

# Acquiring Subject-verb Agreement in French: Evidence for Abstract Knowledge from Comprehension

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## 1. Introduction

A milestone is reached when a child has acquired the fundamental syntactic relation known as subject-verb agreement found in most languages of the world (Morgan et al., 2006). Subject-verb agreement is a rather complex phenomenon. For languages encoding agreement morphologically, it requires that the child be able to relate two specific grammatical categories (a verb and its subject), extract distinct abstract features of the subject (e.g., person and number) and copy/realize them on the verb. Mastering agreement may in addition involve several sub-patterns, as is the case in French. Therefore it is hardly surprising that children acquiring French as their native language show early on a dissociation in their production of tense vs. subject-verb agreement (Legendre et al., 2002; Legendre, 2006): while non-present tenses are produced at adult level before the age of 24 months, subject-verb agreement involving forms other than third person singular is not productive until about age 31 months, based on a study of spontaneous production available from the CHILDES database.

The present paper reports on an on-going investigation of children's comprehension of subject-verb agreement that aims to establish its time-course. Our data suggest that: (i) 30-month-old children acquiring French as their native language have conceptual and grammatical knowledge of abstract features (person, number) entering agreement relations that allows them to productively apply this knowledge in different tasks. (ii) However, their knowledge of person and number is still pragmatically immature in the sense that they do not yet show consistent comprehension of agreement markers in contexts of shifting reference between a speaker, an addressee, and a third party.

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## 2. The expression of subject-verb agreement in adult and child French

Like other Romance languages, French has a system of conjugation classes that in part determines the morpho-phonological properties of verb-tense-person-number combinations. For example, class II and III verbs typically encode distinction in number via suffixal morphology and/or modification of stem (e.g., infinitive [prɑ̃dr] ‘take’: 3sg [prɑ̃] vs. 3pl [pren]). Unlike other Romance languages, however, French has undergone a lot of phonological reduction over its history and class I verbs (infinitive *-er* [e]; 90% of French verbs) have silent suffixal morphology (e.g. [dɑ̃s] ‘dance’: 1st sg/pl, 2nd sg, 3rd sg/pl). Many verbal forms are disambiguated by a set of weak/clitic subject pronouns which are obligatory. A sample paradigm is illustrated in Table 1.

**Table 1. Present tense forms of *danser* ‘dance’ (Spoken French)**

1st sg	[ʒɑ̃dɑ̃s]	1st pl	[ɑ̃dɑ̃s]
2nd sg	[tюдɑ̃s]	2nd pl	[vudɑ̃se]
3rd sg masc	[i(l)dɑ̃s]	3rd pl masc	[i(l)dɑ̃s]
fem	[eldɑ̃s]	fem	[eldɑ̃s]

Notable is the fact that the singular/plural distinction is silent in the third person when the verb starts with a consonant, as illustrated for [dɑ̃se] ‘dance’ in Table 1. However, an obligatory morpho-phonological process of *liaison* ‘linking’ differentiates 3sg from 3pl verbal forms starting with a vowel, as in [ilariv] ‘he arrives’ vs. [i(l)zariv] ‘they arrive’. In such contexts, pronoun-verb agreement is signaled by one segment [z] only.

Little is known about the acquisition of *liaison* in French, especially in subject pronoun-verb contexts. One study of spontaneous production by one 3-year-old (Basset, 2000) reports that obligatory *liaison* is produced 91% of the time (vs. 100% at age 7, 99% at age 11).

More is known regarding the acquisition of subject pronouns. French is a Root Infinitive language (Pierce, 1992; Wexler, 1994). Full NPs as well as null subjects appear with non-finite verbs in contexts requiring finite forms up to about 30 months of age (Legendre et al., 2002). That is, children routinely produce both adult-like forms like [dɑ̃s] ‘dance’ and non-adult-like forms like [dɑ̃se] ‘to dance’. Subject pronouns appear between 24 and 27 months, but in inflected verb contexts only (Hamann et al., 1996; Kaiser, 1994; Legendre et al., 2002; Pierce, 1992). That is, children routinely produce adult-like forms like [ʒɑ̃dɑ̃s] ‘I dance’, while non-adult-like combinations of a subject pronoun and an infinitive like [ʒɑ̃dɑ̃se] are practically non-existent. In the more than 3000 child utterances analyzed in Legendre et al. (2002) only 3 cases were found that might arguably be instances of a subject pronoun with a non-finite verb. This pattern supports the conclusion that subject pronouns function as agreement markers, at least in child French.

