'I want hold Postman Pat': An investigation into the acquisition of infinitival marker 'to'

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ABSTRACT

Infinitival-to omission errors (e.g., *I want hold Postman Pat*) are produced by many English-speaking children early in development. This article aims to explain these omissions by investigating the emergence of infinitival-to, and its production/omission in obligatory contexts. A series of corpus analyses were conducted on the naturalistic data from one to 13 children between the ages of approximately 2;0 and 3;1 testing three hypotheses from two theoretical viewpoints. The data suggest that the errors are associated with different verb sequences (e.g., *going-to and going-X*) and their frequencies in the language to which children are exposed. The article concludes that these constructions compete for output when children are producing those verbs and that this supports the usage-based/constructivist account of the omission errors.

KEYWORDS

Frequency; infinitival-to; omission errors; to-infinitive clauses; two-word chunks

Infinitival-to is a marker that, in adult language, appears at the beginning of to-infinitive clauses (e.g., *I want **to** hold Postman Pat*). Its development in children's speech has received relatively little attention from researchers (Bloom, Tackeff, & Lahey, 1984; Rice, 1999, 2003), even though different theoretical stances make

different predictions for its development, making it a good test case for language acquisition theory.

The nativist stance assumes that children are born with an innate knowledge of the principles and properties of grammar (UG) that will enable them to quickly generalize linguistic input into relevant categories (e.g., Chomsky, 1957, 2000; Hyams, 1986; Pinker, 1984, 1991; Radford, 1990; Radford, Atkinson, Britain, Clahsen, & Spencer, 1999). From this perspective, a child's production of a particular linguistic item (e.g., infinitival-to) is often taken as evidence that the child has acquired that item/category. The fact that children do produce a fair amount of non-adult-like (i.e., ungrammatical) speech is explained, not by their lack of innate knowledge of grammar, but by other factors such as maturation (e.g., Radford, 1990; Wexler, 1994) and performance limitations (e.g., Clahsen & Felser, 2006; Pinker, 1984; Valian & Aubry, 2005; Valian, Hoeffner, & Aubry, 1996; Wexler, 1998). The maturational stance holds that it is not until at a certain pivotal point in development that a certain aspect of the innate grammar becomes available for children, thereafter enabling adult-like production of that aspect of grammar. The performance limitation view, on the other hand, holds that while children have adult-like language representations, their general cognitive processes are not adult-like and hence errors can occur during production.

The usage-based/constructivist stance differs considerably from the nativist viewpoint. First, it assumes no innate syntactic knowledge. Second, children's production of a linguistic item is not necessarily taken to indicate that they have acquired an abstract representation of that item, or that they understand its full range of possible uses. Third, adult-like and non-adult-like language representations are thought to build up from language exposure (e.g., Cameron-Faulkner, Lieven, & Theakston, 2007; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2001; Kidd, Lieven, & Tomasello, 2006) and general cognitive processes working together (e.g., Abbot-Smith & Tomasello, 2006; Gentner & Medina, 1998), so that children build up more advanced representations from existing representations (e.g. Diessel, 2004; Lieven, Behrens, Spears, & Tomasello, 2003). Children's grammatical constructions are thus thought to be initially lexically specific; they are learned with the lexical items that frequently appear in those constructions in the input (e.g., Diessel, 2004; Diessel & Tomasello, 2001). Fourth, within this approach, both type and token frequencies are expected to affect the acquisition of linguistic items/constructions (Bybee, 1998). For instance, high type frequency or variability within a linguistic construction is thought to result in more abstract representations (e.g., *Where's X gone?*, where X represents a range of possible referents). On the other hand, high token frequency with little or no variation is likely to result in a lexically specific schema (e.g., *Where's Daddy gone?* if *Daddy* occurs in this construction with very high frequency). Thus, frequently co-occurring linguistic items can form one unit comprising a number of words (e.g., Bannard & Matthews, 2008; Kirjavainen, Theakston, & Lieven, in press; Pine & Lieven, 1997; Reali & Christiansen, 2005; Rowland, 2007; Rowland & Pine, 2000; Wilson, 2003) and it is possible that one verb has several representations – in different constructions (e.g., Theakston, Lieven, Pine, & Rowland, 2002).

If a verb has multiple representations, this means that more than one representation can get activated during production. This in turn is likely to result in

competition between these different representations. Competition during language processing has been suggested, for instance, by MacWhinney and Bates (e.g., Bates & MacWhinney, 1987; MacWhinney, Leinbach, Taraban, & McDonald, 1989). Their Competition Model of sentence processing has the potential to explain why English-speaking children produce certain errors, the pattern of error, and the recovery from those errors by competition of cues. Recent studies indeed suggest that competition between constructions during production can result in errors. Kirjavainen et al. (in press) conducted a corpus study on 1psg ACC-for-NOM pronoun errors (e.g., *me do it*) and found that the relative proportional use of me + verb sequences in non-finite complement clause constructions (e.g., *Watch me do it*, *Let me do it*) in the input relative to I + verb sequences was associated with children's error production. In addition, the error verbs were more likely to have appeared in previous input in non-finite complement clause constructions with medial *me* than a random sample of verbs. This was taken to indicate that children had two 1psg pronoun + verb constructions for certain verbs (based on frequencies in input), and the competition of these representations led to error production. Similarly, Theakston and Lieven's (2008) study on auxiliary omissions (e.g., *he dancing*) showed that input in prior discourse of questions (auxiliary precedes the noun) vs. declaratives (auxiliary appears between the noun and the verb) was related to the errors. Thus a particular construction can be selected for production based on its occurrence in recent input. Lastly, Theakston, Lieven, and Tomasello's (2003) experimental study showed that children's verb agreement errors (e.g., *it tam*) resulted from the children hearing pronoun + non-finite verb sequences (*Will it tam?*) as opposed to pronoun + finite verb sequences (*It tams*).[1] This study (together with the aforementioned studies) suggests that children can learn sequences of particular words as lexically specific constructions, resulting in individual verbs appearing in several constructions, and that the source for these lexically specific constructions is often in the input.

Bearing the two theoretical viewpoints in mind, we now turn to the development of infinitival-to. The most studied questions relating to this area of research are: (1) when does infinitival-to emerge in children's speech? and (2) why do children make errors of omission of infinitival-to? We first review the literature on the acquisition of infinitival-to. Second, we outline (a) the main findings concerning errors of omission of infinitival-to, and (b) the theoretical explanations for omission errors, deriving a series of predictions.

