures do not compare in terms of biological gender differences and focus on the analysis of the ages of first occurrence (Gropen et al., 1989; Snyder and Stromswold, 1997; Campbell and Tomasello, 2001) and the role played by adult input in child output (Snyder and Stromswold, 1997; Campbell and Tomasello, 2001), as examined in monolingual English children's spontaneous production data.

An order effect has been found in monolingual English children's earlier onset of DOCs when compared to *to/for*-datives (Campbell and Tomasello, 2001; Gropen et al., 1989; Snyder and Stromswold, 1997), as analyzed in spontaneous production data retrieved from monolingual English corpora available in CHILDES (Child Language Data Exchange System; MacWhinney, 2000).

Although English DA constructions show an order in their onset, monolingual English children begin to produce DOCs and *to/for*-datives at around the age of two ($r = .76$, $p = .0043$) (Snyder and Stromswold, 1997). These findings are argued to lend support to the shared syntactic properties that underlie the two DA constructions as complex predicates or as SC constructions, as per the property A of the complex predicate parameter (Snyder, 2001). Nevertheless, the delay in the onset of *to/for*-datives, when compared to DOCs, is explained by the special status of the prepositions 'to/for', namely, the prepositions mediate the assignment of dative case and recipient theta role to the prepositional complement as allocated by the verb (Pesetsky, 1985; Larson, 1988). Such a special status entails the acquisition of an additional property (or property B) in the production of *to/for*-datives to that required in the production of the two English DA constructions (or property A) (Snyder and Stromswold, 1997).

Biological gender differences have been attested in previous monolingual empirical works on the girls' earlier maturational patterns when compared to boys regarding motor movements (Nagy et al., 2007), lexical production (Berglund et al., 2005), and syntactic development (Koenigsknecht and Friedman, 1976; Lovas, 2011). As for motor movements, Nagy et al. (2007) report that female newborns outperform male newborns when they imitate adults'

movements through index finger extension movements ($t(2,39) = -2.85$, $p < .01$) and imitative gestures ($t(2,39) = -2.53$, $p < .05$).

Furthermore, cross-sectional studies (see Berglund et al., 2005) and longitudinal studies (see Eriksson et al., 2012) have accounted for biological differences in monolingual children's lexical production. To set an example, Berglund et al. (2005) observe that monolingual Swedish girls show higher scores when compared to monolingual Swedish boys in lexical production and in lexical comprehension at 1;06, as obtained by means of the Swedish Communicative Screening parental report at 18 Months (SCS18). These biological gender differences are observed regardless of the adult input type they are exposed to (namely, family childcare, home care or day-care center) and regardless of whether they are first-born children or later-born children.

Biological differences are also seen in the acquisition of syntax. For instance, Koenigsknecht and Friedman (1976) measure the language development of 20 monolingual English girls' and 20 monolingual English boys' spontaneous production speech at 5 age stages (2;00, 3;00, 4;00 5;00 and 6;00) via the developmental sentence scoring (DSS; Koenigsknecht, 1974). The maturation of syntax and the mean length of utterance are calculated by considering the overall mean DSS scores retrieved from the use of subject-verb utterances and the number of words produced. Findings have shown that monolingual English girls show higher DSS scores when compared to monolingual English boys in the production of subject-verb sentences from 4;00 ($F(4,190) = 12.95$, $p < .01$) and differences are still significant at 5;00 and at 6;00 ($F(4,190) = 2.52$, $p < .05$).

These maturational differences between girls and boys could be attributed to the children's brain lateralization (Hyde and Linn, 1988; Shakouri et al., 2016) and/or adult input conditions, that is, when parents interact with their sons or with their daughters (Lovas, 2011). Indeed, adult input has been found to play a significant role in monolingual English children's output (Campbell and Tomasello, 2001; Legate and Yang, 2002; Yang, 2016; Sánchez Calderón, 2018; Sánchez Calderón and Fernández Fuertes, 2018). With regards to English DA, Campbell and Tomasello (2001) report higher frequency rates in the production of DOCs when compared to *to/for*-datives in the adult input (mean rates = 65.7% and 34.3%, respectively) and in the monolingual English children's output (mean rates = 68% and 32%, respectively) ($p < .01$). Contrastingly, other studies have not reported a significant correlation between the adults' use of DOCs (mean rates = 73.2%) and *to/for*-datives (mean rates = 26.8%) and the monolingual English children's age of onset of DOCs (mean = 2;02) and *to/for*-datives (mean = 2;06) (Snyder and Stromswold, 1997).