Third person singular subject pronouns emerge first in spontaneous production (Clark, 1998; Hamann et al., 1996). However, they are frequently

used as defaults (Legendre et al., 2002; Legendre, 2006). Up to about 29 months of age children spontaneously produce only half as many 1sg and 2sg pronouns as adults engaged in the same conversation (Legendre et al., 2002; Legendre, 2006). Finally, Girouard et al. (1997) report on the basis of a pragmatic comprehension task on person reference that 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> person pronouns (subject and object confounded) are properly understood as early as 21 months of age.

The main data reported here was collected in Paris (LPP, CNRS/Université Paris 5) on a group of 30-month-old children (range: 28-32 months) growing up in Paris and surrounding suburbs and acquiring French as their only native language. Each infant participated in 3 studies exploring various aspects of the acquisition of subject-verb agreement. For Studies 1 and 3, we report preliminary data for a group of 24-month-old children (range: 23-25 months).

### **3. Study I: Comprehension and production of subject pronouns**

#### **3.1. Method**

Data was obtained for 24 30-month-olds. Preliminary data for 15 24-month-olds is also presented.

Parents were asked to fill out a French version of the MCDI questionnaire (Fenson et al., 1993; Kern, 2003) modified by the authors for the present purposes. The MCDI is a parent-friendly, successful and reliable tool for measuring the lexical and function words a child understands and/or produces spontaneously (Bates, Bretherton & Snyder, 1988; Bornstein & Cote, 2004).

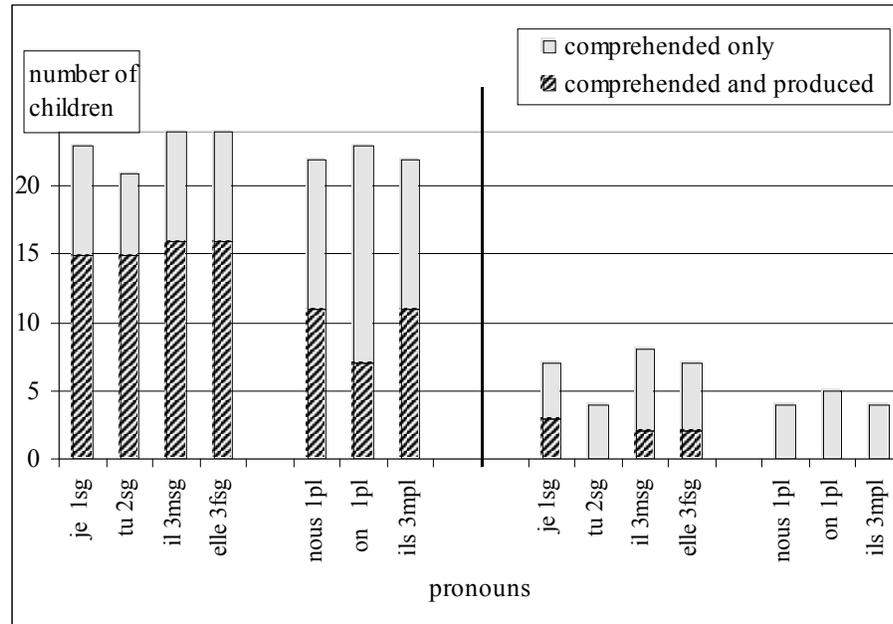
#### **3.2. Results**

An analysis of the subject pronoun section of the parental reports reveals that almost all 30-month-olds understand all subject pronouns while only half of them produce the plural *ils* form (see Figure 1, left panel). This is evidence that their comprehension of subject pronouns exceeds their production (forms like *elles* ‘they-fem’, *vous* ‘you-pl or you-formal’ were inadvertently omitted from the parental questionnaire).

In comparison, few of the 24-month-olds have a solid comprehension of subject pronouns (see Figure 1, right panel). In fact, only one fifth of the 24-month-olds understand all the forms tested and only half of them understand 1sg, 3msg, and 3fsg subject pronouns. This is evidence of partial comprehension of person only and better comprehension of singular forms than plural ones at age 24 months. The data from the 24-month-olds further reveals an order of acquisition that holds for all participants, as reflected by their comprehension: 3msg, 3fsg < 1sg < 1pl < 2sg, 3pl, confirming the spontaneous production evidence reviewed in the previous section.