THE EMERGENCE OF INFINITIVAL-TO

It is not so much the actual age of acquisition of infinitival-to that has interested scholars but, rather, the age of emergence relative to the acquisition of its hom-onym, prepositional-to (e.g., *I went **to** Manchester*). Bloom et al. (1984) analysed four American children's corpora (Peter, Eric, Gia, Kathryn) between the ages of approximately 1;7 and 3;0 and found that the children learned infinitival-to at the same time as prepositional-to, and they therefore suggested that infinitival-to is initially learned with the prepositional meaning '*direction towards*'. Bloom et al. also coded the main – also known as 'matrix' verbs – and complement verbs

co-ocurring with infinitival-to as either indicating or not indicating movement and report that only very infrequently were the utterances such that neither the main nor complement clause indicated movement towards something. Unfortunately, Bloom et al.'s allocation of meaning to different verbs was somewhat opaque. They not only assigned a movement meaning to verbs such as *going*, but also held that a large number of other verbs such as *want*, *like*, *suppose*, and *try* signal 'the child's wish or intention towards performing the action named by the complement verb' (Bloom et al., 1984, pp. 401–402). Although the movement meaning of some verbs, for instance *going*, is fairly salient because they take both locative prepositional and to-infinitival complements, this meaning is not obvious for the majority of verbs (e.g., *want*, *try*, *like*). Therefore, although children may not initially differentiate the meanings of *to* in infinitival and prepositional contexts with verbs like *going*, it is not clear that they make the same connection between desire/intention and movement for many other verbs.

Other researchers have also investigated the emergence of infinitival- and prepositional-to. Tomasello's (1987) diary-study of his daughter's speech showed that she started to produce infinitival-to (1;10.19) about three months after prepositional-to (1;7.25). Pinker (1984) analysed Adam and Eve's data (Brown, 1973) and reports the same order of appearance as Tomasello. Rice studied the acquisition of nine prepositions by two American children, Naomi (Sachs, 1983) and Abe (Kuczaj, 1976; Rice, 2003) and the prepositions *to* and *for* by 32 British children (Rice, 1999). Rice assumed that cognitively simpler, concrete uses of *to* (prototypical prepositional-to) should appear before cognitively complex, abstract uses (infinitival-to). However, Rice's (1999, 2003) participants seemed to acquire these in the reverse order, i.e., counter to her own hypothesis, and to Tomasello (1987), Pinker (1984) and Bloom et al.'s (1984) findings. Rice (1999, 2003) suggests that the frequency of different meanings of *to* in the input may affect the order of acquisition, explaining why the more concrete meaning was acquired later in Rice's participants.

INFINITIVAL-TO OMISSION ERRORS

It has been reported by several researchers that most English-speaking children occasionally omit infinitival-to, at some point in development (e.g., Bloom et al., 1984; Diessel, 2004; Limber, 1973). Bloom et al. examined the production of *to*, schwa, and zero realization of *to* in their participants' speech and found that early acquired main verbs were more likely to appear with a schwa or zero marker than the main verbs that appeared later. They report that the error percentages for the early acquired verbs as a group declined with age, but do not report verb-specific development. Thus, it is unclear whether the decline was caused by relative changes in the frequency of use of individual verbs with some early acquired verbs always appearing with infinitival-to and some always without, or whether errors of omission declined for each main verb in synchrony, with correct and incorrect utterances co-occurring for individual verbs. Bloom et al. did not find any complement verbs, early

or late, that appeared either always with or always without *to*. This suggests that infinitival-to is learned as part of the main not the complement verb.

Different theoretical approaches provide rather different explanations for the pattern of acquisition reported by Bloom et al. (1984). From a nativist perspective, Pinker (1984, pp. 224–227) attempted to explain infinitival-to omissions by appealing to its lack of perceptual salience (infinitival-to is often unstressed, usually appears in the middle of utterances, and is rarely uttered on its own). Children are thought to assume that a null complementizer is required for to-infinitive clauses until they are able to segment infinitival-to from the speech stream. Based on Bloom et al.'s suggestion that the two forms of *to* are synonymous, Pinker suggests that segmentation is only possible once the child has learned prepositional-to, which is more easily identified in a sentence (it can be stressed and appear in the beginning of utterances) and whose meaning is more salient than that of infinitival-to. However, when children start producing infinitival-to, they are expected to only produce it with verbs that they have not used in infinitival contexts before. Verbs that have been produced in to-infinitival contexts (erroneously without *to*) are expected be produced sometimes without infinitival-to because these verbs' lexical entries have a null-complementizer option as well as a newly acquired complementizer form. Input of infinitival-to, when the child is aware of its existence, will, in time, 'drive out' omission errors. The developmental predictions based on Pinker's theory are that:

1. Omission errors will appear in children's speech before infinitival-to is produced;
2. When prepositional-to is acquired, children will start producing infinitival-to with new main verbs, but will continue making errors with old main verbs;
3. Children should generalize infinitival-to for use with new main verbs quickly after its emergence, based on the UG assumption that children have functional categories from early in development.

Another possible explanation for infinitival-to omission errors, also derived from a nativist perspective, relates to performance limitations. A lack of processing power might result in the child producing words that have a more salient meaning than infinitival-to (e.g., nouns and verbs) (see e.g., Valian & Aubry, 2005; Valian et al., 1996 for a similar explanation for subject omission). If this assumption is correct, one would expect to find that infinitival-to is fully realized in children's shorter utterances more often than in their longer utterances. Thus, utterances containing infinitival-to should be significantly shorter than utterances where infinitival-to is omitted, as measured by their mean length of utterance (MLU excluding infinitival-to).

The usage-based/constructivist viewpoint might however provide an alternative explanation for children's omission of infinitival-to. The verbs that Bloom et al. (1984) reported to appear early and with which errors commonly occurred were: *want*, *got*, *have*, and *going*. All these verbs take to-infinitival complements but can also be followed by other words (commonly NPs) (e.g., *want/got/have juice*; *going home*). This means that children have to acquire at least two constructions with these verbs that could be characterized as (1) a two-word chunk based on the verb in combination with infinitival-to due to the high token frequency of the verb-to sequence (e.g., *want-to* and *going-to*) and (2) a verb-X construction as a result of

the high type and relatively low token frequency of the words in the X-slot (e.g., *want teddy/bottle/my green vest* and *going home/out/there/in the kitchen*).

Having two constructions associated with a particular verb means that when children are producing utterances with that verb, they may have two representations competing for output. For some verbs, the verb-X construction may be more frequent in the input than the verb-to construction. The more frequent construction is expected to have more activation during production and can therefore be chosen instead of the less frequent form. This could explain why infinitival-to omissions may be found with a particular verb when infinitival-to is already occasionally produced with that verb.

The verbs that Bloom et al. (1984) found to appear later (and often with *to*) were verbs such as *pretend*, *seem*, and *try*, and adjectives such as *ready* and *hard*. These words may be proportionally less likely to appear in the verb/adjective-X construction than the early verbs. The constructivist standpoint would predict that errors will appear less frequently with verbs that appear a high proportion of the time in the verb-to construction.

ASSESSING ACQUISITION OF INFINITIVAL-TO

Three studies were conducted to examine the development of infinitival-to. In Study 1, we first address the emergence of infinitival-to since the literature is somewhat inconsistent as to when prepositional- and infinitival-to appear, and which variant is learned first. These differences may, at least partly, reflect sampling differences. To shed light on the order of appearance of infinitival- and prepositional-to, we analyse one child's densely collected data (Brian – five hours per week), which should provide us with a relatively accurate age of acquisition for these items. This is done to see whether (1) the two homonyms appeared at the same time (as reported by Bloom et al., 1984), (2) prepositional-to appears before infinitival-to (as reported by Pinker, 1984 and Tomasello, 1987) or (3) infinitival-to appears before prepositional-to (as reported by Rice, 1999, 2003) in Brian's densely collected data. It should be noted though that there may be individual differences in children's acquisition patterns (Lieven, Pine, & Dresner-Barnes, 1992) and Brian's data alone, regardless of the high recording density, may not reflect the acquisition of these items in children in general. To address Rice's (1999, 2003) suggestion that children might acquire the more frequent meaning of *to* earlier, we analyse the input frequencies of infinitival- and prepositional-to. Lastly, the meaning of the main and complement verbs in Brian's early utterances with to-infinitive clauses is analysed to determine whether early verbs denote movement and would hence be compatible with the *direction towards* meaning together with infinitival-to as suggested by Bloom et al. A more transparent method of allocating meaning to verbs than was used in Bloom et al.'s study is adopted.