Akin to the empirical works discussed earlier on the emergence of English DA, previous studies have not investigated whether adult input is a factor that causes differences in the production of DA when the monolingual English girls' output is compared to the monolin-

gual English boys' output. However, parent-daughter and parent-son interactions have also been reported to be a factor that explains biological gender differences in language acquisition. That is, girls' higher language exposure from parents seems to facilitate the language development process when compared to boys (Clearfield and Nelson, 2006; Lovas, 2011).

Provided that the comparison on the ages of first occurrence of DOCs and *to/for*-datives between monolingual English girls and monolingual English boys has not been investigated by previous empirical studies yet, and neither has the role played by adult input in the two biological gender groups' output, the present work aims to contribute to shed light on these two issues under investigation.

4. The monolingual acquisition of double object constructions and *to/for*-datives from a biological gender perspective

4.1. Research questions

Considering earlier formal accounts on English DA (section 2) and previous empirical studies on the acquisition of these constructions by monolingual girls and by monolingual boys (section 3), two RQs have been formulated. Two chief issues are explored in the present study, namely, whether monolingual English girls differ from monolingual English boys in the acquisition of DOCs and *to/for*-datives (RQ 1) and whether the amount of exposure to the two English DA in the adult input is a factor that causes differences between the two monolingual English children's biological gender groups in the production of the constructions under analysis.

RQ 1. Are there biological gender differences in the monolingual English children's acquisition of DOCs and *to/for*-datives?

Taking as a starting point earlier monolingual acquisition works on biological gender (Berglund et al., 2005; Eriksson et al., 2012; Lovas, 2011), we predict that English girls show an earlier onset, and possibly a higher incidence, in the production of the two English DA constructions, when compared to English boys' data. Such an earlier acquisition could entail two potential scenarios. Firstly, DOCs and *to/for*-datives could show a concurrent onset, and possibly a rather similar incidence, which could suggest the lack of a syntactic derivational relationship between the two structures (Marantz, 1993; Mulder, 1992; Snyder, 2001). Secondly, either DOCs or *to/for*-datives could reflect a delay in the ages of first occurrence; these data could explain the grammatical derivational properties of one of the two DA constructions when compared to their DA counterpart (Aoun and Li, 1989; Dryer, 1986; Larson, 1988).

Our findings would be expected to be more in line with the first scenario hypothesized above. This would entail that, as attested by earlier empirical works (Snyder and Stromswold,

1997), monolingual English girls would start producing DOCs and *to/for*-datives at an approximately similar age and at an earlier stage when compared to their biological gender counterpart. These data could explain the acquisition of the shared underlying complex predicate or SC structure between the two English DA constructions (Snyder, 2001) or the formation of two opposing underived representations (Marantz, 1993; Mulder, 1992).

Although significant differences are not expected to appear in the monolingual English children's emergence of the two English DA constructions, we also predict that girls show a delay in the onset of *to/for*-datives when compared to DOCs (Capmbell and Tomasello, 2001; Snyder and Stromswold, 1997). Such a delay will be expected to occur at an earlier stage when compared to boys' data. These results could be associated with the special status of the prepositions in *to/for*-datives, as captured by Snyder and Stromswold's (1997) property B.

RQ 2. Do adults' relative frequency rates of exposure to DOCs and *to/for*-datives cause biological gender differences (or lack thereof) in the monolingual children's production of these constructions?

