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Experimental and empirical evidence for the status and acquisition of subject clitics and agreement marking in adult and child Spoken French

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1. Introduction

An enduring controversy surrounds the status of French pronominal elements commonly known as subject clitics. They are highlighted in (1):

(1) *Je/ tu* lis des romans. 'I/you read novels'

Traditionally, these pronominal elements are held to be θ -role-bearing elements in canonical subject position, cliticizing phonologically onto the verb (e.g. Cardinaletti & Starke 1999; Côté 2001; De Cat 2005, 2007; Kayne 1975; Rizzi 1986) and resulting in a host of properties of prosodically weak elements documented in Kayne (1975).¹ More recently, these elements have been hypothesized to have the status of agreement markers generated directly on the verb in either the lexicon or post-syntactically (e.g. Auger 1994; Ferdinand 1996; Jakubowicz & Rigaut 1997; Kaiser 1994; Legendre et al. 2002; Miller 1992; Pierce 1992; Roberge 2006; Zribi-Hertz 1994).

Empirically speaking, the controversy persists because Modern French is a rapidly changing language and Standard French, the written and spoken register typically examined in generative studies with ambiguous evidence for the status of subject clitics, is being supplanted in conversations by a strictly spoken, colloquial register used among friends, relatives, and with children (Ashby 1981; Fonseca-Greber & Waugh 2003; Lambrecht 1981). The use of different registers by speakers of French tends to mask certain properties that are characteristic of the colloquial register alone (Ashby 1976/82, Coveney 2002/2005, Armstrong 2002; see also Culbertson 2009). One purpose of this paper is to demonstrate that French CDS (CDS) can be characterized as a well-defined colloquial register which we refer to as Spoken French or SpFrench.

¹ In particular, French subject clitics cannot i) be used in isolation, ii) be stressed; iii) be separated from their verbal host except by other clitics, iv) be conjoined, and v) be modified.

On the basis of corpus and experimental evidence we argue that subject clitics have become affixal agreement markers in the colloquial, spoken register. In particular, we present evidence from newly analyzed corpora of child-directed and child speech showing that subject doubling – a full DP subject +clitic – is the dominant type of DP subject, experimental evidence showing that subject doubling is not an instance of DP dislocation, and a Headturn Preference task showing that children as young as 1;6 have abstract representations of subject-verb agreement in French.

An important consequence follows for theories of acquisition. Wexler's theory of optional root infinitives, for example, is grounded in the claim that root infinitives are restricted to non-null subject languages (Wexler 1998). The fact that French learners go through a stage of 'optional root infinitives' (Pierce 1992; Legendre et al. 2002) falls into place if subject clitics are analyzed as argumental subjects in canonical subject position. If however, subject clitics are affixal agreement markers, then Spoken French is a null subject language, akin to some Northern Italian dialects and the correlation on which Wexler's influential theory is based is challenged. This paper will conclude that young learners of French are acquiring a null-subject language, casting doubt on the generalization Wexler's theory is intended to capture.

The paper is organized as follows. Section 2 is devoted to a study of CDS which exemplifies the register called SpFrench. The dominant adult pattern involving a full DP is [DP – clitic – V] or [clitic V DP], whereby a subject DP co-exists with a subject clitic. Evidence is reviewed, including a prosodic analysis carried out in Culbertson (2009), which supports a subject clitic doubling analysis of SpFrench adult [DP – clitic – V] combinations, hence an agreement analysis of subject clitics. Section 3 is devoted to a study of spontaneous speech by 2-year-olds acquiring French as their native language, showing that they treat subject clitics and full DP/ strong pronoun subjects differently. Such evidence supports the conclusion that young children treat subject clitics as affixal agreement markers. Section 4 presents experimental evidence that 18-month-olds acquiring French already have abstract representations of [DP – V] dependencies involving 'true' and highly variable number agreement on V. These representations are hypothesized to facilitate children's analysis of subject clitics as affixal agreement markers; however, no specific time course is being proposed.

2. The status of subject clitics in CDS

2.1. The impoverished nature of subject-verb agreement

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 person/number via suffixal morphology and/or modification of stem (e.g., infinitive /prãdr/ 'take': 3sg /prã/ vs. 3pl /prɛn/). See Section 4 for further discussion.

Unlike other Romance languages, however, French has undergone a lot of phonological reduction over its history and class I verbs have silent suffixal morphology (e.g. /dãs/ 'dance': 1st sg/pl, 2nd sg, 3rd sg/pl).