More generally, these results support the conclusion that comprehension precedes production (e.g., Bates, 1993; Bishop, 1997) and that tapping

children's abstract knowledge in terms of their spontaneous production systematically under-represents their actual knowledge of grammar.



**Figure 1.** Number of 30-month-old children out of 24 (left panel) and 24-month-old children out of 15 (right panel) comprehending only, or comprehending and producing the different subject pronouns.

### 3.3. Discussion

To sum up, 30 months of age appears to be a reference point for productive comprehension and relative production of subject pronouns (agreement markers) in French. If the abstract category of number is in place by 30 months of age, then children can be expected to show evidence of productivity in other tasks, including one focusing on the number distinction mediated by liaison. The fact that French children are able to segment a similar [z] in plural nominal contexts (e.g., *les ours* [lezurs] ‘the bears’) between 2 and 3 (Chevrot & Fayol, 2001) suggests that the morpho-phonological process itself may not be an obstacle.

A separate issue concerns a parallel pragmatic development of pronominal reference. Given that referents of pronouns are dependent upon the non-linguistic context of their utterance (i.e., their interpretation depends on who is talking to whom), it is necessary to experimentally evaluate whether 30-month-olds have both the morphosyntactic and pragmatic competence associated with pronouns. Studies II and III directly address both of these issues.

#### 4. Study II: Comprehension of verbal number agreement

As discussed in Section 2, a young child acquiring French as her native language must eventually master several systems of marking number in the verbal domain. This includes mastering the dominant pattern (class I) where no singular-plural distinction is phonologically present except in a very specific morpho-phonological environment, i.e., in the presence of a 3pl subject pronoun like *ils* ‘they-masc’ followed by a verb starting in a vowel: [i(l)zariv] ‘they arrive’, compared with [ilariv] ‘he arrives’.

##### 4.1. Method

Data of 20 30-month-olds were analyzed. The data of two additional children were discarded due to excessive side bias (> 85% looking to one side), while that of two additional children were discarded because they did not contribute data to all conditions (see below).

The intermodal preferential looking paradigm (IPLP, Golinkoff et al., 1987) was used in this study because it places relatively few demands on children by measuring comprehension without requiring them to make metalinguistic judgments or point (motor planning). As standard with the IPLP, each child sitting on a parent’s lap (blind to the video stimuli) was presented with pairs of scenes displayed simultaneously on two screens. The two scenes were first presented in silence (baseline measure), then a speech stimulus matching one of the two scenes was played, and the two scenes were presented again (test measure). Previous studies have shown that children tend to look longer at the scene matching the speech stimulus during test compared to baseline (e.g., Golinkoff et al., 1987; Naigles, 1990).

Each child was presented with 6 to 8 trials (e.g., pairs of scenes). In each trial, a child was presented with a pair of 6-second-long videos that illustrated the same action/verb (e.g., catching or kissing an object) performed by either one or two 8-year-old boys. In the singular video, one boy catches or kisses an unfamiliar object while the other boy stands next to the first boy, doing nothing. In the plural video, both boys simultaneously catch or kiss another unfamiliar object. Children did not have a name for both unfamiliar objects.

For half of the trials, the speech stimulus corresponded to the singular video, while it corresponded to the plural video for the other half of the trials. The speech stimuli incorporated several important features: (i) all verbs were transitive and each child was exposed to stimuli containing known verbs only (based on parental report); (ii) all verbs were vowel-initial, with phonologically identical 3sg and 3pl forms resulting in number agreement being signaled by liaison only; (iii) pseudo-words were used to refer to the unfamiliar objects present on the videos in an effort to eliminate a possible (correct but unintended) distributive interpretation associated with singular sentences. Indeed, a sentence like *il embrasse la poupée* ‘he is kissing the doll’ matches both a scene in which only one boy kisses the doll and a scene in which two separate boys are kissing

the doll (see Kouider et al., 2006, for further discussion). Thus, for the kissing trials, the speech stimulus presented was either [ilãbraslɔtak] ‘He-sing is kissing the tak’ (singular condition) or [izãbraslɔvub] ‘They-masc are kissing the voub’ (plural condition). All speech stimuli were recorded by the same female speaker, using a naturally high pitched voice.

A digital video camera placed between the two TV screens was used to record the children’s looks to both screens. The videos were coded offline frame-by-frame using SuperCoder (developed by George Hollich) in order to determine the duration of looking times to the to-be-matching (baseline) or matching (test) videos. 10% of the data was independently re-coded with an average agreement of 94%.

