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Title: Constructing ‘basic’ verbal constructions: a longitudinal study of the blossoming of constructions with six frequent verbs

Running head: Constructing “basic” verbal constructions

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In this paper we adopt a usage-based perspective on the process of first language acquisition. Following Tomasello (2003), we assume that children initially learn concrete chunks of language, linguistic gestalts that can take different sizes and shapes, in dialogue. They then generalize across those various elements in order to assemble more abstract constructions (Fillmore 1988, Goldberg 1995) in the process of creating new utterances. These linguistic constructions are units of language that contain multiple elements used together for a coherent communicative function.

Language acquisition is a fruitful field in which to apply construction grammar. As Ingram (1998) reminds us in the title of his comment on Tomasello’s (1998) review of Goldberg’s (1995) book: “Constructions have been in child language all the time.” The 19th century observers of child language had already expressed their intuitions about gestalt language in their diaries about their own children (Stern & Stern 1907, Pavlovitch 1920, Guillaume 1924; see Ingram 1989 and Morgenstern 2009 for a more extensive review). These intuitions were expanded on by Brown (1973), and applied by authors such as Crystal, Fletcher and Garman

(1975) to assess language levels, by Peters (1980) to describe the development of language units, and by many developmental-functionalist approaches to language acquisition (Budwig 1995; Clark 2003) to relate language development to other domains of cognition and to its social, conversational anchoring.

Children can internalize the language to which they are exposed; and they can extract form-function pairings, use them with sensitivity to the pragmatic and dialogue context (Halliday 1967). But they also exploit the creative potential of language (Chomsky 1957, 1965), going beyond rote learning based on situations that are fixed in advance. Children are both lumpers, generalizing observations into patterns, and splitters, analyzing patterns based on item-specific knowledge. Their mastery of language is marked by how freely they combine constructions and produce utterances that are accepted and understood by their interlocutors in context through negotiation of meaning as part of the social practice of conversation (Gumperz & Levinson, 1996). Therefore constructions are “actively appropriated by children in actual contexts as they attempt to use language to co-construct reality with their interlocutor” (Budwig, 1998: 446).

One approach to children’s linguistic knowledge is to study longitudinal naturalistic recordings of individual children and analyze both the children’s productions and the input they receive over a certain period of time. Child language research is one of the first fields in which spontaneous conversation data was systematically collected, initially through diary studies (Ingram 1989; Morgenstern 2009) and later by audio and video recordings. Corpora from various languages therefore form the backbone for a large number of issues in the field.

The data-centered method has allowed many researchers to confirm that in the course of their development, children make their way through successive transitory systems with their own internal coherence (Cohen 1924). This phenomenon can be observed at all levels of linguistic analysis, but the gradual assembling of verbal constructions is of particular interest for

linguistic theory. However, children's appropriation of verbal constructions or of any specific linguistic item is not easy to tease apart from the rest of language acquisition, since they do not hear them in isolation in the input: they observe not constructions but rather utterances embedded in conversations. The longitudinal analysis of both the parental input and children's productions can give us some insights about how they develop verbal constructions.

Just like other categories of constructions, verbal constructions can vary in their complexity, depending on the type and number of elements that are used and how they relate to each other. It has been assumed that children learn constructions with fewer arguments faster (Valian 1991). However, certain verbs following constrained complex patterns with mandatory arguments are very commonly used (such as 'Agent GIVE Patient to Recipient' and 'Agent SAY Patient to Recipient'). So how do children tackle these more 'complex' constructions and comprehend their communicative function when they encounter them in the input? How do they extract the various elements of the constructions they hear from the larger wholes?

It has been found that children do not produce all the arguments at once at the beginning of multiword speech. Rather, they have a tendency to omit subjects even when they are grammatically required (Bloom 1990), and they do not produce complex constructions with two or three arguments at first. Nativist theories (Chomsky 1959, 1965; Pinker 1984) assume that despite the fact that they don't use adult-like utterances, children operate with an abstract knowledge of grammatical categories. The 'incomplete' form of young children's productions is explained by performance limitations: the limitation in memory capacity governs their ability to realize sentence constituents overtly. Valian (1991) has argued that since children have full competence, they will avoid producing utterances that they know are wrong; instead, they will make less 'complex' utterances (with fewer arguments), in particular more

intransitive constructions than transitive constructions. But from a constructivist perspective, Theakston, Lieven, Pine & Rowland (2001) have demonstrated that a clearer predictor of the sentential frames the children use with specific verbs is the frames their mothers use with the same verbs. These authors have found no significant differences between adult speech and children's speech in terms of preference for certain verb frames for particular verbs. Indeed, "constructionist approaches emphasize the fact that languages are learned, that they are CONSTRUCTED on the basis of the input together with general cognitive, pragmatic and processing constraints." (Goldberg 2006:3).

In their conversational exchanges with adults and in the surrounding language they overhear, children are provided with information about the frequencies of various forms and seem to be extremely sensitive to that factor. They opt for the most frequent and productive affixes in word-formation, for example, and only later master the less frequently used ones (Clark & Berman 1984). Children use specific verbs only in constructions they have heard in the input (de Villiers 1983).

The role of the input and of token frequency in the acquisition of verbal frames seems therefore quite important. According to Bybee (1995), high token frequency is inversely related to productivity: morphological tokens with especially high frequency do NOT lead to generalizations because the children seem to use them in an automatic, unanalyzed manner. It is thus important to compare verbs that are used frequently and verbs that are used less frequently according to how variable their uses are, in terms of both verb frames (number of arguments), and of morphological marking.

In this study, we analyze a set of verbal constructions in longitudinal French data in order to uncover clues addressing various questions that are important in constructional approaches:

- Is there an evolution from incomplete patterns to complete patterns in development?

- Are children sensitive to the patterns of verb use in the input and affected by the frequency of their use?
- Do verbs with different frames ‘behave differently?

1. Data and Method

1.1. Data

We analyzed the development of verb constructions in young French-speaking children by focusing on spontaneous language data from three children in the *Paris Corpus*, (CHILDES database) transcribed in the CHAT format (MacWhinney 2000). We used the CLAN software for quantitative analyses (Parisse & Morgenstern 2010). Madeleine, Théophile and Léonard were videotaped approximately one hour a month; the data used for this study covers the 1- to 3-year-old period. The three children come from upper-middle-class families with college-educated parents and live in Paris or in nearby suburbs. We have worked extensively on other topics using data from these children and have a good understanding of their linguistic development and the quality of the interactions in the family.