We predict that adults show higher frequency rates in the production of DOCs when compared to *to/for*-datives. Nevertheless, the amount of exposure to English DA in the adult input is expected to cause differences between monolingual English girls and monolingual English boys in the use of the two target structures (Clearfield and Nelson, 2006; Lovas, 2011). In particular, while adult input and girls' output are expected to pattern closely in the use of DOCs over *to/for*-datives, boys will not be expected to show analogous production patterns to those ones heard in the adult input regarding the use of the two constructions under investigation.

4.2. Participants and corpora selection

The participants of the present work have been selected from seven monolingual English corpora available in the CHILDES open access database (MacWhinney, 2000). Their ages range from 0;06 to 8;00. As shown in Table 1, seven monolingual English girls and six monolingual English boys have been selected. Given that the amount of data available in CHILDES differs across the children selected, the number of participants is equally balanced in the two biological gender groups to the extent possible.

The children's data are oral spontaneous longitudinal interactions with adults, as reflected in the two biological gender groups. These conversations are transcribed in the CHAT (Codes for the Human Analysis of Transcripts) written format. All the participants have been exposed to English from birth and do not present language delay and speech or hearing disabilities.

In order to examine the role played by adult input in girls' output and in boys' output, we have also selected child-direct speech data. The source of adult input data mainly comes from parents, as well as other caregivers (aunts, grandparents, researchers and uncles).

TABLE 1

Monolingual English boys and monolingual English girls selected

BIOLOGICAL GENDER	CHILD	AGE RANGE	# FILES EXAMINED	CORPORA
Girls	Eve	1;06-2;03	20 [010600.cha] to [020300b.cha]	Brown
	Jane	1;05-3;07	21 [010517.cha] to [030718.cha]	Cruttenden
	Lara	1;09-3;03	20 [010913.cha] to [030325.cha]	Lara
	Lucy	1;05-3;07	21 [010517.cha] to [030618b.cha]	Cruttenden
	Naomi	1;01-5;01	83 [010229.cha] to [040903.cha]	Sachs
	Nina	1;11-3;11	52 [011116.cha] to [030321.cha]	Suppes
	Sarah	2;03-5;01	129 [020305.cha] to [050106.cha]	Brown
Boys	Adam	2;03-4;10	55 [020304.cha] to [050212.cha]	Brown
	Benja-min	2;03-5;00	10 [010521.cha] to [050024.cha]	Wells
	Gerald	1;06-4;09	9 [010606.cha] to [040905.cha]	
	Jack	1;05-4;09	10 [010526.cha] to [040901.cha]	
	Mark	0;07-5;06	292 [010411a.cha] to [070802.cha]	MacWhinney
	Ross	0;06-8;00	292 [010411a.cha] to [070802.cha]	

4.3. The search for double object constructions and *to/for*-datives: extraction of utterances and classification criteria

The search for DOCs and *to/for*-datives in the output of the two biological gender groups as well as in the adult input combines the manual extraction of the utterances under analysis with the use of one of the CLAN (Computerized Language Analysis) software package programs, namely, KWAL (Key Word and Line).

KWAL has been used to carry out an automatic morphosyntactic search for verbal utterances produced by girls, by boys and by adults. This search has been conducted for those corpora selected that have a morphological dependent tier in their transcripts data (namely, Brown, Cruttenden, MacWhinney, Sachs, Suppes and Wells). In the case of the Lara corpus, the search for verbal utterances has been performed manually since a morphological dependent tier is not included in the CHAT transcripts.

When retrieving utterances via KWAL, the output displays the uttermost morphological verbal possibilities without making a distinction of utterances in terms of their verbal subcategorization framework (for instance, DA, intransitives, monotransitives, among others) and their internal argument structure (for example, subject-verb-object (SVO), wh-movement or VS constituent order). Therefore, the KWAL output has been manually culled out for the analysis of the target constructions, namely, adult-like SVO declarative and imperative (affirmative and negative) utterances whose internal verbal subcategorization follows the four types of constituent order illustrated in Table 2.