For each trial, durations were then transformed into proportions of looking towards the to-be-matching (baseline) or matching (test) video. Then, these proportions were averaged over trials separately for baseline and test, leading to two measures per child. In a second analysis, trials were averaged separately for trials in which the singular video was the target versus the plural video, leading to four measures per child.

## 4.2. Results

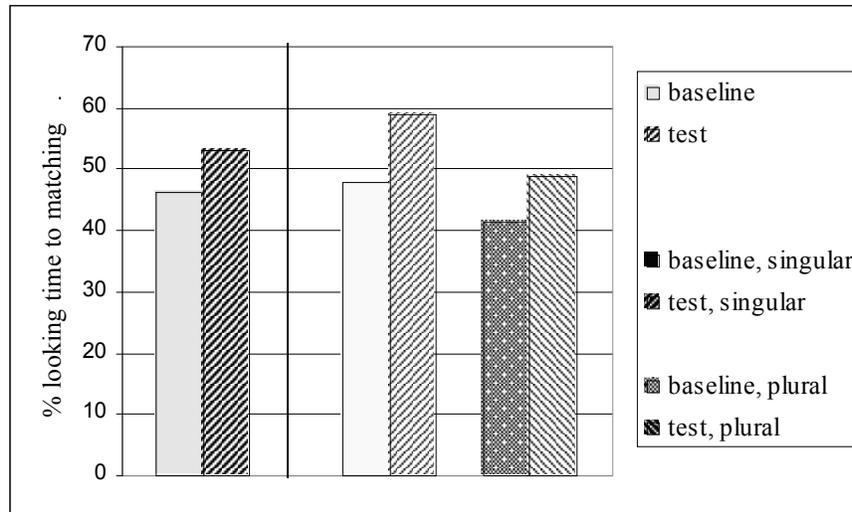
A first one-way ANOVA with the within-subject factor of phase (baseline versus test) was conducted on the proportion of looking times toward the target video. There was a significant effect of phase,  $F(1, 19) = 5.05$ ,  $p = .037$ , indicating that children look longer at the matching video after having heard the speech stimulus ( $M = 53.1\%$ ) than during baseline ( $M = 46.3\%$ , see Figure 2, left panel). This suggests that these 30-month-old children tend to match the speech stimuli to their appropriate videos.

In order to determine whether this effect is present both for trials in which the matching video is the singular or the plural one, a second ANOVA was conducted on the proportion of looking times toward the target video with the within-subject factors of phase (baseline versus test) and condition (singular versus plural). There was a main effect of phase,  $F(1, 19) = 9.09$ ,  $p = .007$ , confirming that infants look longer at the matching video after having heard the speech stimulus than during baseline. There was also a main effect of condition,  $F(1, 19) = 5.77$ ,  $p = .027$ , indicating that children tended to look longer toward the (to-be-)target in the trials of the singular condition. Importantly though, there was no interaction between the two factors indicating that children increased their looking times toward the matching video between baseline and test both in the singular and plural conditions (see Figure 2, right panel).

## 4.3. Discussion

The results of the preferential looking experiment demonstrate that 30-month-old children acquiring French are able to identify the plural marking expressed as the linking consonant [z] in the dominant agreement pattern of

otherwise phonologically identical verbs. These results may be interpreted as a) a reflection of a frequent pattern in the input or b) evidence that these children have reached a milestone in the acquisition of subject-verb agreement in that they have acquired the abstract category of plural instantiated by 3<sup>rd</sup> person plural pronouns and liaison.



**Figure 2.** Looking times toward the matching video collapsed (left panel) or separated for the singular vs. plural conditions (right panel) at 30 months of age.

To test the first interpretation, a survey of the entire Champaud corpus available on the CHILDES database (MacWhinney & Snow, 1990) composed of 10 transcribed files of a single child (Grégoire, age range 19-26 months) provides suggestive evidence that this account is not tenable.

Table 2 summarizes the number of singular vs. plural forms (*il* ‘he’ vs. *ils* ‘they’) appearing in the adult speech (either by the mother, the person making the recordings, or occasionally an older child) both when directed at the child (+CD) and when directed at each other in the child’s presence (-CD). The data further separates instances of subject pronouns immediately followed by a vowel (+V) or a consonant (-V). The vowel or consonant may be the initial segment of a verb (e.g. *ils ont* [ilzõ] ‘they have’) or more frequently that of an object pronoun or a negative particle which appears in a fixed order between the subject pronoun and the verb (subject pronoun – negative particle – object pronoun – verb) as in *ils m’ont* [ilmõ] ‘they have me’ or *ils n’avaient* [ilnavɛ] ‘they didn’t have’. The forms produced by the child are given in row 3.