Their infinitive ends in *-er* or */e/* and they comprise 87% of French verb types and 49% of verb frequency, based on a French lexical database of written corpora (New et al. 2001). As a result, many verbal forms are only disambiguated by a set of weak/clitic subject pronouns which are obligatory in the absence of a full DP subject. A sample paradigm is illustrated in Table 1.

Table 1. Present tense forms of *danser* ‘dance’

1st sg	/ʒədās/	1st pl	/õdās/
2nd sg	/tюдās/	2nd pl	/vudāse/
3rd sg masc, fem	/i(l)dās/ , /ɛldās/	3rd pl masc, fem	/i(l)dās/ , /ɛldās/

Notable is the fact that the singular/plural distinction remains silent in the third person in the presence of a subject clitic when the verb starts with a consonant, as illustrated for */dāse/* ‘dance’ in Table 1. However, an obligatory morpho-phonological process of *liaison* or resyllabification in connected speech differentiates 3sg from 3pl verbal forms starting with a vowel, as in *il arrive* /i.la.riv/ ‘he arrives’ vs. *ils arrivent* /i(l).za.riv/ ‘they arrive’. In such contexts, plural agreement is signaled by one segment only: the onset consonant */z/* of the second syllable which is often analyzed as a latent coda consonant of the subject clitic (Encrevé 1988; Tranel 1996) – evidence that the clitic itself encodes person/number agreement. Given the impoverished nature of suffixal agreement marking on French verbs, it is hardly surprising that argumental subject clitics were destined to be reanalyzed as agreement markers, first in the spoken register (Givón 1976).

2.2. Doubling in CDS

Spontaneous speech data by native French mothers of five monolingual, normally developing children acquiring Parisian French was analyzed, including dizygotic twins Camille and Pierre, ages 1;3-2;1 and 1;4-2;3, respectively (Hunkeler, 2005); Pauline, age 1;2-2;6 months (Bassano & Mendes-Maillochon, 1994); Anne, age 1;10 -2;6 (Plunkett, 2002); and Grégoire, age 1;9-2;5 (Champaud corpus). All data are available from the Child Language Data Exchange System or CHILDES (MacWhinney 2000).

All occurrences of the (full and reduced) third person singular clitic *il* (/il/ or /i/) and third person plural clitic *ils* (/il/, /ilz/, /iz/) were coded, both in the absence of a full DP subject and in the presence of a full DP subject (doubling), and compared with occurrences of a full DP subject by itself. Attested examples of each are provided and comparative frequency of occurrence out of a total of more than 54,000 utterances from the corpora listed above is provided in Table 2. Only third person subject clitics are being considered because they are systematically compared with full DP subjects.² All examples in (2) are from the mother in the Champaud corpus of Grégoire, age 1;9.

² Counts include third person masculine *il(s)* for Camille, Pierre, and Pauline while they also include third person feminine *elle(s)* for Anne and Grégoire. We do not think that this (accidental) difference affects the point that is being made.

- (2) a. DP subject only: **Maman** va remonter les chaussettes. ‘Mother is going to pull up the socks’
 b. Left-peripheral doubled DP: **Victor il** va te gronder. ‘Victor is going to scold you’
 c. Right-peripheral doubled DP: **Il** va être fâché **Victor**. ‘Victor is going to be angry’
 d. Subject clitic only: **Il** est mignon. ‘He is cute’

Table 2. Third person subject-verb patterns in CDS

Child’s name & age range	Camille 1;3-2;1	Pierre 1;4-2;3	Pauline 1;2-2;6	Anne 1;10-2;6	Grégoire 1;9-2;5
Doubled DP subjects [DP clitic V], [clitic V DP]	66 (100%)	50 (96%)	114 (81%)	137 (91%)	267 (94%)
Non-doubled DP subjects [DP V]	0	2	26	14	17
Total DP subjects	66	52	140	151	284
Clitic V (3rd person only) [clitic V]	151	279	421	1374	639
<i>Total child-directed adult utterances</i>	<i>1875</i>	<i>1558</i>	<i>8873</i>	<i>35480</i>	<i>6430</i>

Table 2 shows that (left- and right-peripheral) DP subjects are disproportionately doubled in CDS, ranging from 81% (Pauline) to 100% (Camille). These numbers are confirmed by an analysis of CDS in the Lyon corpus, a separate corpus consisting of four children and their mothers (also available from CHILDES, Demuth & Tremblay, 2008) where the overall frequency of doubling with left-peripheral DP subjects is 81% (889/1103) (Culbertson 2009).