TABLE 2

Internal constituent order for the selection of English double object constructions and *to*/*for*-datives

CONSTITUENT ORDER	UTTERANCE
DO (DP)-IO (*to*-DP)	Send it to the navy [Eve, 2;02, the Brown corpus, CHILDES]
DO (DP)-A (*for*-DP)	We are going to buy meat for the cat [Mark, 4;07, the Brown corpus, CHILDES]
IO (DP)-DO (DP)	Give me a rug [Adam, 3;00, the Brown corpus, CHILDES]
A (DP)-DO (DP)	We have to buy Becky a new one [Eve, 2;02, the Brown corpus, CHILDES]

The constituent order in Table 2 has been followed regardless of whether the utterances under investigation have been extracted manually or via the KWAL program. The utterances extracted have been codified as DOCs (10a) that alternate as *to*-datives (10b), on the one hand, and as DOCs (11a) that alternate as *for*-datives (11b), on the other hand. The codification of utterances has been carried out regardless of the form of the internal arguments or adjuncts (that is, complementizer phrases, DPs or pronouns).

(10) a. Give me your hand [DOC]
b. Give your hand to me [*to*-dative]

[Jane, 1;11, the Cruttenden corpus]

(11) a. I'd like to get daddy some toast [DOC]
b. I'd like to get some toast for daddy [*for*-dative]
[Lucy, 4;02, the Cruttenden corpus]

To-datives and *for*-datives have been classified as *to/for*-datives since; although the two prepositional DA constructions differ in the verbal subcategorization (see Table 2), they both exhibit an alternating DA counterpart, namely, DOCs. Indeed, Snyder and Stromswold (1997) report that when monolingual English children's ages of onset of *for*-datives are examined, these structures are acquired three months later than DOCs ($t(11) = 3.17$, $p = .009$), akin to the later emergence of *to*-datives when compared to DOCs, as previously discussed in section 3. Thus, given that *to*-datives and *for*-datives are delayed in their acquisition when compared to their corresponding DOCs (Snyder and Stromswold, 1997), the two prepositional English DA structures will be collapsed in the data analysis under the tag of *to/for*-datives (see section 4.4).

Along with the ages of first occurrence, the girls' and the boys' production of DOCs and *to/for*-datives has been compared longitudinally. More specifically, the developmental use of English DA in the two biological gender groups has been analyzed in terms of thirteen age groups distributed in intervals of six and five months that range from age 1;00-1;06 (age group 1) to 7;00-7;06 (age group 13). The distribution of the thirteen age groups takes as a starting point the five child language development stages (Yule, 1996) and are established in terms of the girls' and the boys' chronological age, that is to say, from 0;06 to 8;00. The ages prior to age group 1 (that is, before 1;00) and subsequent to age group 13 (that is, after 7;06) have not been examined since the production of DOCs and *to/for*-datives has not been observed in the data from the two target biological gender groups. Indeed, we have established 7;06 as the study period final age since girls and boys develop the main grammatical properties of the language(s) they are acquiring from birth by 5;00 (Peccei, 1999).

4.4. Data analysis

As displayed in Table 3, girls and boys reveal analogous patterns in the subsequent ages of onset of the two English DA constructions, namely, DOCs emerge earlier than *to/for*-datives in the two groups, as reflected in the mean ages of first occurrence.

Nevertheless, and despite the order effect in the onset of the two English DA structures in the two biological gender groups, DOCs and *to/for*-datives do not show significant differences in the ages of first occurrence, as equally observed in the girls' data ($t(6) = -1.585$, $p = .164$) and in the boys' data ($t(2) = -1.154$, $p = .368$). This is evidenced in the onset of English DA constructions at an approximately similar age, that is, at around the age of 2;00.

An overview of the data analyzed in the present study is illustrated in Table 4 for the girls, for the boys and for the adults they interact with. The incidence of DOCs and *to/for*-datives is examined by considering the overall production of the two English DA constructions.