Madeleine’s Mean Length of Utterance, a measure often considered to be a better predictor of language development than age (Brown 1973), developed more rapidly than that of the two boys. Madeleine’s development was about five months ahead of Léonard and Léonard’s development was another four months ahead of Théophile’s as shown in Figure 1.

@@ insert figure 1 here

Our other studies of the three children also show that Madeleine uses a wider variety of prosodic patterns with pragmatic functions between 10 and 12 months (Dodane & Martel 2010) and has a much richer lexicon than the two boys. Her first prepositions emerge at 1;09 (Morgenstern & Sekali 2009) and she begins to self-repair her utterances very efficiently as early as 1;09 as well (Leroy, Morgenstern, Caet, forthcoming). Her use of tenses becomes varied as early as 2;03 (Morgenstern, Parisse, Sekali, 2010) and her phonological development has also stabilized by then (Morgenstern, Yamaguchi 2010). Most relevantly, her use of verbal constructions is also more varied at an earlier age than the two boys, as shown in our quantitative results.

1.2. Choice of Verbs

We chose to study verbs that appear with different patterns of arguments and to compare the behavior of frequent and less frequent verbs both in the children's data and in the adult input. This choice allows us to analyze the degree of automaticity versus creativity in children's verbal constructions and to study child and adult use in parallel using the same set of criteria. As we have emphasized, in order to understand how children learn verbal constructions, we must focus on the language they hear and how the same constructions are used by the adults around them. We know from previous studies that children's use of verbs is highly sensitive to the input (Choi 1999). Verbs need to be frequently produced in the input as well as highly accessible semantically in a wide range of contexts, with a wide range of possible arguments for children to learn how to use them (Slobin 1985).

Therefore, we conducted a frequency analysis of all the children and adults' verbs and selected three sets of concurrently produced verb frame patterns. We chose two verbs per verbal pattern, one very frequent and one with average frequency, in order to test how the

children's production reflects the frequency patterns of their input, in terms of both number of occurrences and number of construction pattern types (see Bybee 1995, Goldberg 2006). The six verbs chosen (see Table 1) cover an average of 20% of all verb tokens in the input and in the children's production data at our disposal.

The six verbs are categorized according to three sets.

VERB FRAME 1

Verbs with one or two potential arguments but used nearly exclusively in the input with no overt arguments: *attendre* (to wait), frequent, and *tenir* (to hold), less frequent.

Example¹ with two arguments: *Il t'attend*. 'He is waiting for you.'

Example with one argument: *Elle attend*. 'She is waiting.'

As noted, these two verbs are used mostly in the imperative in the input.

Example with 0 overt arguments: *Attends!* 'Wait.' *Tiens*. 'Take it'.

VERB FRAME 2

Verbs with two or three arguments: *mettre* 'to put)' (frequent), and *enlever* 'to remove)' (less frequent).

Example with three arguments: *Tu peux mettre les pieds sur les pédales*. 'You can put your feet on the pedals.'

Example with two arguments: *Tu enlèves ton chapeau*. 'You take your hat off'.

¹ All the examples used to illustrate the verb frames are taken from the adult input.

VERB FRAME 3

Verbs that typically have three arguments but in context often appearing in other patterns: *dire* ‘to say’ (frequent), and *donner* ‘to give’ (less frequent).

Examples with three arguments: *Tu dis bonjour à Martine.* ‘You say good-morning to Martine’. *Tu donnes le biberon à la poupée?* ‘Are you giving the bottle to the doll?’

In verb frame 3, we chose the verb *donner* ‘to give’, despite its relative infrequency, because it is often described as a prototypical verb for the ditransitive argument structure. Goldberg (2006) has proposed that children hear exemplars of the ditransitive construction most often with the verb *give* and acquire the meaning of the verb at the same time as the pattern, which facilitates their ability to generalize that pattern to other verbs. In our data, the verb *donner* is not nearly as frequent as *dire* ‘to say/tell’ making them interesting candidates for study and comparison.

@@ insert Table 1 here

1.3. Coding

We extracted all utterances containing the six verbs in the three children’s data and in the input. We used two types of coding.

1) Descriptive coding: person and number; tense, aspect and modality; arguments (object, indirect object, adjunct, disjunct). Arguments were coded for whether they were pronominal or lexical and whether they were whole clauses.

2) Meta-linguistic coding: whether the absence of each argument could be considered an omission when compared to the productions of the adults who are their interlocutors during

each session. When a construction was not produced by the adults, if it lacked arguments and if it was not an obvious correct form in oral French (such as “donne”/give), we considered it as non standard speech with omissions.

The following examples illustrate the coding scheme employed.

(1) Léonard 2;0. He is in the bath and holds up his head towards the soap in his father’s hands.

CHILD: *Donne, je mets.*

Give, I put.

‘Give it to me, I’ll do it myself’.

This utterance contains two separately coded segments. The first segment (*donne*) was coded descriptively as imperative, second person singular, no arguments, and meta-linguistically as ‘no omission’ since an adult could have produced the utterance in the same context. We analyzed this production as ‘correct’ in oral French even though *donner* is usually considered a verb requiring three arguments. The referent of the direct object (the soap) is present in the context and is clearly indicated by the child’s gesture. The indirect object (the recipient) is also clearly the child and is moreover explicitly referred to in the following clause (*je mets*). The subject (the agent) is not overtly marked since the verb is in the imperative form, but is clearly the father.

The second segment (*je mets*) was coded descriptively as first person, present, one argument (subject), and meta-linguistically as omitting two arguments. We assume that in oral French, an adult would more likely have said *je vais m’en mettre* ‘I’m going to put some on’. The target of our analysis is not the use of the present instead of the periphrastic future tense, although it reinforces the incomplete aspect of the child’s production. But both the object (the soap) and the indirect object (the child’s body) are missing.

(2) Léonard 3;0. He is reading a book with his mother.

CHILD: *Il est quand même gentil parce qu'il donne un tabouret.*

'He is nice you know, because he gives a stool'.