The very high rate of doubling in CDS potentially plays a critical role in what grammar new learners of French acquire. Learners necessarily derive their grammar from the input they receive. If learners consistently receive strong evidence that doubling is near-obligatory, it seems reasonable to conclude that they have and will continue to further drive change in the grammar of SpFrench.

However, the best analysis of doubling in French is itself controversial. Traditional analyses consider it to be an instance of subject dislocation to a clause-peripheral position with an argumental subject clitic in canonical subject position (e.g. Côté 2001; De Cat 2004, 2007; Rizzi 1986).

- (3) **Jean il** est parti. a. Dislocation analysis: [XP Jean [IP il [I est [VP parti]]]]
 ‘John he left’ b. Clitic Doubling analysis: [IP Jean [I il+est [VP parti]]]

A main argument in support of a dislocation analysis comes from the observation that doubling is impossible with quantified phrases as in (4) because they are not possible topics (Brandi & Cordin 1995; Rizzi 1986,

Côté 2001).³ Quantified subject phrases are therefore restricted to an A-position, e.g. SpecIP.

- (4) ***Personne** *il* parle.
 nobody he speaks
 ‘Nobody is speaking’

An affixal agreement analysis of subject clitics provides a competing analysis of ‘true’ subject doubling, akin to the Northern Italian phenomenon discussed in Brandi & Cordin (1989) and Suñer (1992) among others. Next we summarize evidence from Culbertson et al. (2008) and Culbertson (2009) in support of the latter analysis as well as her counterproposal for the absence of doubling with quantified phrases.

2.3. Further properties of CDS

In a detailed analysis of CDS, Culbertson et al. (2008) and Culbertson (2009) show that SpFrench does not have the properties which traditionally support an argumental analysis of subject clitics. These properties specifically concern the negative scope marker *ne*, verb-clitic inversion in questions, and conjoined verb phrases.

Standard French negation is discontinuous and involves a weak scope marker *ne* which follows full DP subjects and subject clitics, as well as a strong negative marker *pas* which follows the verb. See (5a). The fact that *ne* intervenes between the subject clitic and the verb, but not the complement clitic and the verb, as shown in (5b) is traditionally taken to indicate the higher structural position of the subject clitic as compared to the complement clitic(s) (Rizzi 1986; Brandi & Cordin 1989; Zanuttini 1997).

- (5) a. **Jean/il** *n'*aime pas le café.
 John/il=neg=likes not the coffee
 ‘John doesn’t like coffee.’
- b. **Jean/il** *ne l'*aime pas.
 John/he=neg=it=likes not
 ‘John doesn’t like it.’

³ The existence of attested doubled quantified subjects like *Tout le monde il est beau, tout le monde il est gentil* ‘everyone clitic is beautiful, everyone clitic is nice’ in Français Avancé/Advanced French has been reported in Zribi-Hertz (1994). However, these are extremely rare and not commonly found in any CDS we analyzed.

The loss of *ne* in the spoken adult register is well-documented in studies by Ashby (1981), Coveney (1996), and Armstrong (2002). In the Lyon corpus the frequency of *ne*-retention overall is low in CDS, about 7% (Culbertson 2009). More interestingly, the use of *ne* in spontaneous speech is actually affected by the type of subject present in the clause. In particular, *ne*-retention is most common with full NP subjects (including negative subjects), followed by null subject contexts (like imperatives, existential *y'a* 'there is/are', and *falloir* 'it is necessary'), and is least common when a subject clitic is present. In other words, *ne* is preferentially dropped just in the cases where it would intervene between the clitic and V. This is particularly striking when comparing *ne*-retention for doubled and non-doubled DP subjects. The rate of *ne*-retention for non-doubled DPs is around 83%, however when DPs are doubled, the rate drops to 7%. The claim that subject clitics are true syntactic subjects does not predict any asymmetry between DP subjects and subject clitics. But if subject clitics are verbal prefixes, they are expected to be adjacent to the verb without intervening non-affix material.

Another commonly cited argument against analyzing subject clitics as agreement markers is that they show evidence of being available for syntactic movement (De Cat 2007). Yes/no and *wh*-questions can be formed in multiple ways in Standard French, including by inversion of the subject clitic or full DP as in (6).

- (6) a. **Marie/elle** va où?
 Mary/she goes where
 'Where is Mary going?'
- b. Où va **Marie/-t-elle**?
 where goes Mary/she
 'Where is Mary going.'