In Study 2, we turn to investigate infinitival-to omission errors. First, we conduct a month-by-month analysis of Brian's infinitival-to omissions to see when errors appear in Brian's speech, with which verbs he produces errors, and the proportions of errors at different ages. Second, we examine whether the errors in Brian's speech

could be due to a processing problem by comparing the MLU of utterances with and without infinitival-to.

In Study 3, we investigate infinitival-to omissions further and analyse whether competition between two constructions (verb-X and verb-to) could explain error production using data from 13 children.

STUDY 1: THE ACQUISITION OF INFINITIVAL-TO

Method

A corpus analysis was conducted on one English-speaking child's ('Brian') data.

Corpus

Brian's naturalistic corpus was collected by the Max Planck Child Study Centre in Manchester. Brian is a monolingual only child of a middle-class family from the North-West of England. His speech was recorded for an hour a day, whenever possible, on five consecutive days a week between 2;0.12 and 3;2.12. Between the ages of 3;03.02 and 4;11.20 the same weekly density was retained but data collection was conducted only one week per month, i.e., the child was recorded on five consecutive days each month. Four of the weekly recordings were audio and one a video recording. The contexts of the recordings were usually mealtimes and play sessions with toys. The interaction between the child and his family members (most commonly the mother) and one weekly visit from a research assistant (the video recording) was entirely spontaneous.

The recordings used in the present study were 2;0.12–2;9.30 (N = 198) – the period during which according to previous research one would expect (1) both prepositional and infinitival-to to start to occur in a child's speech and (2) infinitival-to to be synonymous with prepositional-to.

Procedure

Emergence of infinitival- and prepositional-to. One issue in relation to the transcription of infinitival-to in naturalistic corpora needs some consideration; this is the different realizations of infinitival-to. American children, for instance, have been reported to produce infinitival-to as (a) *to*, (b) a contracted schwa (*wanna*, *gonna*) or (c) zero – an omitted form (Bloom et al., 1984; Diessel, 2004; Limber, 1973). In addition, children may also realize *to* as a 'non-contracted' schwa (e.g., *I want ə eat*, *It's ready ə go*, *Need ə pull it*). There is some difficulty in reliably determining whether an item that sounds like *to* in a child's speech is the full realization or a contracted or non-contracted schwa, and different researchers have different views on whether *wanna*, *gonna*, *have ə*, *need ə*, *got ə*, etc. are unanalysed items versus a verb and infinitival-to. Many American corpora appear to have transcribed contracted and non-contracted schwas as contracted forms (*wanna*, *gonna + gotta*, *hafta*, *needta*) which, when analysed as taking bare-infinitive clauses, affects the age of acquisition of infinitival-to reported. Peters (2001) argued that before children fully grasp the phonological and morphosyntactic properties of unstressed syllables

they notice the linear physical characteristics of the positions of these syllables. Hence, children may produce schwas to preserve the number of syllables and/or the rhythm of the sentence. While *to* in *gotta*, *hafta* and *needta* has very similar forms as the full realization of *to*, the contracted forms of WANT and GOING (*wanna* and *gonna*) are phonologically more distinct from the full realization (*want to* and *going to*). Hence, while *wanna* and *gonna* may be independent constructions from *want to* and *going to* (and take bare-infinitive clauses), *needta* (or *need (t)ə*), *gotta* (or *got (t)ə*) and *hafta* (or *have (t)ə*) may be better viewed as consisting of the verb and an immature realization of *to*. In the present article, following the transcription procedures of the Manchester corpus (Theakston, Lieven, Pine, & Rowland, 2001, available in CHILDES) and Max Planck dense database children, *wanna* and *gonna* are seen as contracted forms while the other realizations of schwas (*need (t)ə*, *have (t)ə*, *got (t)ə*, *want ə*, *going ə*) are seen as attempts to produce *to*.

For the comparison between the emergence of prepositional- and infinitival-to in Brian's speech, instances of infinitival- and prepositional-to were extracted using the CLAN programs (MacWhinney, 2000). Infinitival-to utterances were extracted by searching for multi-verb utterances and then manually searching for infinitival-to clauses (with *to*, schwa or zero-to) in the output. Following Peters (2001), all utterances having either the full realization of infinitival-to (*I want to hold Postman Pat*) or a non-contracted schwa in an infinitival-to context (*I want ə hold Postman Pat*) were included in the analysis, but coded separately. Contracted schwa (i.e., *wanna* and *gonna*) were excluded from this analysis, as they were seen as potentially being a separate construction.[2] Also, utterances which may have been attempts to produce a coordinate structure (verb-and-verb, e.g., *go ə play* and *try ə do*) were excluded. Prepositional-to utterances were extracted by searching for all instances of prepositional-to (fully or immaturely realized). An item was taken as a prepositional-to if *to* (*I'm going to Manchester*) or a schwa (*I'm going ə Manchester*) preceded a noun. This was done regardless of whether or not prepositional-to appeared in a complete sentence frame (i.e., utterances such as *to Manchester* were seen as instances of prepositional-to as *to* appeared in the prepositional context). Utterances that were direct repetitions of the interlocutors' or the child's own speech, and rote-learned utterances, such as songs and rhymes, were excluded from the analysis. Utterances in which the intended meaning of *to* was ambiguous (such as *going to sleep*) were excluded from the analysis – based on the difficulty in determining whether *to* had a prepositional or infinitive meaning.[3]

In addition, Brian's mother's data in the same files were searched for instances of prepositional- and infinitival-to. This was done to find out whether the most frequent variant was the first to appear as suggested by Rice (1999, 2003).

Coding for whether the meaning of main and/or complement verbs denotes movement towards something. The main and complement verbs that appeared in the target sentences were coded for their meaning. Bloom et al. (1984) argued that virtually all verbs in their data denoted movement towards something. We aimed to identify verbs in our data that had a salient meaning of movement by checking whether they could combine with prepositional-to phrases, as children may very well be using prepositional-to semantics when producing infinitival-to with the verbs that are compatible with prepositional-to phrases.