In this second example of *donner*, coded descriptively as third person, present, two arguments (subject and object), the metalinguistic coding again does not indicate any omissions. Even though the recipient of the stool is not explicitly marked in the child's production, we don't consider it necessary because (1) both the adult and the child know who it is since they have just read the story; and (2) the child uses the clause *il donne un tabouret* to justify the quality *gentil* 'nice' he attributes to the character in the story and there is no need to mention the recipient in this situation. As this example demonstrates and as we will show in our analyses below, the verb *donner* appears to be less constrained than its English counterpart *give* even though its main use is with three arguments..

Our coding was done using Excel; each line of the spreadsheet was linked to the CLAN transcription and video, which enabled us to conduct both quantitative and qualitative analyses in the context of our conversational data.

2. General Results

2.1. Number of tokens

In line with other measures of linguistic development and with our expectations, we noted that Madeleine's production of the six verbs is very rich. All the verbs studied were observed by 2;01, whereas for Théophile and Léonard they had not all appeared until 2;11.

We have 751 total uses in Madeleine's data, 115 in Théophile's, and 136 in Léonard's (see Table 2). In general, the little girl has more precocious language development with more verbal material. Her productions will therefore be analyzed in more detail than those of the two boys².

@@ insert Table 2 here

2.2. The use of grammatical subjects

It has been shown, mostly for English, that children often do not overtly express subjects in their early utterances containing verbs. Numerous explanations have been proposed. Some explanations are linked to the processing demands on young children required by transitive utterances, which leads to their simply dropping the subject (Bloom 1970; Valian 1991). Since subjects in English appear in utterance positions that are prosodically weak, they are more likely to be dropped (Gerken 1990). But it is also possible that the frequency of use of particular verbs with or without subjects should matter, especially when we know children hear some verbs mainly in the imperative (Tomasello 2003).

Other explanations are linked to the possibility of a preferred argument structure (Dubois 1987) and to the fact that new information is expressed in lexical noun phrases (mostly the the object in transitive constructions). Greenfield and Smith (1976) presented evidence that from the very beginning of language acquisition, children overtly express only the most informative elements (see also Greenfield 1979). Subjects are typically given information and are more likely to be omitted in the beginning of acquisition (Danon-Boileau & Morgenstern

² We have continued filming Théophile, who is now 5;0 and now very talkative. He has produced the same types of constructions as Madeleine over the last two years, but a little later than she did.

2009). Clancy (1995, 2000) documented that 2-year-old children learning Korean follow this same pattern; Allen and Schröder (2003) have confirmed it for 2-year-olds speaking Inuktitut. For two of the verbs, *tenir* and *entendre*, Tomasello's explanation based on the use of imperatives is very relevant, as we will discuss in our detailed analyses below. Taking the six verbs under study together, we found 53% overt subjects in the children's data and 69% in the input³. Subjects were produced 77% of the time by the children when they were mandatory (99% of the time in the input).

The developmental curve of mandatory subjects for each child shows that Madeleine has a clear tendency to omit subject when she is young (65% omission before age 2;0) but no longer does so one year later (13% omission after age 2;7). The trend is significant with Madeleine. A simple linear regression with percentage of omission and age in months shows a decrease (intercept = 1.41, slope = -0.04, $R^2 = .73$, $F(1,16) = 42.96$, $p < .000001$). Leonard displays a similar trend: 54% omission before age 2;1 and 16% after age 2;7. A similar simple linear regression shows less significant results (intercept = 1.27, slope = -0.03, $R^2 = .36$, $F(1,11) = 6.34$, $p < .02$) because Léonard's percentages of omission are less stable than Madeleine's. Finally, Théophile has a similarly low percentage of omissions after age 2;10 (13%), but the small number of occurrences before age 2;07 does not enable us to compute any statistical tendency. When there is an overt subject, there is an overwhelming majority of pronouns over lexical subjects (Table 3).

@@ insert Table 3 here

These results on the use of nouns and pronouns in our data seem to agree with the findings from spontaneous spoken adult-adult discourse that follow the 'light subject' constraint of

³ We included "filler syllables" (Peters 2001) such as "/ə/" in "/ə/ te le donne" (a give it to you) in our count.

Chafe (1994). They are also compatible with the Preferred Argument Structure hypothesis (DuBois 1987, Dubois et al. 2003): the non-lexical A constraint and the given A constraint induce a large number of pronominal subjects. They are the result in our data of the overall tendency for A to be animate (Everett 2009) given the type of verbs under study (human or characters in books, or toys).

As far as the pronominal or lexical status of the other arguments is concerned, the results are not as clear-cut. A number of factors must be taken into account for each verbal construction, such as the lexical aspect of the verb, the type of semantic role, the status of the discourse object in the dialogue and shared knowledge.

2.3. Number of arguments according to the children's language development over time

Verb frame 1 clearly differs from verb frames 2 and 3 in the number of arguments typically observed; we therefore separated our results into two categories.

In verb frame 1, there is a massive number of 0-argument constructions. This is linked to the overall use of these two verbs in the imperative, as will be shown in the detailed analyses of their use. The children start slowly using *tenir* and *entendre* with more arguments as they get older (an even greater percentage than the adults), but 0-argument constructions remains the norm.

For verb frames 2 and 3, a clear evolution through three developmental periods can be observed.

During period 1 (up to 2;01), the children slowly enter the system with deviations of all kinds from the adult input. They massively overproduce one-argument constructions. They then use the most frequent occurring verbs (*mettre* and *dire*) adequately during period 2 (2;1 to 2;7).

They use no more incorrect 0-argument constructions, but they still use twice more one-argument and twice less three-argument constructions than the adults. Then during period 3 (2;7 to 3;3), they use more and more arguments and start producing rare and creative forms. Madeleine in particular appropriates rare constructions in specific situations and has the skills to use them and to construct utterances with creative meanings. We can note the co-occurrence of two strategies at the same age: using fixed patterns directly replicated from the input on the one hand, and creating more elaborate constructions on the other.

The following examples occur at 2;09 in Madeleine's data.

(3) MAD: *Faut la mettre comme ça.*

'We must put it like this'.

In the adult's data we find examples of this exact same utterance.

(4) MAD: *Je vais la mettre derrière la table à langer pour les animaux.*

'I'm gonna put it behind the changing table for the animals'.

The example in (4) is more elaborate, and it only makes sense in the specific situation in which it has been produced, requiring more creativity in the child's production.

At the end of the data, the children's productions tend to resemble the adults', but they still use fewer three-argument constructions and more two-argument constructions than the adults.