Frequencies of questions employing inversion in adult-directed speech, all registers confounded, are typically reported to be below 20% (Coveney 2002; De Cat 2007). In a sample of all questions used by one mother in the Lyon corpus, inversion is used in just 0.1% of *yes/no* questions (13/13253) vs. 1.4% in *wh*-questions (112/7862). Further, 46/112 of these cases are full DP inversion, leaving only 66/7862 (0.8%) cases of subject clitic inversion. Subject clitic inversion is clearly not productive in CDS, and therefore does not impede a morphological analysis of subject clitics.

Perhaps the most widely cited factor in determining the status of French subject clitics has been their behavior in conjoined verb phrases (Fonseca-Greber and Waugh 2003; Sportiche 1992; Auger 1995; Rizzi 1986; Kayne 1975). Whereas object clitics in French must be repeated when two VPs are conjoined, subject clitics reportedly need not be repeated. If true empirically this would be a crucial blow to the morphological analysis of subject clitics, since agreement markers which are word-level affixes should appear each time the verb appears. Evidence from SpFrench supports the claim that this is precisely how they *do* behave.

In the Lyon corpus, only 3 cases were found where the subject clitic was not repeated when VPs were conjoined (3/184 or 1.6%). Moreover, there is a clear difference in the rate of subject clitic repetition depending on whether the mother is spontaneously speaking to her child vs. reading to her from a book. Only 38% of subject clitics were repeated in the latter context (vs. 98.4% in spontaneous speech). (7a) exemplifies spontaneous speech while (7b) is an example of read speech with non-repetition under conjunction. The more formal nature of the read speech is highlighted by the use of the literary synthetic past tense (*passé simple*) used in narration. Similarly, the informal nature of the spontaneous speech in (7a) is highlighted by the use of the periphrastic future tense rather than its formal synthetic counterpart.

- (7) a. *Il* va ouvrir la porte et *il* va rentrer. (Nathan's mother, Lyon corpus)
 'He's gonna open the door and he's gonna go in.'
 b. *Elle* déposa son panier dans l' herbe et – se mit à cueillir des fleurs.
 'She put her shovel down on the grass and began to cut some flowers'

Thus, the spoken input to children clearly supports the hypothesis that subject clitics *must* be repeated in conjoined VPs, as expected if they are prefixal agreement markers. In a sample of 23 speakers from the (adult-directed) Phonologie du Français Contemporain (PFC) corpus (Durand, Laks, & Lyche 2005), 28/29 (97%) conjoined VPs had repeated subject clitics (the single non-repeated instance being from a 70 year old speaker).

2.4. Prosodic analysis of [DP – clitic – V] combinations

Studies of French prosody suggest that a unique signature exists for dislocated elements. Doetjes et al. (2002) analyzed read speech containing left-dislocated elements, and found evidence for two important prosodic/acoustic cues: (i) an F0 rise over the dislocated element (target F0 being reached either realized at the nucleus or the end of the final lengthened syllable), and (ii) a lengthening of the final syllable duration. A third cue, a rise in intensity over the dislocated elements, has also been mentioned in the literature (De Cat 2007).

If subject clitics are affixal agreement markers, doubling constructions are predicted not to show this prosodic signature, but rather to have prosody similar if not identical to clauses with non-doubled nominal subjects. Under this hypothesis, the subject clitic is not an argument bearing element, and thus both a subject clitic and full DP subject may occur within the same simple clause. Culbertson (2009) experimentally tested this prediction against the alternative prediction that not only dislocated objects, but nominal subjects doubled by a clitic as well will bear the distinctive prosodic/acoustic features of left-dislocation. Stimuli were designed to create near-minimal pairs of three test sentence types: non-doubled nominal subject (8a),

doubled nominal subject (8b), and left-dislocated nominal object (8c).

- (8) a. David_i l_j'= a déjà invité.
 David_i him_j=has already invited
 'David_i has already invited him_j.'
- b. David_i il_i= l_j'= a déjà invité.
 David_i he_i= him_j= has already invited
 'David_i has already invited him_j.'
- c. David_i il_j= l_i'= a déjà invité.
 David_i he_j= him_i= has already invited
 '(As for) David_i, he_j has already invited him_i.'

Test sentences were embedded individually in five nearly identical sets of scenarios consisting of short conversational exchange of information between two friends. Participants were 4 pairs of native speakers of French under 30 years of age, each speaker acting out a part in the scenario. They were explicitly instructed to act out the scenarios as if they were having a casual conversation with a friend. The printed scenarios thus included various words, phrases, and spellings that encouraged this spoken, colloquial register.