A verb was taken to denote movement if it produced a grammatical sequence when followed by a prepositional-to$_{LOC}$ phrase (e.g., VERB + *to Manchester*) in an intransitive or transitive sentence, depending on the verb's transitivity. For a verb to be saliently associated with movement towards, we assumed that it should productively combine with to$_{LOC}$ phrases. Productivity was defined by the verb being able to appear in at least three sentences in which the NPs in the prepositional-to$_{LOC}$ phrases were different (e.g., *I'm going to Manchester/school/town*). If the verb was transitive, in addition to the three different NPs in the LOC-phrases, it also had to take at least three different object NPs (e.g., *I blew the bubbles/dust/feather to Manchester/school/town*). For verbs that can occur in both intransitive and transitive constructions, the example sentences had to all be either intransitive or transitive. This was done to rule out the possibility that rote transitive and intransitive sentences would contribute to productivity. These criteria meant that verbs such as *going* were seen as indicating *movement towards* because a prepositional-to$_{LOC}$ phrase can appear after the verb going (e.g., *I'm going to Manchester*). Verbs such as WANT (**I want (it/him/my aunt) to Manchester*) were not seen as denoting movement as a prepositional-to$_{LOC}$ phrase cannot follow the verb WANT in a simple sentence. This procedure was applied to each main and complement verb type by two independent coders. Where disagreement occurred (0/8 main verbs, 5/40 [12%] complement verbs) a third person coded for the disputed verbs. The majority view was used in the final coding of the verbs. The number of movement and non-movement towards verb tokens in the data were then counted and the proportions calculated.

Results

Emergence of infinitival- and prepositional-to

The first prepositional-to appeared at 2;4.10 (*to Stockport*). The first clear instance of a to-infinitival clause, on the other hand, was not found until 2;7.26 (*Pwww* [= family cat] *is going to die*). Three instances of schwa were observed between 2;5.11 and 2;7.5, which may have been attempts to produce an infinitival-to – but these were ambiguous (*Coming ə see a xxx come off* [2;5.11], *Gone ə drive off* [2;6.29], *Shopping ə buy strawberries* [2;7.5]). No instances of infinitival-to omissions were observed before Brian had produced his first infinitival-to. The first omission was observed in the 2;8.0 file. Before the first clear instance of infinitival-to was produced, 24 instances of prepositional-to and 12 instances of prepositional-to in which *to* was realized as schwa (e.g., *Coming ə Brian* [2;3.30], *Been ə London* [2;5.16], *Going ə Manchester* [2;7.5]) were found. Hence, we conclude that Brian learned prepositional-to before infinitival-to.

Rice (1999, 2003) suggested that the frequency of different meanings of *to* in the input may have a part to play in the order of appearance of these meanings. A search of Brian's mother's data revealed, however, that while she produced 4281 instances of prepositional-to she produced 13,599 instances of infinitival-to in the files 2;0.12–2;9.30.[4] That is, Brian had three times more exposure to infinitival-to than prepositional-to, yet he started producing prepositional-to about three months earlier than infinitival-to. A more detailed analysis of the input revealed that a

small number of main verb + to combinations accounted for a large proportion of infinitival-to uses in the input (*going-to* [*N* = 3411], *HAVE-to* [*N* = 1480], *WANT-to* [*N* = 1391], *GET-to* [*N* = 860], *LIKE-to* [*N* = 809] and *NEED-to* [*N* = 429]). In contrast, the token frequency of individual verb + prepositional-to combinations was much lower (*go-to* [*N* = 485], *going-to* [*N* = 379]). While infinitival-to appears to be learned in combination with a small number of main verbs, prepositional-to shows a different pattern of acquisition that is not tied to specific main verbs. In fact, prepositional-to seems more likely to be learned in combination with its complement as the sequence prepositional-to + *the* accounts for 33% of sequences involving prepositional-to in the input (*N* = 1417). Thus, although input frequencies do not, in any straightforward way, predict the order of acquisition of prepositional- and infinitival-to, the different distributional characteristics associated with these items may, in combination with factors such as perceptual salience, cognitive complexity, and usefulness to the child, provide an explanation for the order in which these items are learned.

Does the meaning of main and/or complement verbs denote movement towards something?

Between 2;7.26 and 2;9.30, 134 utterances were found with to-infinitive complements (81 with *to*; 53 with a non-contracted schwa). In these Brian used seven different main verbs and one complement-taking adjective (see Table 1). By our definition, only *going*, *come* and *got* can have a salient meaning of movement towards something. Their combined proportion of all targets was low (8%). The proportions are identical if the analysis is run so that only full realizations of *to* are included. If we take a look at the utterances in chronological order, four of the five earliest (produced between 2;7.26 and 2;8.24) had a movement main verb

Table 1   The number and proportion of main verbs Brian
              used in his utterances with to-infinitive clauses
              between 2;7.26 and 2;9.30

Verb/adj[a]	*N*	%
go[b]	9	6.7
want	114	85.1
come[b]	1	0.7
need	6	4.5
try	1	0.7
get[b]	1	0.7
like	1	0.7
ready	1	0.7
Total	134	100.0

[a] In the stem or any other inflected form.
[b] Verbs that were taken to have a movement meaning.

(3 × *going*, 1 × *coming*). After these first five targets, the proportion of movement main verbs declined rapidly.

In the 134 utterances with to-infinitive clauses, Brian used 40 complement verb types. Fourteen of these were coded as denoting movement, resulting in 50 of the 134 complement verb tokens (37%) denoting movement (see Table 2). Only two of the five earliest complement verbs were movement verbs (*go* and *get*).

Taken together, these data question whether Brian was using, and hence had learned, infinitival-to as synonymous with prepositional-to.

Discussion

We found that Brian started producing instances of prepositional-to earlier than infinitival-to, and he produced 36 instances of prepositional-to before the first infinitival-to was produced. This suggests that the acquisition of prepositional- and infinitival-to did not go hand in hand as suggested by Bloom et al. (1984), nor was infinitival-to acquired earlier than prepositional-to as suggested by Rice (1999, 2003). Instead, Brian showed the same order of acquisition as was reported by Tomasello (1987) and Pinker (1984).

Brian did not learn the more common variant of *to* in the input first. One possible explanation for this discrepancy is that children's early production of infinitival-to may rely heavily on specific verbs learned as chunks in combination with infinitival-to, which does not seem to be the case with prepositional-to. These distributional differences in combination with other factors may explain the pattern of acquisition, although if and how these factors interact is not well understood.

Two such additional factors that may have affected the order of acquisition found for the two homonyms are cognitive complexity and utterance complexity. First, Rice (1999) hypothesized that infinitival-to, which has a more abstract meaning, should appear later than prepositional-to, which has a more concrete meaning. The more concrete prepositional meaning does appear before the more abstract complementizer meaning in Brian's data even though he received more input overall for the latter, supporting the suggestion that cognitive salience may play a part in the development of the two items. Second, prepositional-to + NP can occur in reduced sentences (e.g., *to Manchester*), which means that the sentence length/complexity of the utterances in which prepositional- and infinitival-to appear are not directly comparable. The fact that infinitival-to usually appears in two-verb utterances which are cognitively and structurally more difficult than single-verb utterances or reduced sentence structures such as PPs is likely to have contributed to the fact that instances of prepositional-to were found earlier in Brian's data than instances of infinitival-to.