**Table 2. Production of *il* vs. *ils* (Champaud corpus, CHILDES database)**

Tokens	<i>il</i> + V	<i>il</i> -V	<i>ils</i> + V	<i>ils</i> -V
Adult, +CD	382	301	10	46
Adult, -CD	303	364	4	23
Child	64	111	0	10

Overall, the adult (and child) production of plural *ils* is very low, compared to singular *il*. In addition, combinations of plural *ils* + V are very rare in the adult speech (and non-existent in the child's speech). Of these rare occurrences, only two tokens each (+/-CD speech) of two verbs that are themselves phonologically ambiguous (singular/plural) were found: *ils étaient* 'they were'; *ils aiment* 'they like'. This means that in the course of 6700 adult utterances (some of which include several pronoun-verb combinations), Grégoire is exposed to exactly four instances of forms comparable to the stimuli used in our IPLP experiment. With no a priori reason to think that our participants' exposure to adult forms differ in crucial ways from Grégoire's, we conclude that a 30-month-old child's ability to identify the plural marking in our stimuli is not the result of having learned a frequent adult pattern. Rather, the child has acquired the abstract feature and made use of it in interpreting subject-verb contexts with liaison. If anything, the analysis of the Champaud corpus suggests that little primary linguistic data is necessary to acquire a specific form of plural agreement (the one mediated by liaison), once knowledge of plurality is in place.

### 5. Study III: Comprehension of person reference

As discussed earlier, the acquisition of subject pronouns (person markers) involves acquisition of morpho-syntactic and morpho-phonological properties as well as pragmatic reference. Girouard et al. (1997) report that they successfully tested Canadian-French children as young as 21 months of age using several pragmatic comprehension tasks including a Fishing Task whereby randomized 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> person singular questions were asked of children as to who is fishing what out of a bowl. However, their reported results conflate all pronouns (weak or strong, subject or object) across several tasks; it is thus impossible to retrieve information relevant only to subject pronouns. We attempted to replicate their results focusing strictly on subject pronouns in the context of the agreement sub-pattern investigated in the preferential looking paradigm.

#### 5.1. Method

Data was obtained for 16 30-month-olds, 8 additional children refusing to complete the task. We also discuss our attempt to collect data on 24-month-olds.

In our version of the Fishing Task, the children were tested individually, sitting at a table in a parent's lap, across from two female experimenters. Parents

were asked not to prompt their child or otherwise participate (except in the plural condition; see below). Answers were coded on-line.

First, the two experimenters taught the child their first names until the child was comfortable identifying both of them. The child was then asked to name pictures from commonly known animals and objects (based on parental reports). If a child was unable or unwilling to name the pictures, one of the experimenters asked her to point at the right picture by saying for example *Montre-moi la vache* ‘show me the cow’. All correctly identified pictures were placed in a basket. The two experimenters and the child then picked one picture each out of the basket in preparation for the familiarization phase of the experiment. Once the familiarization phase was completed, two singular blocks were run involving two rounds of fishing for new pictures out of the basket (see Table 3). The order of the questions (1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> person) was randomized across the two blocks. Two other blocks were run using plural forms which required the parent to participate in asking about the two experimenters together.

Using past tense forms like *j’[e]/elle [a] attrapé* ‘I have-1sg/she have-3sg caught’ would have been more pragmatic in this Fishing Task. However, it would have changed the nature of the verbal stimuli significantly, the person marking being instantiated by the auxiliary *in addition to* the pronoun. Therefore, we had to carry out the present study using present tense forms only. To make this as pragmatically correct as possible, we started asking questions right when everyone was still in the process of fishing for a picture.

**Table 3.** Structure of the familiarization and singular blocks of the Fishing task.

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Familiarization (talking to the child):

- Experimenter 1: Qu’est-ce que “nom de l’enfant” attrape?  
‘what is “name of the child” catching?’
- Experimenter 2: Qu’est-ce-que “nom de Exp 1” attrape?  
‘what is “name of Exp 1” catching?’
- Experimenter 1: Qu’est-ce-que “nom de Exp 2” attrape?  
‘what is “name of Exp 2” catching?’