When taken alone, Madeleine, who is more precocious linguistically, is much more similar to the adult picture.

3. Detailed analyses of each verbal construction

In this section we analyze and discuss our results for each verb in turn. We begin with a description of the adults' system, the arguments omitted by the children, and the evolution over time of each argument structure pattern. The overall quantitative results of our coding

are presented in Tables 4 to 9, organized into two types of results for each child: in the R columns, the percentages of ‘realized’ or instantiated arguments; in the T columns, the percentages of ‘targeted’ arguments. Targeted arguments include the arguments that we judged to be omitted in the children’s constructions. When possible, we also provide an analysis of the developmental patterns of arguments used, since they tend to change between the earliest and latest productions of the children. We divided the period under study into three parts: from 1;04 to 2;00, from 2;01 to 2;06, and from 2;07 to 3;03. The analysis was performed separately for each verb and each child on the basis of the realized productions (targeted production will be described whenever they differ significantly from realized production), on the condition that the number of verb occurrences available was sufficient⁴.

3.1. Verb frame 1: *Attendre* and *Tenir*

While coding the adult data, we saw that *attendre* and *tenir* were almost always used as performatives: there is a high percentage of *Tiens* ‘here’ or *Attends* ‘wait’ with no argument. Both verbs therefore have similar characteristics and could be analyzed more as one-word speech act constructions than as fully inflected verbs.

- (5) a. MOT: *Attends, c’est presque fini.*
‘Wait, it’s almost finished.’
- b. MOT: *Tiens Madeleine.* She gives her a card.
‘Here Madeleine.’
- c. MOT: *Tiens, est-ce que tu veux bien m’apporter le petit lapin de Côme, s’il te plaît Madeleine?*

⁴ (Each developmental “stage” was also required to cover at least two sessions. Théophile never produced enough data to be studied before age 2;04.)

‘Oh, could you bring me Côme’s little rabbit Madeleine, please?’

3.1.1. *Attendre*

@@ insert Table 4 here

Attendre occurs mainly with two different frames: a) alone with no argument; b) with an object.

- (6) a. THEO (2;06): *Attends!*
‘Wait!’
- b. THEO (2;11): *Tu m’attends?*
‘You wait for me?’

There is a disproportionate use of *attendre* in the imperative form (which corresponds most of the time to the 0-argument construction) in both the adults (85%) and the children (96%).

Figures are not high enough to confirm a developmental effect, since the number of occurrences with any arguments is smaller than 5 for all values. Pooling together figures corresponding to one and two arguments for all Madeleine’s data, it appears that her behavior is not significantly different from her input, $\chi^2(1, 212) = .61, p = 0.43$.

Nonetheless, Madeleine and Théophile progressively use more and more arguments. At 2;11, Madeleine says *Ah! J’attends que maman ait fini* ‘Oh! I’m waiting for Mummy to finish’ using a complex structure; at 3;02, Théophile says *tu m’attends* ‘you wait for me’ using the complete verbal construction with two arguments. But the major use remains the 0-argument structure (imperative) over the whole developmental period, for both adults and children.

compare her productions with her input, though again it is necessary to pool one- and two-argument occurrences for both Madeleine and her input. There is a significant difference between Madeleine at age 1;04-2;00 and Madeleine at age 2;01-2;06, $\chi^2(1,48) = 4.00$, $p = 0.046$; and between Madeleine at age 1;04-2;00 and Madeleine at age 2;07-3;03, $\chi^2(1,73) = 3.86$, $p = 0.049$. No other significant difference is found, and Madeleine's production is globally similar to her input, $\chi^2(1,137) = .51$, $p = .47$. This means that Madeleine begins by using *tenir* with no arguments, but after age 2;00, she starts to use more forms with one or two arguments, similar to her input.

Overall, the two verbal constructions studied for verb frame 1 are acquired in similar ways by the children, quite early on. The overwhelming preference in the adults' data for an imperative use with no arguments is replicated quite early on in the children's data.

3.2. Verb frame 2 - Verbs with two or three arguments: *mettre* and *enlever*

3.2.1. *Mettre*

Mettre (7.3% in the children, 5.7% in the adults) is much more frequent than *enlever* (2.1% in the children, 1.1% in the adults), which may explain why *mettre* appears in a much larger variety of constructions than *enlever*

@@ insert Table 6 here

In the input, *mettre* has a special status since there are as many two-argument as three-argument constructions used.

- (8) a. Three arguments. Théophile's mother when he is 3;03: *On va mettre ça là*. 'We are going to put this here.'
- b. Two arguments. Léonard's mother when he is 1;10: *Je vais mettre la table*. 'I'm going to set the table', and when he is 1;11: *Tu vas mettre tes chaussons?* 'You're going to put on your slippers?'

The children do not hear a single fixed pattern; both the patterns with two and three arguments have an equal status in the input, with only a slight advantage for the two-argument pattern (46% over 44% for the adults in Madeleine's data; 46% over 37% for the adults in Léonard's data; 60% over 40% for the adults' in Théophile's data). The imperative is used in 7% of the input (telling the child to put on an item of clothing is quite frequent as well as placing objects in various places). The adults' constructions are overall extremely varied; even in three-argument constructions, the locative or the patient might be omitted when the context is clear enough.

If we take the example of Madeleine, her uses of *mettre* are quite numerous (295 occurrences, and quite varied), but we find no imperatives. If she had used imperatives, the absence of the subject would not have counted as an omission. *Mettre* is a verb she uses from the very beginning of the data at 1;06 but quite sporadically up to 2;01. She produces the verb in three-argument constructions⁶ quite early:

- (9) a. (2;03) *On met la main ici*. (We put the hand here).
- b. (2;04) *Je mets ça aussi sur mon lit*. (I put this too on my bed.)

However, she frequently omits an argument (example at 2;01 *on met dedans* 'we put inside' with the direct object missing). Interestingly enough, Madeleine uses a fixed pattern in which the infinitive is preceded by a modal with no subject for a while: *peux mettre* 'can put'; *veux*

⁶ We consider the locative an argument in the construction with the verb *mettre*. The two argument pattern exemplified by *Il faut mettre la table* has a very different meaning (we must set the table).

mettre ‘wanna put’; *faut mettre* ‘must put’. She systematically adds the subject as of around 2;01. We also find a large number of uses of the infinitive *mettre* in various constructions in the input that include the subject. Apart from those set frames with modals and the infinitive, Madeleine seems to acquire *mettre* in two distinctive stages: she uses the verb with only one or two arguments at first; then, at 2;03, she uses it with three arguments about 50% of the time, just like the adult.