Even though we did not find prepositional- and infinitival-to to appear at the same time, the fact that instances of prepositional-to emerged earlier than infinitival-to in Brian's data means that infinitival-to may still have been learned as a synonym to prepositional-to (Pinker, 1984). However, our analysis of verb meaning suggests that this is not the case as we found that only 8% and 37% of the main and complement verb tokens (respectively) denoted movement. If the verbs that appear in utterances with infinitival-to cannot denote movement towards something, then

Table 2 The number and proportion of complement verbs Brian used in his to-infinitive clauses between 2;7.26 and 2;9.30

Verb[a]	N	% of total
blow[b]	1	0.7
build[b]	4	3.0
carry[b]	1	0.7
crash	1	0.7
cut	2	1.5
die	1	0.7
dig[b]	4	3.0
do	11	8.2
draw	1	0.7
drop[b]	1	0.7
eat	5	3.7
get[b]	15	11.2
go[b]	11	8.2
have	1	0.7
hang	1	0.7
hold	17	12.7
jump[b]	1	0.7
like	1	0.7
look[b]	1	0.7
make[b]	3	2.2
open	1	0.7
pick	2	1.5
play	9	6.7
post[b]	1	0.7
press[b]	1	0.7
pull[b]	3	2.2
put	6	4.5
rain	1	0.7
read	1	0.7
ring	2	1.5
save	1	0.7
see	9	6.7
show	1	0.7
sit	3	2.2
smell	2	1.5
sniff	1	0.7
stay	1	0.7
stick	2	1.5
take[b]	3	2.2
tidy	1	0.7
Total	134	100

[a] In the stem or any other inflected form.
[b] Verbs that were taken to have a movement meaning.

it is unlikely that the meaning of infinitival-to together with these verbs is synonymous to the meaning of prepositional-to. Instead, similarly to Bloom et al. (1984), we suggest that the meaning of infinitival-to is likely to be embedded with the meaning of the main verb it appears with, which means that children learn *to*, for example, in *want-to*, *going-to* or *need-to* as two-word chunks. Studies 2 and 3 investigate this issue further.

STUDY 2: ERRORS OF OMISSION WITH INFINITIVAL-TO

Children often omit infinitival-to in their early to-infinitive complements (Bloom et al., 1984; Diessel, 2004; Limber, 1973) and therefore produce utterances such as **I want __ hold Postman Pat*. To investigate the extent to which this took place with different main verbs over an eight-month period, an error analysis was conducted on Brian's 2;7–3;2 data. We also investigated the source for these errors and analysed whether these errors could be due to a processing problem; Brian may make infinitival-to omissions more commonly with longer utterances than short ones due to higher processing demand.

Method

Corpus

The same corpus (Brian) was used as in Study 1.

Procedure

Analysis 1: Infinitival-to omission errors in Brian's data. All utterances in which infinitival-to appeared, was omitted or was replaced by a non-contracted schwa in obligatory infinitival-to contexts were extracted using the COMBO command for CLAN in Brian's 2;7–3;2 transcripts. The command extracted all multi-verb utterances from the data, after which targets were manually searched from the output. As before, non-contracted schwas were coded as infinitival-to. To keep the targets uniform, and because it is possible that other to-infinitive constructions may be acquired separately, the only construction type that was analysed was the V-VP construction (e.g., *I want to hold Postman Pat*); instances of the V-NP-VP construction (e.g., *I want Mummy to hold Postman Pat*) or adj-VP (e.g., *It's ready to go*) were excluded from the analysis. The utterances with infinitival-to (V-VP) clauses (with and without *to*) were analysed to see whether there was an early/late verb distinction in the error pattern as suggested by Bloom et al. (1984).

Analysis 2: Processing analysis. To investigate the suggestion that performance limitations may play a part in the omissions making utterances with omitted infinitival-to longer than those in which it was present, we analysed utterance length over a two-month period (2;7.26–2;9.30) in Brian's data. This is the period during which Brian started to produce the two constructions. Hence, if omission of infinitival-to were caused by a processing problem, we should find the effect during this period.

In order to compare only clear instances of infinitival-to to the omissions, utterances with a non-contracted or contracted schwa were excluded from this analysis. Any utterances that had inaudible sequences ($N = 3$) were also excluded as it would have been impossible to determine the number of words/morphemes in these utterances. No utterances with an omitted *to* appeared in the data before Brian had produced at least one fully realized infinitival-to. Thus, errors were not due to the child not knowing infinitival-to. Both errors and infinitival-to were produced at the early and last recordings (errors persisted beyond the age range of this study). Between 2;7.26 and 2;9.30 we found 78 utterances with a to-infinitival clause and 27 utterances that lacked *to* in obligatory contexts. All the erroneous utterances ($N = 27$), and the first 27 grammatical utterances were coded using two coding schemes:

1. The number of words in each target (excluding infinitival-to) was counted;
2. The number of morphemes in each target (excluding infinitival-to) was counted.

The mean length of the utterances in which *to* was produced was compared to that of the utterances in which *to* was omitted to see if the former were shorter than the latter.

Results

Analysis 1: Infinitival-to omission errors in Brian's data

The analysis found 861 instances of the V-(to)VP construction. Of these, 515 had the full realization of *to*, 242 had the non-contracted schwa realization, and in 104 utterances infinitival-to was omitted. Omission errors did not precede correct production (appeared at 2;8.0 and 2;7.26 respectively).

Brian used 17 different main verbs in these utterances. The mean error percentages differed between different verbs. The early main verbs (*going*, *want*, *come*, *need*, *try*, *get*, *like*) that appeared before 2;10 appeared more regularly with errors than the verbs that appeared later (Table 3 illustrates the mean error proportions for each main verb – these proportions remain very similar even if the utterances with non-contracted schwas are excluded from the analysis). The number of utterances with the later appearing verbs was extremely low ($N = 18$) and hence, it is difficult to determine whether there was a clear distinction between earlier and later verbs. However, it did not seem to be the case that later appearing verbs were always produced with infinitival-to, as *mean* and *pretend* appeared with errors. Likewise, the earliest main verb (*going*) did not appear with errors in the beginning, but later in development errors were occasionally made with this verb (see Tables A1 and A2 in Appendix for month-by-month analyses). Different early verbs also exhibit different error rates that did not relate to the order of appearance. These findings suggest that the errors were not solely related to the early/late distinction.

Analysis 2: Processing analysis

We analysed the first two months (2;7.26–2;9.30) of Brian's utterances in which he produced or omitted infinitival-to in obligatory contexts. During this period,

Table 3 The number of infinitival-to omission errors made with each main verb, the total (including omissions), and the error percentages in the 2;7–3;2 transcripts

Verb[a]	Errors	Total	Error %
go	4	95	4
want	68	474	14
come	1	5	20
need	27	244	11
try	1	11	9
get	1	7	14
like	0	7	0
been	0	1	0
start	0	7	0
have	0	3	0
forget	0	1	0
suppose	0	1	0
pretend	1	1	100
love	0	1	0
mean	1	2	50
use	0	1	0
Total/mean %	104	861	12

[a] In the stem or any other inflected form.