TABLE 3

Age of onset of English double object constructions and *to*/*for*-datives in monolingual girls' and boys' speech

GENDER	CHILDREN	DOCs	*TO*/*FOR*-DATIVES
Girls	Eve	1;08	1;11
	Jane	1;11	2;06
	Naomi	2;01	2;11
	Sarah	2;09	3;02
	Nina	2;01	2;01
	Lara	2;06	2;04
	Lucy	2;07	2;00
Mean		**2;02**	**2;04**
Boys	Ross	1;04	2;06
	Adam	2;04	2;11
	Mark	2;06	2;09
	Benjamin	2;03	-
	Jack	2;02	-
	Gerald	-	2;11
Mean		**1;08**	**2;08**

TABLE 4

English double object constructions in girls' and in boys' monolingual speech and adult input (# of cases (%))

		DOCs	*TO*/*FOR*-DATIVES	TOTAL
girls	output	259 (69.8)	112 (30.2)	**371 (100)**
	adult input	836 (70)	361 (30)	**1,197 (100)**
boys	output	493 (76.7)	150 (23.3)	**643 (100)**
	adult input	1017 (77.6)	294 (22.4)	**1,311 (100)**

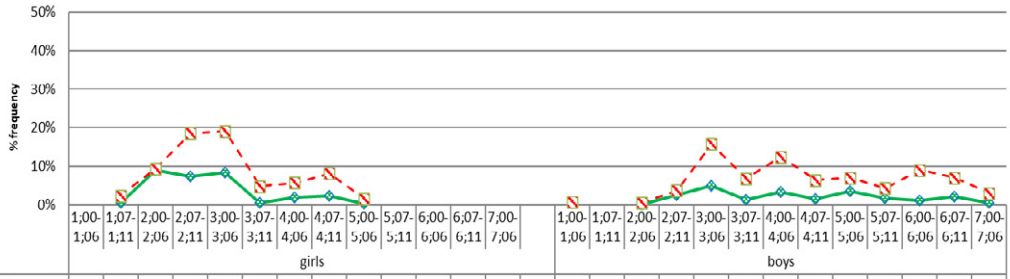
Girls and boys show analogous patterns in the overall production of DOCs over *to*/*for*-datives. Despite the lack of biological gender differences, girls reflect higher relative frequency rates in the use of the two English DA constructions when compared to boys' data. Similar

findings appear in the adult input girls and boys are exposed to. That is to say, although the adults that address girls show higher relative frequency rates in the production of the two English DA constructions when compared to the data from adults that address boys, DOCs are preferred over *to/for*-datives across the two adults' groups.

We have also examined the monolingual children's incidence of English DA through language development in the data from the two biological gender groups. We aim to further elucidate whether girls and boys show differences (or lack thereof) in the acquisition of the syntactic (non)derivational relationship between the two English DA constructions. As illustrated in Figure 1, girls use DOCs and *to/for*-datives through shorter age groups (from 1;07-1;11 to 5;00-5;06) when compared to boys' data (from 1;00-1;06 to 7;00-7;06).

FIGURE 1

The production of double object constructions and *to/for*-datives in the monolingual English girls and in the monolingual English boys per age stages



	1;00-1;06	1;07-1;11	2;00-2;06	2;07-2;11	3;00-3;06	3;07-3;11	4;00-4;06	4;07-4;11	5;00-5;06	5;07-5;11	6;00-6;06	6;07-6;11	7;00-7;06
girls													
to/for datives (%)		0,5%	8,9%	7,3%	8,3%	0,5%	2,0%	2,4%	0,3%				
to/for-datives (cases)		2	33	27	31	2	7	9	1				
DOCs (%)		2,4%	9,4%	18,6%	19,1%	4,8%	5,7%	8,1%	1,6%				
DOCs (cases)		9	35	69	71	18	21	30	6				
boys													
to/for datives (%)	0,8%		0,1%	2,5%	5,0%	1,4%	3,4%	1,5%	3,6%	1,7%	1,2%	2,2%	0,6%
to/for-datives (cases)	5		1	16	32	9	22	10	23	11	8	14	4
DOCs (%)			0,6%	3,7%	15,7%	6,8%	12,4%	6,4%	7,0%	4,3%	9,0%	7,0%	3,0%
DOCs (cases)			4	24	101	44	8	41	45	28	58	45	18

[100% = overall DA structures produced by either English monolingual girls or by English monolingual boys]

Moreover, similar patterns are observed in the girls' data ($t(8) = -3.151$, $p = .014$) and in the boys' data ($t(12) = -4.331$, $p = .001$) with regard to the higher relative frequency rates in the production of DOCs when compared to *to/for*-datives through the age groups under analysis.