The initial DP (either subject or object) in each test sentence collected during each session was analyzed using Praat software. Each of the four subjects produced five of each of the three test sentences, therefore 20 of each type and 60 total DPs were analyzed. Three main measures were taken: duration of final syllable, F0 rise over that syllable, and intensity rise over that syllable.

The study found no significant effect of F0 rise or intensity, however there was a significant effect of sentence type on syllable duration. While dislocated object DPs exhibited higher final syllable durations compared to the other sentence types, no significant difference was found between doubled and non-doubled subjects. These results suggest that in terms of final syllable duration, only dislocated objects show the lengthening effect expected for dislocations, while doubled subjects *do not* show this effect. In fact, doubled subjects appear no different from non-doubled subject on this acoustic dimension, in line with an agreement analysis of subject clitics in SpFrench. This is of course contrary to the prediction made by an argument analysis that doubled subjects should pattern with other left-dislocated phrases.

2.5. More evidence for SpFrench as a null subject language

SpFrench exhibits other properties typically associated with the Null Subject Parameter (Rizzi 1986). Non-referential null subjects are highly common, as shown in (9).

- (9) a. Non enfin ben – faut pas être trop longue quand même. (PFC database)
 ‘well no (=you) must not be too late, really’
- b. J'ai entendu dire que – y'avait une plage sur l'île St. Hélène. (web)
 ‘I heard that (there) was a beach on the St. Helena island’

Postverbal subjects are also common, constituting about 35% of all subjects in CDS. (Of course, the issue of whether such constructions are instances of (right)-dislocation arises, which we leave aside for now).

- (10) a. Parce qu' *elle_i* respire une histoire **cette ville_i** (PFC database)
 ‘because it_i breathes a story this city_i’
- b. *Elle_i* va dessus **la vache_i**. (Lyon corpus)
 ‘it_i goes above the cow_i’

Finally, it is well-known that (Spoken) French does not show *that*-trace effects. One way to characterize the pattern is to analyze *qui* as the agreeing counterpart of the complementizer *que*, somehow making the complementizer eligible to serve as a proper governor of the *wh*-trace (Rizzi 1990). An alternative construal is that the *qui*→*que* alternation in a repair strategy to produce an optimal, grammatical outcome (Legendre, in press).

- (11) Qui crois-tu **qui/*que** viendra?
 ‘Who do you believe who will come?’

2.6. Interim summary: The target grammar

SpFrench, as instantiated in CDS or in conversation among friends, displays a range of properties pointing to one and the same conclusion: Subject clitics are not independent syntactic words; nor do they behave like arguments. Rather, they behave like affixal agreement markers.

This conclusion leaves the absence of doubling with quantified subjects (3) to be explained. Adopting a Feature Matching Hypothesis (Suñer 1988, 1992), Culbertson (2009) argues that the absence of doubling is due to a fatal clash between their features ([-definite, -specific] and the features of a subject clitic like *il* ([+accessible, +specific] rather than an inability to be dislocated. The feature matching analysis of subject clitic agreement claims that the optionality of doubling in SpFrench is only apparent, instead doubling occurs in all cases where the subject clitic and subject features match.

In addition, Culbertson demonstrates that, with respect to doubling possibilities, SpFrench occupies an intermediary position between Veneto (allowing doubling with strong pronouns only) and Trentino (allowing doubling with quantified subjects) on a continuum of Romance languages (Poletto 2000). Note that the Advanced French dialect described in Zribi-Hertz (1994) — see footnote 1 — shares doubling properties with Trentino. Subject doubling in Romance is therefore not a single property but a set of distributional feature-based properties individual dialects may avail themselves of.

Thus, for a child learning French as a native language, the target grammar is that of a null-subject language with overwhelmingly prefixal agreement marking. SpFrench is also a language which allows redundant marking of subject-verb agreement (at least to the extent described in Section 2), since both prefixal and suffixal agreement can co-occur (in those rare cases where the verb begins in a vowel and the suffixal agreement is still phonologically overt via resyllabification, as in *il a* /i.la/ ‘he has’ vs. *ils ont* /i(l).zõ/ ‘they have’). Note that this is the case for many Northern Italian dialects as well as Picard (a language in which doubling is obligatory for all subject types, and yet suffixal morphology is still fairly rich, see Auger 2003).