78 grammatical (with infinitival-to) and 27 ungrammatical utterances (that lacked *to*) were found. The mean length of the first 27 grammatical utterances was compared to the mean length of the 27 ungrammatical utterances. A paired-samples *t*-test showed that utterance length (excluding infinitival-to) was not significantly longer for the infinitival-to omission utterances regardless of whether we determined the utterance length by words (infinitival-to: $M = 4.7$, $SD = 2.08$; omission: $M = 4.9$; $SD = 1.66$; $t(26) = 0.43$, $p = 0.67$) or morphemes (infinitival-to: $M = 4.5$, $SD = 1.95$; omission: $M = 4.6$, $SD = 1.55$; $t(26) = 0.31$, $p = 0.76$). Hence it seems that infinitival-to omissions are not due to different processing demands associated with utterance length in the correct and erroneous utterances.

Discussion

In Study 2, we first investigated the omission/production of infinitival-to in Brian's speech and found that, contra Pinker's (1984) hypothesis, omission errors did not precede the production of infinitival-to. Both errors of omission and correct production started to appear more or less at the same time. In addition, even though early main verbs were proportionally more often produced with infinitival-to omissions than later verbs, there was no clear evidence that this was related to

the order of appearance of these verbs. We also compared the length of Brian's utterances with and without infinitival-to. We found that utterance length (whether determined by the number of words or morphemes) did not differ between utterances in which *to* was realized and those in which it was omitted. Hence, the data suggest that infinitival-to omissions are not the result of increased processing demands due to the length of the utterance in which the infinitive-to appears.

In Study 2, we found little support for the nativist explanations for infinitival-to omission errors. However, the central assumptions of the usage-based/constructivist stance may be able to provide an explanation for the omission errors. We turn to this possibility next.

STUDY 3: EVALUATING A CONSTRUCTIVIST EXPLANATION FOR ERRORS OF OMISSION WITH INFINITIVAL-TO

Children get exposed to the input of certain verbs with (e.g., *I want to go out*, i.e., the want-to construction) and without (e.g., *I want it*, i.e., the want-X construction) to-infinitive complements. A competition between these constructions could result in omission errors when the wrong construction is selected for production based on its, and its competitor's, input frequencies. To investigate whether input and constructional competition could predict children's infinitival-to omission errors we conducted a corpus analysis on 13 children's data.

Method

Corpora

A corpus analysis was conducted on naturalistic data from 12 monolingual English-speaking children. All the data for all 12 children (Anne, Aran, Becky, Carl, Dominic, Gail, Joel, John, Liz, Nicole, Ruth and Warren) in the Manchester corpus were included (Theakston et al., 2001). The children were from predominantly middle-class families and were recruited through newspaper advertisements and local nurseries. They were first-borns from monolingual English-speaking families, and were cared for primarily by their mothers. They were audio recorded for two separate hours in every three-week period for one year roughly between the ages of 2;0 and 3;0. In every hour recording, the first half-hour involved the child and mother playing with their own toys, whereas the second half-hour involved them playing with toys provided by the researcher. The researcher remained in the background as far as possible throughout the recordings. In addition to the Manchester corpus, data from Brian (see earlier) were analysed between 2;0.12–3;2.12.

Procedure

An initial main verb search on the children's data revealed that only two verbs (WANT and *going*) that take to-infinitive complements appeared in all the children's data. Hence the analysis was restricted to these two verbs.

Error searches on the children's data. Infinitival-to omission errors appearing with the main verbs WANT (*want*, *wants*, *wanted*, *wanting*) and *going* were extracted

from the corpora, beginning from the first file in which the child produced infinitival-to at least once in an obligatory context. This was done to exclude errors that could have been due to the child not knowing infinitival-to. Only the progressive form of GO was included because (1) it is impossible to determine whether a child producing *I go eat my lunch* is omitting infinitival/purposive-to (*I go to eat my lunch*) or the coordinator *and* (*I go and eat my lunch*). This ambiguity does not arise with *going* as it is not compatible with the coordinating construction (?*I'm going and eat(ing) my lunch*), and hence instances of omission of *to* after *going* can be assumed to be infinitival-to omissions, and (2) the non-progressive forms of GO appeared very infrequently in the children's speech in the to-infinitive construction.

Instances of infinitival-to in correct contexts with the main verbs WANT and *going* were also extracted to enable us to calculate the proportional use of infinitival-to in obligatory contexts, for each child separately. For the *going*-search, only full realizations of *to* were seen as instances of *to*, i.e., *gonna* and *going ə* were excluded from the analysis. The phonetic difference between *want to*, *want ə* and *wanna* is smaller than in *going to* versus *gonna*, and is therefore more likely to have been transcribed inconsistently. Hence, for the WANT-search all the above realizations were seen as instances of the correct production of infinitival-to.

Input searches. All instances of WANT (*want*, *wants*, *wanted*) and *going* were extracted from the mothers' speech in all the files available for each of the Manchester corpus children. For Brian's mother, files 2;0–3;2 were included.

In addition, the number of instances of the WANT-toV and going-toV constructions was counted. The proportion of the mother's production of WANT and *going* that was followed by anything other than infinitival-to (i.e., verb-X) was calculated by deducting the number of instances of the WANT-toV or going-toV construction from the total number of utterances including WANT and *going* (with any complement) and dividing it by the total number of instances of WANT or *going* (with any complement). In this analysis only instances of infinitival-to were included in the count for the going-to construction. However, an additional analysis was run in which the mothers' utterances with infinitival- or prepositional-to were included as instances of the going-toV construction.

In order to rule out the possibility that omission errors were due to a general lack of input of infinitival-to, rather than the input of infinitival-to with specific verbs relative to the competing verb-X construction, an additional search was conducted on the mothers' data pulling out all uses of infinitival-to irrespective of the main verb with which it appeared. We also searched for the total number of words and utterances in the mothers' data, and then, for each mother, calculated the proportion of infinitival-to use relative to (1) the number of words and (2) number of utterances. For the children's error proportions, data for WANT and *going* were combined.

Results

To test whether the mothers' use of the two constructions (verb-X vs. verb-to) would predict the children's errors, we compared the children's infinitival-to error rates with the proportional use of the verb-X construction in the input. We found

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Table 4 The error proportions for WANT and *going*, and the proportions of the input for the competing construction (i.e., mother's utterances without infinitival-to)

	Children's error %		Input % of the verb-X construction	
	WANT	*going*	*WANT*	*going*
Anne	23	26	61	45
Aran	13	0	58	25
Becky	7	12	52	31
Brian	13	4	47	36
Carl	24	18	49	28
Dom	15	58	74	50
Gail	19	18	47	52
Joel	21	14	59	41
John	25	0	51	28
Liz	32	1	59	47
Nic	21	13	60	23
Ruth	70	94	76	61
Warren	27	4	57	30
Mean	24	20	58	38

that the error rate varied across children. Most children also produced different error rates for the two verbs, WANT and *going*. Likewise, different mothers produced different proportions of the verb-X construction with WANT and *going* (see Table 4).

Pearson's correlation tests comparing the children's error proportions to the proportion of the verb-X construction in the input were run separately for WANT and *going*. The tests showed a significant correlation for both verbs (WANT $r = 0.56$, $n = 13$, $p = 0.05$; *going* $r = 0.72$, $n = 13$, $p = 0.01$). A significant correlation was also found if the mothers' utterances containing prepositional-to following *going* were included ($r = 0.70$, $n = 13$, $p = 0.01$). These analyses suggest that those children whose mothers produced proportionally more utterances such as *I want it/biscuit/some banana* and *I'm going home/in/under the table* produced more to-infinitive omission errors than children whose mothers produced a higher proportion of utterances such as *I want to have it* or *I'm going to head home*. That is, different children's error rates seem to be related to the relative proportions of the competing construction in the input.