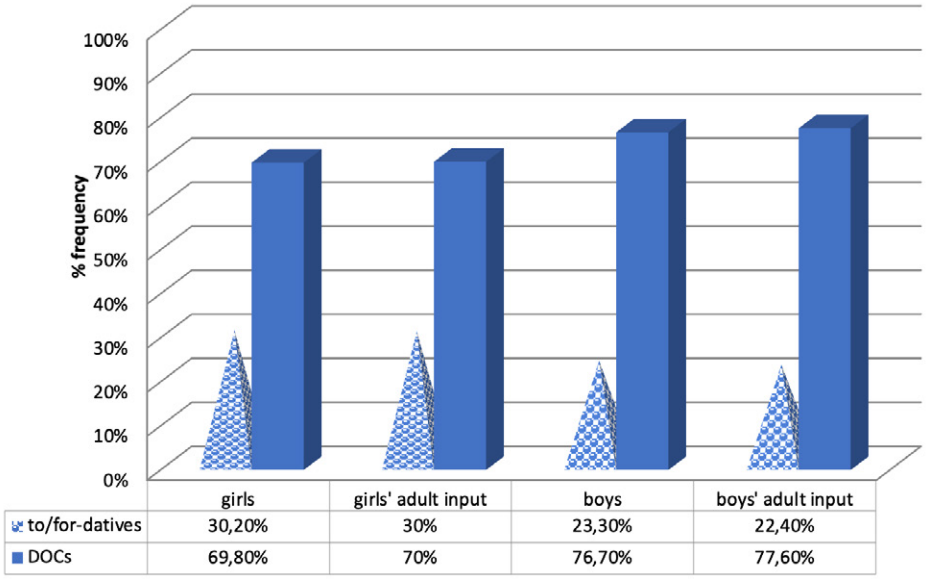
As for the adult input - child output patterns, and as depicted in Figure 2, the relative frequency rates with which English DA constructions are used by adults seem to be in line with the girls' output and with the boys' output.

Table 5 shows the production of English DA constructions per girl and per boy, along with the use of the target structures in their corresponding adult input.

Taking into account the data presented in Figure 1 and in Table 5, a preference in the use of DOCs over *to/for*-datives is seen in the adult input that girls are exposed to (836 DOCs > 361 *to/for*-datives, 70% > 30%, out of 1,197 DA constructions, 100%) and in their output (259 DOCs

FIGURE 2

The production of English double object constructions and *to/for*-datives in the adult input, the monolingual girls' output and the monolingual boys' output



[100% = overall DA structures produced by adults or by monolingual English children]

TABLE 5

The production of double object constructions and *to/for*-datives per monolingual child output and adult input (# of cases (%))

CHILDREN	CHILDREN'S OUTPUT OF DOCs	ADULT INPUT OF DOCS	CHILDREN'S OUTPUT OF *TO/FOR*-DATIVES	ADULT INPUT OF *TO/FOR*-DATIVES
Eve	19 (66.3)	96 (70)	11 (36.7)	42 (30)
Jane	11 (68.8)	-	5 (31.2)	-
Lara	12 (35.3)	135 (73.4)	22 (64.7)	49 (26.6)
Lucy	4 (30.8)	-	9 (69.2)	-
Naomi	17 (68)	76 (73.8)	8 (32)	27 (26.2)
Nina	101 (72.1)	412 (66.8)	39 (27.9)	205 (33.2)
Sarah	95 (84.1)	117 (75.5)	18 (15.9)	38 (24.5)
Total (girls)	**259 (69.8)**	**836 (70)**	**112 (30.2)**	**361 (30)**
Adam	157 (79.3)	155 (73.1)	41 (20.7)	57 (26.9)
Benjamin	4 (100)	11 (64.7)	-	6 (35.3)