Under the Feature Matching hypothesis one task for the child is to identify the relevant features and to ensure that they match. Only then can it be claimed that a child has acquired the full clausal agreement system of French. Not only must the child eventually acquire the relatively abstract features doubling involves; they must also acquire and match number features, such as singular vs. plural. However, very little is known even about the process of acquisition of suffixal subject-verb number agreement. In Section 4, we investigate an early piece of the puzzle at an age when children do not yet produce full clauses (~1;6), focusing on the number feature. We establish that 18-month-olds show a familiarity effect when exposed to grammatical subject-verb agreement combinations, compared to ungrammatical ones.

3. The status of subject clitics in spontaneous child speech

Child French displays a pattern of adult-like and non-adult-like properties. As is well known, children acquiring French go through a stage of optional root infinitives (e.g. Legendre et al. 2002; Pierce 1992). The adult-like distribution of subject clitics in child speech, compared to strong pronouns and full DP subjects, demonstrates that they are being treated differently by young learners.

3.1. ‘Mature’ grammar of subject clitics by age 2

First, subject clitics are used both very early and correctly in a wide variety of corpora, as early as 1;8 (Hamann et al. 1996, Legendre et al. 2002, Pierce 1992). They are very rarely found with root infinitives, regardless of the context of production. In the (3000+) child utterances from three CHILDES corpora analyzed in Legendre et al. (2002), only 3 instances or 0.1% of subject clitics co-occur with a root infinitive, as in **je ranger* ‘I put away-infinitive’. In a sample of five children, age 2;0, involved in short monologues

(Le Normand 1999) all 19 bare subject clitics are found in finite contexts only. In Hamann et al. (1996) Augustin produces only 1.8% of his subject clitics in root infinitive contexts. Finally, in Jakubowicz & Rigaut (1997) none of the 12 children, age 2;0-2;7, tested in an elicited production task in interaction with two adults, produce a single subject clitic in a non-finite context. This adds up to strong evidence that subject clitics are closely associated with finiteness for children acquiring French. This is to be expected if subject clitics are agreement markers, but not expected otherwise (without further assumptions).

- (12) a. *Il* va là. ‘he goes there’ (Claire 2;0; Jakubowicz & Rigaut 1997)
 b. *Il* court après. ‘he runs after’ (Augustin 2;0, Hamann et al. 1996)
 c. *Il* pleure. ‘he is crying’ (Virginie 2;0; Le Normand corpus)

Second, subject clitics are treated as fixed elements in preverbal position and are never found in postverbal position despite the fact that VOS is the preferred clausal word order in Child French in the presence of a full subject DP – see (16) and comments thereof. In questions, subject clitics are overwhelmingly found in preverbal position, as shown in (13). In addition, there is no corpus-based evidence that subject clitics can be used in isolation, or dislocated though an object DP can be, — see (13d). Overall, children do not appear to go through a stage where they treat subject clitics like independent words.

- (13) a. Poule où *elle* est? ‘Hen where she is?’ (Tim 1;8; Demuth & Tremblay 2008)
 b. *T’*as vu Caroline et Sophie? ‘You saw C and S?’ (Gaëtan 2;3; Jakubowicz & Rigaut 1997)
 c. *Je* sers moi. ‘Me I am serving’ (Pierre 2;4; Jakubowicz & Rigaut 1997)
 d. Poupée *on* mange? ‘Doll do we eat?’ (Grégoire 1;9, asking about eating the doll’s ears)

Finally, subject clitics are never found in the wrong order in clitic sequences. They always appear first, before other clitics (reflexive in (14a) or object in (14b)). This suggests that children have knowledge of the template-like restrictions on the position of clitic elements.

- (14) a. *I s’*habille. ‘He is putting clothes on’ (Valentin 2;5; Jakubowicz & Rigaut 1997)
 b. parce qu’*il le* coupe puis le plie ‘because he cuts it and then folds it’ (Augustin 2;9; Hamann et al. 1996)
 c. *Il m’*a fait sauter Adrien ‘Adrien made me jump’ (Grégoire 2;5; Champaud corpus)

3.2. Immature grammar of full DP and strong pronoun subjects

These subject clitic properties are in sharp contrast with children's treatment of full DP and strong pronoun subjects. First, full DP and strong subject pronoun subjects commonly occur in spontaneous speech in both finite *and* non-finite contexts.