A clue about how Madeleine constructs the multi-argument pattern can be seen in the way she incrementally adds information across multiple utterances as in the following example:

(10) MAD (2;01): *On met là. On met les gâteaux.*

‘We put here. We put the cakes.’

She first fills the slot for the location, and then she repeats the verb with the patient slot filled. It seems reminiscent of children’s earliest one-word utterances, which are often separated by a pause and contain complementary elements; Scollon (1976) calls these Vertical Structures that prepare the child for multiword utterances. The same process seems to be repeated here as the child is preparing her multi-argument constructions.

The subjects used are mostly pronominal, as for the other verbs. One of the other arguments is lexical and the other pronominal, according to its information status in the dialogue, similar to the adult use.

The overall difference between the realized and targeted arguments, based on our coding of omissions, is quite important for the verb *mettre*. Taking out the 0-argument data, we see a significant difference between Madeleine’s uses and the ones found in her input: $c^2(1,381) = 26.42$, $p < .000001$). A similar difference was found for Théophile, $c^2(1,84) = 27.63$, $p = < .00001$), and for Léonard $c^2(1,97) = 15.50$, $p = 0.0002$). The children produced fewer three-argument constructions than the adults (see Table 6) and more one-argument constructions.

Madeleine's percentages of productions of one- and three-argument constructions change as she grows older, with a maximal difference between her production and her input in the 2;01-2;06 age range, when she produced nearly as many one-argument constructions as two-argument constructions. Her number of three-argument constructions remains quite low, ranging from 15% to 25% against 44% for her input.

Our hypothesis is that it is more difficult for the children to instantiate all the argument slots because they don't have a stable model in the input. In some cases the adults make the location for the action of putting explicit, and in some cases they don't, mostly when the verb means putting something on oneself, as in *tu vas mettre ces moufles* 'you are going to put those gloves on'. The location is implicit since it is co-referential with the agent. But even when the construction does not refer to putting clothes on, one of the arguments, most frequently the location, may be omitted when discourse and extra-linguistic factors make it clear enough. When Théophile's father says *je vais mettre du gruyère* 'I'm going to put some cheese', he obviously means on the pasta. Léonard's mother tells him to place the piece of the puzzle he is holding in his hand: *tu peux mettre là* 'you can put here'—again, where the intended location completing the puzzle is obvious in context.

3.2.2. *Enlever*

@@ insert Table 7 here

The verb *enlever* 'to take off or away', which means the opposite of *mettre*, is more clear-cut since for pragmatic reasons, the frame with three arguments is very rarely used in the input (4% in Madeleine's input data, 15% in Léonard's input data, 9% in Théophile's input data). It is often useful or even necessary to specify where one should 'put something' (*mettre*); in

contrast, it is usually apparent in context where something is when one takes it off or away, and the goal location isn't usually important to express. The most frequent adult frame is therefore the two-argument construction with a subject and a direct object.

The form with no arguments is very rare in the children's productions and found only at the beginning of the data. We cannot make detailed analyses of Théophile and Léonard's productions since they have very few occurrences (2 for Léonard, 11 for Théophile). Madeleine, however, uses it 91 times throughout the data, mostly to talk about clothes (talking about taking off one's shoes is an important topic since in order to reach her toys, other children and herself need to climb on her bed). She doesn't use the imperative form, but she does have a pattern in which she uses the infinitive with no subject and a modal, just as for *mettre*: *peux enlever* 'can take off', *veux enlever* 'wanna take off', *faut enlever* 'must take off'.

Veux 'want' and *peux* 'can' are modals that refer systematically to her and *faut* 'must' to an impersonal subject, a deontic impersonal source (*il faut* in adult French). The pattern exists in the input, but is not as frequent. Madeleine seems to have taken a fancy to that construction. After 2;03, she almost always adds the subject. Most of her uses of *enlever* are with a subject and either a pronominal object or a lexical object, depending on the dialogue context. She does have a small percentage of three-argument productions, such as *tu m'enlèves mon collier* 'you take my necklace off' at 2;09. *Enlever* is quite a productive verb; as of 2;03 she uses it with different tenses, aspects and modalities. Madeleine's uses are progressively comparable to the adults' as she gets older: up to 2;03 she produces 19 incomplete forms out of 31; between 2;03 and 2;09, only 14 out of 34; after 2;09, 4 utterances are incomplete out of 26.

This is confirmed by chi-square statistics. Not taking into account the rare occurrences of three-argument constructions⁷, it appears that Madeleine produced constructions statistically different from the input from age 1;04 to 2;00, $c^2(2,37) = 26.22$, $p < .000001$. At age 2;01 to 2;06, the difference with her input becomes small, $c^2(2,51) = 6.08$, $p = .04$. Finally, at age 2;07 to 3;03, there is no longer a difference, $c^2(2,71) = 2.49$, $p = .11$. It also should be noted that, although Théophile did not produce enough occurrences to compute chi-square statistics, his percentage of one- and two-argument constructions matches his input very closely (see Table 7).

Overall, in verb frame 2, the use of argument structure seems to differ according to the specific verb. *Mettre* is unstable, while *enlever* presents a more stable picture. The regularity in the patterns used by the children seem to correlate with the degree of variation in the input.

3.3. Verb frame 3: Verbs with three arguments: *dire* - *donner*

The two verbs chosen in verb frame 3 are used very differently. The patterns with *donner* are quite varied and similar its traditional descriptions. The pattern with *dire* is very fixed and corresponds to only one of the uses of *dire* in traditional descriptions.

3.3.1. *Dire*

@@ insert Table 8 here

Dire is used mostly in two-argument constructions in the input. The adults in Madeleine's data use it in three-argument constructions more often than the other adults (38%). The adults

⁷ Note that this construction is highly infrequent in both Madeleine's productions and the adults; taking it into account would not have changed the statistical results, but it may have resulted in incorrect chi-square statistics.

use a lot of imperatives (23.5%) in addressing the child, telling her to say ‘hello’, ‘good-bye’, and ‘thank you’.

As with the other verbs, Madeleine uses *dire* more often than the other two children but starts producing this verb only at 2;03 and in quite complex constructions right away. She does not use any imperatives, so this is a case where adult use and child use of the same verb may differ for pragmatic reasons and their asymmetric social position: the adult is more likely to tell the child what to say than the other way around.