We would ideally also like to explain different error rates between different main verbs by input. If one verb appeared relatively more frequently with infinitival-to in the input than another verb, we should find that children made more errors with the latter verb. Table 4 shows that, overall, the mothers produced relatively fewer instances of the infinitival constructions with WANT than with *going*. A *t*-test showed that this difference was significant ($t(12) = 6.63$, $p < 0.01$). To compare like with like (WANT vs. *going*), in this analysis, for the children's proportions, all different variants of *to* appearing with *going* were taken as *going-to* sequences

(similarly to the analysis with WANT, in which *want-to*, *want ə* and *wanna* were seen as the correct production of infinitival-to). This analysis showed that the mean error rate for *going* (11%) was significantly lower than the error rate in utterances with WANT (24%) ($t(12) = 4.07$, $p = 0.01$).

To determine whether the overall proportional use of infinitival-to in the mothers' speech (irrespective of the verb it appeared with) predicted the children's error rates, we carried out a further correlational analysis. The overall proportion of infinitival-to in the input (see Table 5), regardless of whether we calculated it relative to number of (1) words or (2) utterances, did not correlate negatively with the children's error proportions. This indicates that it is not the relative frequency of infinitival-to that is associated with errors but rather the rate of appearance of *to* with specific verbs.

Discussion

We tested a usage-based/constructivist explanation for infinitival-to omission errors. We found a significant correlation between children's levels of infinitival-to omissions with the main verbs WANT and *going*, and the proportional use of the competing verb-X (relative to use of the verb-to) construction with those verbs in their mothers' speech. The verb that had a higher proportion of competing verb-X input (WANT) was also the verb with which a higher proportion of errors was produced by the children. These findings suggest that at least one reason for the different error rates of different children and with different verbs are the proportional frequencies of those verbs in different constructions in the input, providing support for the usage-based/constructivist explanation for the errors.

Table 5 The overall input of the infinitival-to relative to the number of (a) words and (b) utterances in the mothers' speech

Mother of	Inf-to	Total words	% of words	Total utterances	% of utterances
Anne	2884	140,072	2.1	36,560	7.9
Aran	3689	187,615	2.0	35,338	10.4
Becky	1514	97,911	1.5	25,908	5.8
Brian	13,599	1,292,364	1.1	239,516	5.7
Carl	1518	86,344	1.8	22,408	6.8
Dom	2597	128,533	2.0	36,014	7.2
Gail	1546	103,259	1.5	26,819	5.8
Joel	1855	107,735	1.7	28,675	6.5
John	1152	79,299	1.5	19,298	6.0
Liz	1200	78,038	1.5	19,768	6.1
Nic	2640	120,136	2.2	29,314	9.0
Ruth	2221	138,722	1.6	36,161	6.1
Warren	1588	118,858	1.3	25,015	6.3
Total	38,003	2,678,886	1.4	580,794	6.5

   If competition in production between two constructions with which a given verb is associated results in infinitival-to omission errors, we might also expect children to make infinitival-to overgeneralizations (e.g., *I want to/ə biscuit*) if they retrieve the infinitival-to construction in the wrong context. An analysis of this is made difficult by the fact that *to* and a non-contracted schwa sound very similar to the article *a* and hence may have been transcribed as such. Even if these were transcribed as ambiguous, it would still be difficult to distinguish whether a schwa-like sound before a noun is functioning as an article or an infinitival-to. Nevertheless, to investigate this matter, we extracted utterances containing the verb WANT from Brian's data (where the transcription of schwas is the most detailed of the children studied) between 2;7 and 3;2 to see whether a schwa, the article *a* or infinitival-to were used in contexts where they should not appear. After Brian had started to produce instances of infinitival-to (2;7.26), 10 instances of the non-contracted schwa were found in contexts where an article does not occur (e.g., *Want ə where save chocolates*, *Want ə Quavers*, *I want ə me photograph taken Mummy*, *Want ə some cup of tea*, *Want ə custard*). Also one instance of infinitival-to was observed in an incorrect environment (*Want to drawer to get the hammer, Dimitra*). It is of course possible that the schwas above are overgeneralizations of the article *a* rather than infinitival-to. However, the fact that these ambiguous utterances were found supports the possibility that WANT-to may be overgeneralized into incorrect contexts. Other children have also been observed to produce want + schwa + NP/pronoun contexts early in development (Bloom et al., 1984). A phonetically transcribed child corpus may aid in determining whether these errors are made, although, of course such corpora are extremely time-consuming and costly to transcribe.

   Lastly, the overall input of infinitival-to was not related to the error rates. This supports the suggestion that infinitival-to is learned as part of the main verb it appears with in the input, rather than children having a more general representation of *to* as a complementizer. This suggestion is further supported by the fact that the same children showed different error rates for the main verbs, WANT and *going*. Had they had a verb-independent representation of infinitival-to (based on its input frequency with any verbs), they would have been expected to quickly generalize its use across verbs once it had been produced initially.

GENERAL DISCUSSION

As far as we are aware, to date, no plausible explanation has been put forward as to why children produce to-infinitive omission errors, why different error rates are produced by different children, or why children produce erroneous and grammatical utterances with infinitival clauses in the same developmental period (i.e., why errors persist when the child has already produced instances of infinitival-to). We tested the predictions of three accounts explaining infinitival-to omission errors. In Study 1, we found that Brian did not learn infinitival-to at the same time as prepositional-to. Prepositional-to was found to be produced several months before infinitival-to. This was the case even though Brian had overwhelmingly more input for the infinitival- than prepositional-to. The data suggest that the difference in

age of emergence could be due to children learning infinitival-to as part of the main verb it appears with, while it is more likely that prepositional-to is learned separately from the verb and in combination with its complement, forming stand-alone prepositional phrases. Further, our verb analysis did not provide evidence that initially infinitival-to has the meaning 'direction towards'. These findings question whether infinitival- and prepositional-to are synonyms. Instead, it is more likely that prepositional-to is learned as having the dative or direction-towards meaning, while the meaning of infinitival-to is embedded in the main verb with which it appears. In Study 2, we first examined infinitival-to omission errors in Brian's speech, and found that there was not an association between the order of appearance of the verb and error rates. This, together with our findings in Study 1, questions Pinker's (1984) explanation for infinitival-to omission errors. Pinker suggested that the acquisition of prepositional-to would help children to correct their earlier assumption that com-plementizer-to is not required (leading to infinitival-to omission errors). Pinker sug-gests that because prepositional-to is more easily segmentable from the input than infinitival-to due to its more salient meaning and sentence position, it appears earlier and is – once acquired – extended to infinitival contexts because infinitival- and prepositional-to are synonymous. He also proposes that children may categor-ize prepositional-to as a complementizer (like infinitival-to). The production and omission of infinitival-to are expected to co-occur because the child 'thinks' that the complementizer is optional with some verbs.