(15) a. Finite contexts:

Moi arrive pas 'I can't do it' (Anais, 2;3; Lyon corpus)

Moi veux porter bébé 'I want to carry baby' (Marie, 2;2; Lyon corpus)

Victor a cassé ballon 'Victor broke (the) ball' (Grégoire, 2;0; Champaud corpus)

Adrien *il* nage 'Adrien swims' (Grégoire, 2;5; Champaud corpus)

b. Non-finite contexts:

Moi jouer 'I play-inf' (Anais, 2;8; Lyon corpus)

Moi aller avec mon sac gris 'I go-inf with my grey bag' (Marie, 3;6; Lyon corpus)

Second, full DP and strong pronoun subjects freely occur in post-verbal position in both finite and non-finite contexts, in the characteristic V(O)S word order of Child French. Thus, full DP and strong pronouns display both great syntactic freedom and a pattern of agrammaticality absent with subject clitics.

(16) a. Finite contexts:

Est tombé **le puzzle** 'the puzzle has fallen down' (Grégoire 1;9; Champaud corpus)

Il est tombé **Grégoire** 'Grégoire has fallen down' (Grégoire 1;9; Champaud corpus)

J' ai fini **moi** 'I am done' (Nathan, 2;10; Lyon corpus)

b. Non-finite contexts:

Manger salade **Adrien** 'Adrien eat-inf salade' (Grégoire 1;9; Champaud corpus)

Ranger **moi** 'I put-inf things away' (Tim, 1;11; Lyon corpus)

Third, there is an asymmetry in order of appearance in child speech, based on person, which differentiates strong pronouns from clitics. While strong subject pronouns appear in the order 1st < 2nd < 3rd (*Moi < toi < lui*), subject clitics appear in the order 3rd, 1st < 2nd in a variety of corpora including the Augustin corpus (Hamann et al. 1996) and the Lightbown corpus (Pierce 1992). Overall, these contrasting properties show that young children (age 2 and older) make a categorical distinction – clitics vs. non-clitic – which pervades number and person agreement features and support the conclusion that children treat subject clitics as affixal agreement markers.

3.3. Adult-like doubling

Furthermore, young children commonly produce subject doubling just like adults do. Frequencies in child production for three children are given in Table 3, to be compared with the adult frequencies in Table 2, from the same corpora.⁴

Table 3. Third person subject-verb patterns in child speech

Child's name & age range	Pauline 1;2-2;6	Anne 1;10-2;6	Grégoire 1;9-2;5
Doubled DP subjects [DP clitic V]	19 (95%)	52 (96%)	39 (83%)
Non-doubled DP subjects [DP V]	1	2	8
Total DP subjects	20	54	47
Clitic V (3rd person only) [clitic V]	46	150	133
<i>Total child utterances</i>	<i>3943</i>	<i>5468</i>	<i>4037</i>

As Table 3 shows, the rate of doubling collapsed over ages among children who produce any DP subject ranges from 83% (Grégoire) to 96% (Anne), averaging to 91% over a total of 13,500 utterances. In the same corpora, adults produce an average of 91.5% doubled DPs (634 doubled out of 693 DPs) over a total of 54,000 utterances. See Table 1 for details.

These results accord well with results independently obtained by Jakubowicz & Rigaut (1997) on the basis of an elicited production task. The 12 children tested produce a total of 181 DP subjects in finite contexts (52 bare DPs vs. 129 doubled DPs): 71% are doubled. Their frequencies are lower than the ones reported in Table 3 but in the absence of a corresponding study of the adult input in their elicited production task it is difficult to evaluate their full significance.

To close the discussion of spontaneous child production we re-examine the pattern of doubled quantified subjects discussed in Côté (2001) in light of the relative position of SpFrench on the Romance continuum of subject doubling (Section 2.6., Culbertson 2009). All examples in (17) come from one single child, Philippe, age 2;1-3;2 (Suppes et al. 1973).

- (17) a. Une voiture *elle* roule. ‘A car it rides’ (Philippe 2;2)
 b. Tout le monde *il* veut une cigarette. ‘Everybody he smokes a cigarette’ (Philippe 2;3)
 c. Tout *il* y est. ‘Everything it is there’ (Philippe 3;2)

⁴ The younger twins, Camille (1;3-2;1) and Pierre (1;4-2;3) are not at a developmental stage where they produce word combinations yet; hence no subject-verb counts can be provided for them in Table 3.

Côté suggests that (17a) may be bi-clausal while *tout* in (17b-c) may be non-quantificational. Culbertson's analysis of SpFrench as intermediate between a Romance variety which, unlike SpFrench, does not allow doubling with full DP subjects (Central Veneto) and varieties which allow doubling with quantified subjects (Trentino, Advanced French) provides an alternative account. Philippe's speech displays the property of attested Romance varieties, evidence that his grammar has (temporarily) converged on a more advanced variety than the language he is exposed to. In other words, Philippe has over-generalized doubling so much that he is speaking Advanced French.