At first Madeleine mostly produces the pattern Subject + Verb + Direct speech; then at 2;09 she begins to produce the pattern Subject + Verb + Indirect speech. At the end of the data, she sometimes adds the addressee (Indirect object).

(11) a. MAD (3;0): *Mais on peut le dire aux papas.*

‘But we can tell it to the Dads.’

b. MAD (2;11) : *Il lui dit que le trésor se cache dans le potager.*

‘He tells her that the treasure is hidden in the garden.’

All children use enough occurrences to make significant quantitative analyses. All statistics were computed without taking into account 0-argument constructions (taking them into account gives similar results, but without satisfying the full requirements of chi-square statistics). Théophile is the only child who does not produce three-argument constructions, which explains why his production is significantly different from his input, $c^2(2,102) = 10.63$, $p = .005$. Leonard presents an overall pattern of use quite similar to the adults, $c^2(2,118) = .37$, $p = .83$. At age 2;01, he uses lexical elements instead of pronouns as indirect objects. Leonard starts to add a pronoun as indirect object at the end of the data. Madeleine also presents a pattern similar to her input, $c^2(2,116) = 3.54$, $p = .17$. The data is too sparse to compute any developmental effects, for either Léonard or Madeleine. However, as for

Léonard, Madeleine's use of three-argument constructions changes, rising from 13% to 28%, but does not reach the 38% of the adult input.

3.3.2. *Donner*

@@ insert Table 9 here

Though linguists cite it as prototypical of verbs appearing in the ditransitive construction (Goldberg 2006), *donner* is not a highly frequent verb in our data. It is the least frequent of the six verbs under study for Madeleine and Théophile, but not for Léonard (see Table 2). The adults use it more often but two times less than *dire*. Only *enlever* is less frequent.

If we examine the adult use of constructions with *donner*, we find for Madeleine's input data 76% with three arguments, 19% with two arguments and 4% with one argument. The pattern is quite similar in the other two children. In all cases of one- or two-argument patterns, the unexpressed elements have been coded as being implicit in the context and no actual "omission" leading to ambiguity, misunderstanding, and an 'incorrect' utterance has been noted. Thus, while the child hears a 'complete' three-argument frame most of the time, the three-argument pattern is not as constrained as for the verb *give* in English. The adults use two arguments in the following contexts:

- Repetition

(12) MAD (1.0)

OBS: *Donne-moi la main. Tu donnes la main? Donne la main.*

'Hold my hand. Will you hold my hand? Hold my hand.'

The first occurrence is an imperative form, so the subject is not expressed. The indirect object is expressed in the first occurrence, but not in the succeeding one. The adult uses the

repetition process in order to insist and does not find it necessary to reiterate the indirect object *moi* 'me'. We could consider such examples specific to child-directed speech with a simplification of the utterance. It provides scaffolding that helps the child attend iteratively to different aspects of the argument structure.

- Use of extra-linguistic context

(13) MAD (1;09): The little girl and her mother are looking at a picture book.

MOT: *Qu'est-ce qu'il se passe si on tire là? Elle donne quoi la vache?*

'What happens if we pull on this? What does the cow give?'

In the sentence with the verb *donner*, the adult does not mention WHO the cow gives milk to, since it is a generic beneficiary.

Nonetheless, this verb appears in a large variety of grammatical constructions in the children's data; all three of them use it with one, two or three arguments. Madeleine and Léonard also produce it with no arguments at all, but only during the first and second recording sessions. It is used quite early by Madeleine (age 1;10) and Léonard (age 1;11) and later on by Théophile (2;06), but in all cases not before the child had an MLU of about 2.

The pattern of Madeleine's uses of *donner* presents a clear decrease in the number of constructions in which there are missing arguments. From age 1;10 up to age 2;05, Madeleine produced 9 utterances with correct arguments and presented 11 utterances with missing arguments (4 subjects, 7 direct objects and 5 indirect objects). From age 2;06 to age 3;03, she produced 20 correct arguments for only 2 missing ones. This represents a significant pattern, $\chi^2(1,42)=8.29$, $p = 0.004$. Théophile followed the same pattern (1 occurrence used with all the arguments and 2 occurrences with most arguments missing before age 3;0, 6 uses with all obligatory arguments and 1 use with the indirect object missing after age 3;0), but did not produce enough elements to apply chi-square statistics. Léonard did not follow the same pattern as he produced a large number of constructions with missing arguments. He never

used the construction with all its obligatory arguments before age 2;2, after age 2;2, he used the construction 22 times: 8 times with all obligatory arguments, 14 with missing arguments - 13 times without the subject and 7 times without the indirect object. However, the number of constructions with obligatory arguments was growing faster than the number of missing arguments, as with the other children.

For Madeleine, the growing pattern of obligatory arguments can be explained by the systematic use of three-argument structures after age 2;06. The two other children were not as advanced and they produced a small number of forms with three arguments.

Since Madeleine had a much higher number of uses, we can make a more detailed analysis of her profile. The first observation is that overall, we found 50% uses of three arguments with *donner* and 24% of one- or two-argument productions which we judged as lacking one or two arguments. This implies that 74% of Madeleine's utterances overall could be considered to either follow or 'target' a three-argument pattern. It is important to note that Madeleine starts producing *donner* with omissions at an early age; she does not avoid this verb even though it has a complex pattern. Her usage therefore does not fit Valian's (1991) claim that children having full "innate" competence choose to use only 'simple' patterns until they have the right performance capacities.

We find two distinctive periods in Madeleine's uses of *donner*.

1) Up to 2;03, there are incomplete forms with phonological deviations and instability. It also seems that the child reproduces chunks of language and comes up with "incorrect or incomplete" utterances. These early productions may indicate that Madeleine internalizes patterns from the language she hears before she starts constructing her own representation of these patterns.