Gerald	-	4 (57.1)	1 (100)	3 (42.9)
Jack	4 (100)	13 (86.7)	-	2 (13.3)
Mark	89 (81.7)	417 (78.7)	20 (18.3)	113 (21.3)
Ross	239 (73.1)	417 (78.7)	88 (26.9)	113 (21.3)
Total (boys)	**493 (76.7)**	**1017 (77.6)**	**150 (23.3)**	**294 (22.4)**
Total (overall)	**752 (74.2)**	**1,853 (73.9)**	**262 (25.8)**	**655 (26.1)**

> 112 *to/for*-datives, 69.8% > 30.2%, output 371 DA constructions, 100%). Similar patterns are reflected in the adult input that boys receive (1017 DOCs > 294 *to/for*-datives, 77.6% > 22.4%, out of 1,311 DA constructions, 100%) and in their output (493 DOCs > 150 *to/for*-datives, 76.7% > 23.3%, out of 643 DA constructions, 100%).

4.5. Discussion

Considering the data analyzed in section 4.4, the nonsignificant differences in the onset of DOCs and *to/for*-datives, as they appear in the girls' data and in the boys' data, suggest that, as reported by Snyder and Stromswold (1997), the two biological gender groups have acquired the syntactic nonderivational relationship between the two English DA constructions. Such a syntactic relational pattern would entail that a shared parametric property (or property A) underlies DOCs and *to/for*-datives as complex predicate constructions (Larson, 1988; Marantz, 1993) or as SC structures (Aoun and Li, 1989), as captured by the complex predicate parameter (Snyder, 2001). These findings are in line with Snyder and Stromswold's (1997) work since monolingual English children also show a significant correlation in the ages of onset of DOCs and *to*-datives (r = .76, p = .0043). An alternative explanation to the girls' and the boys' rather similar emergence of the two English DA constructions could argue for the formation of two underlying and underived structures that differ in the status of the head that they project (Marantz, 1993; Mulder, 1992).

The similar acquisition patterns in the data from girls and in the data from boys do not go hand with the syntactic derivational standpoints of English DA. This entails that the results of the present work do not lend support to (a) the derivation of DOCs from *to/for*-datives, as accounted for by means of a DP-movement (Haspelmath, 2006; Larson, 1988), and (b) the derivation of *to/for*-datives from DOCs (Aoun and Li, 1989; Czepluch, 1982; Dryer, 1986; Koizumi, 1994).

Although the two English DA constructions start being produced at around the age of 2;00 in the two biological gender groups, an order effect is shown in their emergence and in their incidence through language development (Campbell and Tomasello, 2001; Snyder and

Stromswold, 1997). Therefore, these data could be related to the acquisition of an additional property (or property B) required in the production of *to/for*-datives (Snyder and Stromswold, 1997) to that of property A of the complex predicate parameter (Snyder, 2001; Snyder and Stromswold, 1997).

The analogous patterns observed in the girls' and in the boys' acquisition of the syntactic nonderivational relationship between the two English DA constructions along with the delay in the acquisition of property B in *to/for*-datives speak against the biological gender differences reported in earlier monolingual empirical works (Berglund et al., 2005; Galsworthy et al., 2000).

Indeed, the delay in the emergence and in the lower use of *to/for*-datives when compared to DOCs, as equally reflected in the girls' data and in the boys' data, may also be explained by the role played by adult input in child output (Campbell and Tomasello, 2001; Legate and Yang, 2002; among others). This is evidenced by the fairly similar adult input - child output patterns regarding the relatively higher frequency rates of DOCs when compared to *to/for*-datives, regardless of the children's biological gender and regardless of whether parents address girls or boys.

Thus, provided that the girls and the boys seem to have patterned similarly with the adults' use of DOCs and *to/for*-datives, these data do not lend support to the findings reported in earlier monolingual English studies on the differences regarding the amount of exposure when parents engage in conversations with their daughters or with their sons (Clearfield and Nelson, 2006; Lovas, 2011).