The problems for Pinker's theory in relation to our findings are: first, that we did not find support for the claim that prepositional- and infinitival-to are synonymous. This raises a question as to how and why children would extend prepositional-to to infinitival-to contexts if their meanings are not similar. The only way for this exten-sion to be made is by children categorizing prepositions as complementizers, and hence treating infinitival- and prepositional-to as the same. But in our framework an abstract category such as complementizer is emergent rather than given a priori. Second, Pinker's theory assumes that children produce infinitival-to omission errors before infinitival-to (and possibly prepositional-to) appears in their speech. However, we did not find Brian to produce omission errors until he had already produced his first infinitival-to. The errors and production of *to* appeared more or less simultaneously, or in some cases (e.g., *going*), the production of infinitival-to preceded omission errors by several months. With respect to Pinker's theory, it is not obvious why Brian would make omission errors with those verbs that he had already started producing with infinitival-to. This would be especially puzzling with respect to verbs (e.g., WANT and *going*) that do not appear in adult language without the complementizer (**I want you do it*, **I'm going do it*) – i.e., the child would not have had input suggesting that more than one complementizer equation had to be set. And nor is it clear why Brian would make errors at all since he had been producing prepositional-to for about three months before the first infinitival-to errors appeared. Presumably, he should have been able to segment infinitival-to from the input during this three-month period. Hence, in Brian's case, there clearly was no initial incorrect null-complementizer assumption. Third, we found that Brian produced errors with some new verbs after already having produced infinitival-to in correct environments with all old verbs for months. It is a mystery

why children would make omission errors with new verbs if they had been able to identify infinitival-to in the input; again these are verbs that could not appear without the complementizer *to* in the input (*pretend*, *mean*). It therefore does not seem to be the case that children make an initial incorrect hypothesis about infinitival-to, after which they abandon this hypothesis with aid from the acquisition of the prepositional-to and further adult input. Also, our data do not support Pinker's assumption that children have a functional category for infinitival-to early in development.

Our data did not support the performance limitations account either (Study 2). It was not the case that the omission errors were related to the length of the utterances with or without *to*. Instead, we found support for the usage-based/constructivist account for infinitival-to omissions (Study 3). Children seemed to learn infinitival-to as part of the main verb in a low level schema, i.e., with different verbs separately (e.g., WANT-to, going-to). The fact that these same verbs can also be followed by a large number of words other than *to* results in children also building more abstract constructions with an open slot after the verb (WANT-X, going-X). The two representations (e.g., WANT-to and WANT-X) are likely to compete for production, and when input supports the erroneous variant, infinitival-to omissions can be made.

Importantly, we also found that infinitival-to omissions were not related to the overall input of infinitival-to per se. Our analyses in Study 3 illustrate that overall frequency of an item alone does not necessarily have a major impact on the acquisition of that item, but frequency of a particular item within a certain construction may be more important for the development of language representations.

GENERAL CONCLUSION

To date, the research conducted in relation to the acquisition of infinitival-to has been relatively sparse. The studies that have looked at the development of infinitival-to have used different corpora when determining the age of acquisition – corpora that differ potentially fairly dramatically in the way different realizations of *to* have been transcribed (and coded), providing conflicting results. Even fewer researchers have attempted to explain why children make infinitival-to omission errors regardless of the fact that the error production is well documented. The present article contributes to these issues by reporting the age of acquisition for infinitival- and prepositional-to by one child whose speech was more densely recorded than those of previous studies. In addition, we provide an explanation for infinitival-to omission errors based on Brian's and the 12 Manchester corpus children's data by arguing that the errors are related to competition of different verb forms (verb-to and verb-X) that children are exposed to. Our results hence contribute to the growing body of usage-based/constructivist research that suggests that (1) children's linguistic representations are greatly, but not solely, affected by the type and token frequencies in the language input that they hear and (2) the inventory of constructions (i.e., the child's grammar) can vary in lexically specific detail.

ACKNOWLEDGEMENTS

NOTES

1. Note that researchers from other theoretical perspectives have suggested different sources for the lack of tensing (and/or aspect) in children's speech (e.g., Kallestinova, 2007; Wijnen, 1998).
2. *Wanna* and *gonna* appeared in the data after the child had already produced instances of the *want-to* and *going-to* constructions.
3. The first *go(ing) to/ə sleep* appeared in the 2;8.03 file.
4. The proportions remain similar if the mother's data from only the first half of the age range (2;0.12–2;5.29) are included in the analysis. In these recordings she produced 7771 instances of infinitival- and 2581 instances of prepositional-to. This suggests that the fact that prepositional-to appeared before infinitival-to in Brian's speech was not due to the mother producing more instances of prepositional-to early in Brian's development.

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APPENDIX

Table A1 Early main verbs in Brian's corpus (started to appear before 2;10) and the production of infinitival-to and its omission with those verbs month-by-month

	go[a]	want[a]	come[a]	need[a]	try[a]	get[a]	like[a]
2;7							
Inf-to	1						
Schwa	0						
Error	0						
Total	1						
2;8							
Inf-to	2	2	1				
Schwa	0	0	0				
Error	0	4	0				
Total	2	6	1				

(continued)

Table A1 (continued)

	go[a]	want[a]	come[a]	need[a]	try[a]	get[a]	like[a]
2;9							
Inf-to	3	68	0	2	1	1	0
Schwa	3	44	0	4	0	0	1
Error	0	24	1	2	0	1	0
Total	6	136	1	8	1	2	1
2;10							
Inf-to	10	61	0	38	1	1	
Schwa	2	13	1	18	0	0	
Error	0	7	0	3	0	0	
Total	12	81	1	59	1	1	
2;11							
Inf-to	8	18	2	26	2		1
Schwa	1	20	0	71	0		1
Error	1	3	0	10	0		0
Total	10	41	2	107	2		2
3;0							
Inf-to	9	21		22	2	1	
Schwa	1	8		30	0	0	
Error	0	1		12	1	0	
Total	10	30		64	3	1	
3;1							
Inf-to	29	80		1	1	2	3
Schwa	0	12		4	0	1	1
Error	2	14		0	0	0	0
Total	31	106		5	1	3	4
3;2							
Inf-to	22	55		1	3		
Schwa	0	4		0	0		
Error	1	15		0	0		
Total	23	74		1	3		

[a] In the stem or any other inflected form.

Note: As we only included V-VP constructions in this analysis, the instance of main word *ready* (that was reported in the main verb meaning analysis) has been excluded from this analysis.

Table A2 Late main verbs in Brian's corpus (started to appear at 2;10 or after), and the production of infinitival-to and its omission with those verbs month-by-month

	been	start	have	forget	is supposed	pretend	love	is meant	used
2;10									
Inf-to	1								
Schwa	0								
Error	0								
Total	1								
2;11									
Inf-to		1							
Schwa		0							
Error		0							
Total		1							
3;0									
Inf-to		1	1	1	1				
Schwa		0	0	0	0				
Error		0	0	0	0				
Total		1	1	1	1				
3;1									
Inf-to		2	0			0	1	1	1
Schwa		0	2			0	0	0	0
Error		0	0			1	0	1	0
Total		2	2			1	1	2	1
3;2									
Inf-to		3							
Schwa		0							
Error		0							
Total		3							

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