It may also suggest that the child does not "fuse" the semantic roles of the construction at first in the same way adults do (agent, recipient, patient). At 1;11, she uses what seems to be a

frozen expression *le donner* ‘give it’, both without an agent in *le donner à Liyam* ‘give it to Liyam’, and without a recipient in *Monsieur Toto le donner, Monsieur Toto* ‘Mister Toto, give it, Mister Toto’. At the same age, she also uses *donner* to talk about putting water in a bottle so that she can feed the doll, saying *le donne de l’eau* ‘give it water’ as she hands the bottle to her mother for her to fill it with water. It is hard to tell whether her use of *donne* (give) instead of *met* ‘put’ is linked to her reliance on another agent (the adult) to fill the bottle because she can’t do it herself, or instead to her intention of then actually giving the water to the doll. Whatever rich interpretation we might have of her productions, this usage does seem somewhat unexpected in context. In the process of learning the pattern, the construction may be colored with different meanings.

2) After 2;03, the adult pattern with three arguments represents 90% of Madeleine’s productions. There are other original instances that demonstrate her creativity, such as when she uses *tu me donnes un service* at 2;04 instead of the correct adult French *tu me rends un service* ‘you do me a favor’. She has of course most likely never heard an adult produce such an utterance since it is not ‘conventional’ French. Her use of *donner* might be seen as tinting the expression with the sense that the favor is actually a gift from the adult (the agent) to her (the recipient).

Overall, if we compare the constructions with *donner* used by Madeleine and in her input, the difference in the number of arguments used for the entire data is small and highly significant, $c^2(2,177) = 8.58, p = .01$. There is a significant trend in her data. Between age 1;4 and age 2;00, her production is significantly different from her input, $c^2(2,149) = 33.23, p < .000001$. After age 2;07, however, her production has changed and is similar to her input (no significant difference), $c^2(2,159) = 1.14, p = .56$.

The fact that there is one clear argument pattern for this verb in the input therefore seems to be an important factor in the acquisition of the construction.

Leonard is not as advanced and there is a global significant difference between his productions and his input, $\chi^2(2,77) = 31.61, p < .000001$. Théophile had too few items produced to make any statistical computation. All computations were performed by combining the number of 0- and one-argument constructions.

The fact that Madeleine learns the three-argument pattern of *donner* in two stages suggests that she might need both certain maturational cognitive skills and enough exposure to this pattern in the input to fully acquire it and be productive, which may take some time, since *donner* is in fact not a very frequent verb. Since *donner* does not allow much ellipsis of its arguments in French (but more than in English), the input is quite stable with a large proportion of productions including all three arguments. Madeleine being quite a precocious child, her acquisition of the verbal pattern seems nearly complete at a very early age, but only after she has made several incorrect and incomplete productions. The two other children, whose MLU is quite a bit lower and whose linguistic development is slower, do not reach the same stability by the end of the data, but the same but the same tendency to target mostly the three-argument pattern can be observed in their data.

Conclusion

We have analyzed children's production of six verbs and the nature of the input they received for these verbs. The six verbs were selected to represent different syntactic patterns and different input frequencies. Although the actual differences in frequencies may not have been large enough to result in differential behavior in the children, all six verbs appeared to exhibit specific construction patterns and regularities in the input that were reflected in the children's productions.

- *attendre*, a frequent verb, was used by adults in a fixed form, nearly always in 0-argument constructions. This fixed and syntactically simple pattern in the input was reflected in the similar fixed and simple production of the children.
- *tenir*, a moderately frequent verb, was similar to *attendre*, but with less infrequent one-, two- and three-argument constructions in the input. Children started to produce only 0-argument constructions, but some variety did appear in the last recordings, mirroring the input.
- *mettre*, a frequent verb, appeared in the input in equal proportions in two-argument and three-argument constructions. Children displayed a marked tendency to reduce the number of arguments, producing more 0- and one-argument constructions than the adults. The most frequent pattern was the two-argument pattern, and the number of three-argument constructions was increasing in the last recordings.
- *enlever*, a moderately frequent verb, had a consistent two-argument form in the input. Children started to produce constructions with a reduced number of arguments, but in the last recordings, they achieved a performance similar to the input, showing a clear two-argument construction trend.
- *dire*, a frequent verb, was produced mostly in a clear two-argument pattern by the adults, along with some three-argument constructions. The children did not produce this verb very early, but as soon as they produced it, they followed the adult pattern.
- *donner*, a moderately frequent verb, had a clear three-argument structure in the input. Children tended to severely reduce the number of arguments produced in the first recordings. There was a clear significant tendency to use the three-argument structure in the last recordings, but mastery of the three-argument structure was far from complete.

Despite the differences among the six common verbs we have studied, the development of verbal constructions in young children follows a similar pattern. Children tend to match their input and its specificities. They do not produce elements for a given verb that are markedly different from what they hear. We have also observed a progression from incomplete patterns to complete patterns in development. Children have difficulties producing forms with many arguments, and this is especially true for three-argument constructions. They first tend to omit unstressed syntactic markers such as clitics, although a large number of filler syllables are produced. In some cases, children go as far as replacing the unclear pronouns with lexical items. Limitations due to phonological development are quite clear in Madeleine: she actually stops omitting elements as soon as her phonology, and especially her intelligibility, becomes adult-like. However, the children do not tend to omit complex forms: we have observed that the global frequencies of each verb reflect the verb frequencies in the input. Moreover, the limitations seem to concern only two- and three-argument constructions. One-argument constructions are produced frequently, despite the recurrent presence in the input of 0-argument constructions (see *attendre* and *tenir*). It also appears that the more stable the input is in terms of argument structure, the more the child follows the same pattern as the adult (see *dire* and *donner*). The nature of the input is reflected even in small details: for example, with *dire*, the indirect object is not always produced in the input, which is mirrored in the children's production.

Our results seem to confirm that children's early productions do not demonstrate a coherent formal grammar but initially consist instead of a set of item-based constructional islands. As Cameron-Faulkner et al. (2003) show for English, a great number of the most frequent and repetitive components of the French-speaking children's speech are those they hear from the adults around them. Children's productions differ from the input for both pragmatic reasons (use of imperatives in child-directed speech, infrequent in the children's productions except in

set expressions like “tiens”) and cognitive-developmental reasons (missing arguments, phonologically incomplete forms). But over time, thanks in part to their cognitive capacities, experience and amount of exposure, and in part to the adults’ recasts, reformulations and expansions in conversational exchanges (Clark 1998, Chouinard & Clark 2003), the children will fully acquire the adult patterns.

We hope this study has contributed to research suggesting that our linguistic competence is based mostly on our appropriation of specific linguistic constructions (Fillmore, Kay & O’Conner 1988) in dialogue.