Singular blocks 1 and 2 (identical but randomized questions):

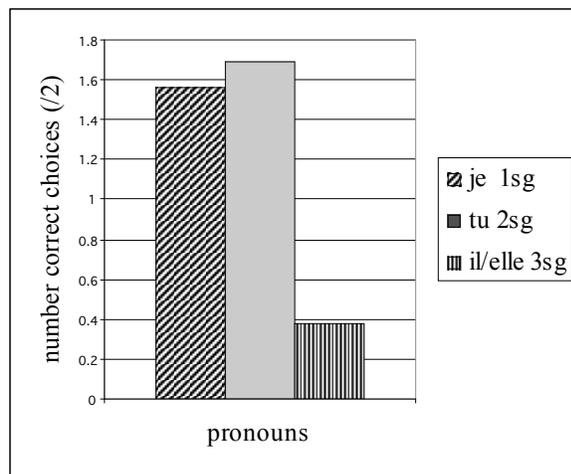
- Experimenter 1: Qu’est-ce que tu attrapes?  
‘what are you catching?’
  - Experimenter 2: Qu’est-ce-que j’ attrape?  
‘what am I catching?’
  - Experimenter 2: Qu’est-ce-qu’elle attrape?  
‘what is she catching?’
- 

## 5.2. Results

The results for the 30-month-olds are illustrated in Figure 3. Overall, they performed the task successfully for person/singular combinations (but not for

person/plural combinations not reported here, in which children often failed to report more than one picture). However, only the results for the 1<sup>st</sup> and 2<sup>nd</sup> singular (*je, tu*) are significantly above chance level,  $p < .001$ .

Our attempts at testing 24-month-olds in the Fishing Task failed even though parents reported that half of them understood the relevant forms. Most participants refused to do the task entirely, despite efforts to engage them in alternative ways by using small animals rather than pictures, verbs other than *attraper*, etc. However, 6/15 children showed a distinctive willingness to appropriately answer a *tu* ‘you’-question referring to their choice of picture/animal but otherwise refused to cooperate.



**Figure 3.** Number of correct choices (out of 2) for the singular pronouns at 30 months of age (16 subjects)

### 5.3. Discussion

Girouard et al. (1997) identified three steps in the acquisition of pronouns (subject and object conflated): 1) 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> person singular pronouns are understood at about the same time (21 months of age); 2) 1<sup>st</sup> person singular pronouns appear in production at 26 months of age; 3) 2<sup>nd</sup> and 3<sup>rd</sup> singular pronouns appear in production at about 28 months of age. They argue that their comprehension results undermine both the person role hypothesis (Charney, 1980) according to which children first acquire person markers that refer to themselves, and the name hypothesis (Clark, 1978) according to which children first treat person markers as proper names, which prevent them from shifting referents depending on the non-linguistic context (results from production tasks partially support the name hypothesis.)

Our results differ significantly from those of Girouard et al. (1997) despite our attempt at replicating one of their comprehension experiments. 30-month-

olds clearly show an order of acquisition of person reference: 1<sup>st</sup>, 2<sup>nd</sup> before 3<sup>rd</sup>. Our participants were comfortable switching reference from themselves to the experimenter and vice-versa but uncomfortable switching reference to the other experimenter. Moreover, not a single 24-month-old completed the fishing task. Overall, our results partially support the name hypothesis while disconfirming the person role hypothesis.

## 6. Conclusions

The results of this set of studies demonstrate that 30-month-old children acquiring French as their native language have the conceptual and grammatical knowledge of abstract features entering agreement relations (person, number) between a subject pronoun and a verb. Whether this ability is present at an earlier age is the subject of on-going studies. Given the nature of the stimuli used and the characteristics of the input, it is argued that this knowledge is unlikely to result from a lexically driven mechanism applied to the adult input forms. On the contrary, the results suggest that relatively few data points may be needed to trigger acquisition of a particular sub-pattern of the agreement system once the relevant features are in place. What is less clear is whether the results also support the conclusion that 30-month-olds are able to relate two elements (subject and verb) on the basis of having acquired the relevant syntactic configuration. Studies of other agreement sub-patterns, involving in particular two instances of number marking, one on the subject NP, one on the verb itself, are needed to further test this hypothesis. Finally, 30-month-olds' pragmatic system of person reference is not yet fully in place.

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