5. Conclusions

In this work, we have investigated the acquisition of DOCs and *to/for*-datives, as analyzed in the spontaneous production of monolingual English girls and monolingual English boys. Our findings have revealed that there are no biological gender differences regarding the age of first occurrence of DOCs and *to/for*-datives since the two groups start producing the two English DA constructions at around the age of 2;00. These data suggest that both girls and boys have acquired the syntactic nonderivational status that relates DOCs and *to/for*-datives. Our data analyses point to the formation of a common underlying complex predicate or SC structure (Snyder, 2001) since nonsignificant differences appear both in the monolingual English children's emergence of DOCs and *to*-datives in Snyder and Stromswold's (1997) study and in the onset of DOCs and *to/for*-datives in the present study.

Although English DA constructions emerge at an approximately similar age, there are no biological gender differences in the monolingual English children's delay of *to/for*-datives when compared to DOCs (Campbell and Tomasello, 2001; Snyder and Stromswold, 1997).

These results may be related to the additional dative case and recipient/beneficiary theta role mediated assigning properties of the prepositions (Snyder and Stromswold, 1997; Pesetsky, 1985) and/or the lower relative frequency rates of exposure to prepositional DA constructions in the adult input (Campbell and Tomasello, 2001; De Marneffe et al., 2012).

Further work would be required to elucidate whether the delay in the monolingual English girls' and in the monolingual English boys' onset of *to/for*-datives is explained by the grammatical properties of these constructions or by adult input conditions. In order to shed further light on these two analyses, the acquisition of prepositional DA constructions would be compared to other related dative constructions in which the prepositions 'to/for' are used, namely, DA structures that do not undergo DA (12) or dyadic *to*-dative constructions (13).

(12) a. John reported the accident to the police
b. *John reported the police the accident

[Mazurkewhich and White, 1984: 262]

(13) Something happened to Fred

[Snyder and Stromswold, 1997: 284]

Considering the results reported above, our data do not lend support to previous works on the earlier motor movements, the higher lexical production and the earlier syntactic development in female infants when compared to male infants (Eriksson et al., 2012; Lovas, 2011; Nagy et al., 2007). The latter is what is of actual relevance in the present study given the syntactic approach to the constructions under investigation. Furthermore, the contrasting neurological factors between girls and boys (Hyde and Linn, 1988; Shakouri et al., 2016) do not seem to have played a role in the monolingual English children's acquisition of the syntactic nonderivational relationship between the two DA constructions in the two biological gender groups, and neither the amount of exposure to the structures under investigation from the adult input seems to have been a factor that has caused biological gender differences in the child output.

However, a word of caution should be said about two relevant issues. The similar emergence of the two English DA constructions in monolingual English girls' data and in monolingual English boys' data does not inexorably entail that DOCs and *to/for*-datives are not syntactically related. Rather, other factors could shed light on the non-significant differences in the ages of first occurrence, namely, discourse factors such as the animacy (Snyder, 2003) or the length (Arnold et al., 2000) of the internal arguments in DOCs that alternate as *to*-datives and the internal argument and the adjunct in DOCs that alternate as *for*-datives. Moreover, spontaneous production data cannot draw standing findings regarding the monolingual English children's linguistic knowledge on the acquisition of the grammatical properties that underlie and connect the two English DA constructions by the two biological gender groups. What is more, the lack of data in some of the target children's production of English

DA constructions (for instance, Benjamin and Jack's use of *to/for*-datives and Gerald's use of DOCs), as it appears in the transcripts available in CHILDES, poses certain parsing issues with regard to the results analyzed in the present work. This entails that we cannot determine whether these children have developed the grammatical knowledge required in the acquisition of English DA constructions in the two biological gender groups, whether these findings are rooted in the low frequency of exposure to these constructions in the adult input, or whether these children have not used the target structures in the language corpora selected. Provided that it is a complex task to determine the source of children's lack of use of some of the constructions under investigation, experimental works could provide further results as for the monolingual English girls' and the monolingual English boys' acquisition of English DA by considering a bigger sample size of data and participants.

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