This study is still incomplete: it focuses on six verbs only, and some prototypical argument structures (such as the intransitive construction) were not studied. We hope that further detailed work on the relationship between children’s production and their input will help lead to a better understanding of language development and the nature of the syntactic knowledge used in oral language.

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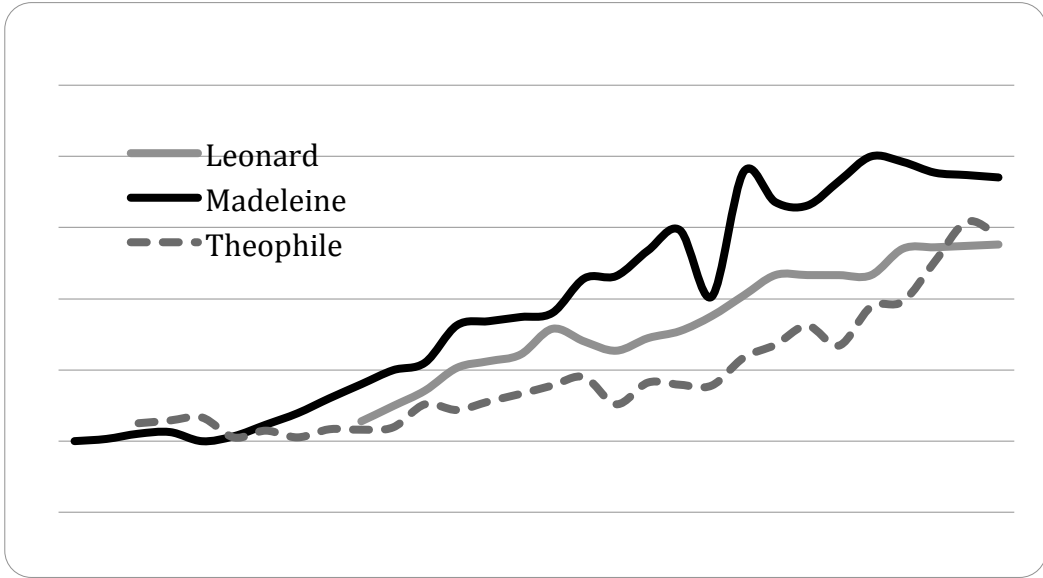


Figure 1: The three children's Mean Length of Utterance according to age

	Madeleine	Léonard	Théophile
INPUT	21%	16%	21%
Nb of verbs in the input	2956	1063	1049
CHILD	25%	13%	11%
Nb of verbs in child's production	30087	4550	11558

Table 1: Frequency of use of the six verbs chosen over the total number of verbs

Verb frame	Léonard		Madeleine		Théophile		Total	
	Child	Adult	Child	Adult	Child	Adult	Child	Adult
1 attendre	4	109	169	325	24	395	197	829
tenir	20	74	91	261	13	514	124	849
2 mettre	41	194	298	610	38	544	374	1348
enlever	2	27	91	72	11	124	104	223
3 donner	28	52	42	207	10	228	80	487
dire	41	233	63	335	19	417	123	985
TOTAL	136	689	751	1810	115	2222	1002	4721

Table 2: Number of verbs used for the children and the adults

	Madeleine		Léonard		Théophile	
	Child	Adults	Child	Adults	Child	Adults
Lexical subjects	6%	5%	4%	3%	3%	2%
Pronominal subjects	94%	95%	96%	97%	97%	98%

Table 3: Percentage of lexical and pronominal subjects in the data

ATTENDRE	Mad		Léo		Théo				
	Adult		Adult		Adult				
	R	T	R	T	R	T			
0 arguments	98	97	93	100	100	91	92	92	78
1 argument	1	2	2			5	4	4	6
2 arguments	1	1	5			4	4	4	16

Table 4: Rate (in percentage) of the number of arguments in constructions

with the verb attendre

R = Realized arguments

T = Targeted arguments

TENIR	Mad		Adult		Léo		Adult		Théo		Adult	
			Mad				Léo				Théo	
	R	T			R	T			R	T		
0 arguments	78	77	83		90	90	78		77	77	85	
1 argument	12	12	10		5	0	5		8	8	7	
2 arguments	10	11	2		5	10	12		15	15	8	
3 arguments			4				4					

Table 5: Rate (in percentage) of the number of arguments in constructions

with the verb tenir

R = Realized arguments
T = Targeted arguments

METTRE	Mad		Adult	Léo		Adult	Théo		Adult
			Mad			Léo			Théo
	R	T		R	T		R	T	
0 arguments	3	3	2	12	12		8	8	0
1 argument	25	5	8	41	3	8	34	8	0
2 arguments	50	62	46	24	63	46	53	76	60
3 arguments	22	30	44	22	22	37	5	8	40
4 arguments						6			

*Table 6: Rate (in percentage) of the number of arguments in constructions
with the verb mettre*

R = Realized arguments
T = Targeted arguments

ENLEVER	Mad		Adult		Léo		Adult		Théo		Adult	
			Mad				Léo				Théo	
	R	T			R	T			R	T		
0 arguments	8						4					
1 argument	30	10	8	50			11	27	27		6	
2 arguments	57	84	88	50	100		70	72	64		85	
3 arguments	4	5,5	4				15		8		9	

Table 7: Rate (in percentage) of the number of arguments in constructions

with the verb enlever

R = Realized arguments
T = Targeted arguments

DIRE	Mad		Adult		Léo		Adult		Théo		Adult	
			Mad				Léo				Théo	
	R	T			R	T			R	T		
0 arguments			7		7	7	0		5	5		3
1 argument	16	8	11		7	5	7,5		21	10		5
2 arguments	60	63	44		70	68	72,5		73	73		67
3 arguments	24	28	38		14	20	20		0	10		25

Table 8: Rate (in percentage) of the number of arguments in constructions

with the verb dire

R = Realized arguments
T = Targeted arguments

DONNER	Mad		Adult		Léo		Adult		Théo		Adult	
			Mad				Léo				Théo	
	R	T			R	T			R	T		
0 arguments	5	2	1		11	0			10			
1 argument	7	4	4		32	11		4	20	10		6
2 arguments	38	19	19		43	25		15	30	30		17
3 arguments	50	74	76		14	64		81	40	60		77

Table 9: Rate (in percentage) of the number of arguments in constructions

with the verb donner

R = Realized arguments
T = Targeted arguments