3.4. Interim summary

To sum up, the contrastive distribution of clitic vs. non-clitic subjects in 2-year-olds is completely unexpected if subject clitics are arguments in canonical subject position. Moreover, it requires positing that 2-year-olds have acquired the distinctive phonological properties of subject clitics – that phonology matters for subject clitics but not for full DP and strong pronoun subjects – and are able to distinguish different types of preverbal elements based on their syntax and phonology. However, relatively little is known about the acquisition of native French phonology (Rose & Wauquiens 2007). If, on the other hand, French children have knowledge of suffixal subject-verb agreement at an age when they do *not yet* produce subject-verb combinations – for example at 18 months – this would constitute evidence that they already have representations which could potentially help them analyze subject clitics as (prefixal) agreement markers. Such evidence is presented in Section 4.

4. Sensitivity to the grammaticality of subject-verb agreement

4.1. Background

Morpho-phonologically speaking, consonant-initial verbs belonging to conjugation Class II (infinitive in *-ir*) and III (all others) are the only ones which still rely on largely unpredictable suffixes to mark person and number, e.g. *finir* 'finish': /i(l)fini/ 'he finishes', /i(l)finis/ 'they finish'; *prendre* 'take': /i(l)prã/ 'he takes', /i(l)prɛn/ 'they take'. The strongest argument that children acquiring French have – or do not – have knowledge of subject-verb agreement relies therefore on the suffixal type of agreement found with irregular verbs like *finir*, *prendre*, etc. and can be made independently of subject clitics.

In the experimental study reported below we focus on the feature of number, specifically the contrast between singular vs. plural. While 6-month-old infants reportedly possess the capacity to represent numerosity in visual-spatial displays (Xu, Spelke, & Goddard 2003), comprehension of number marking has not been established before age 2 in a preferential looking experiment using pseudo-words, and then only in the presence of redundant number marking, as in *There are some blickets*, *There is a blicket* (Kouider, Halberda, Wood, & Carey 2006).

Besides comprehension or matching of a verbal stimulus with a visually displayed stimulus, e.g. a scene involving two objects in Intermodal Preferential Looking experiments following Hirsh-Pasek & Golinkoff (1996) and production – spontaneous or elicited – a third ‘behavior’ has been identified in children below the age of 2, i.e. an ability to identify changes and express a sensitivity to grammatical vs. ungrammatical verbal stimuli in Headturn Preference Procedure (HPP) experiments (e.g. Santelmann & Jusczyk 1998). It is this kind of sensitivity we test below in the domain of subject-verb agreement.

4.2. Experimental procedure and stimuli

The classic version of the Headturn Preference Procedure (HPP) was used in the present study (Kemler Nelson et al. 1995). Each child was held on a caregiver’s lap. The caregiver was seated in a chair in the center of the 3-sided test booth equipped with a red light and a loudspeaker mounted at eye level on each of the side panels and a green light mounted on the center panel.

Each trial began with the green light on the center panel blinking until the child had oriented in that direction. Then, the center light was extinguished and the red light above the loudspeaker on one of the side panels began to flash. When the child made a turn of at least 30° in the direction of the loudspeaker, the stimulus for that trial began to play, the flashing red light remaining on for the entire duration of the trial. The methodological assumption is that when children prefer one kind of verbal stimuli over another kind, they will orient to the lights longer when that kind of stimuli is presented.

After two musical trials (used to train the child to the experimental set-up), a test phase started that consisted of two blocks; in each block, two grammatical and two ungrammatical passages were presented in randomized order. Each passage was played to completion or stopped immediately after the child failed to maintain the 30° head turn for 2 consecutive seconds. For each trial, the computer recorded online the child’s total orientation time towards the light.

The grammatical and ungrammatical passages were constructed as follows. Twelve irregular verbs were selected on the basis of being relatively frequent in French CDS and learned relatively early in development, as attested by previously collected data (Nazzi 2005; Nazzi, Floccia, Moquet & Butler 2009; Nazzi & New 2007). For each of these twelve verbs, short sentences were constructed consisting of a subject phrase (either the singular DP *le garçon* ‘the boy’, or the plural DP *les garçons* ‘the boys’), the verb in the appropriate agreement form, and a pseudo-object DP. For each verb, there were two sentences, one in the singular and one in the plural (e.g., for the verb *faire* ‘make’, *Le garçon fait le vippe* and *Les garçons font le vippe*). The twelve verbs used, together with their diverse phonological encoding of number, are displayed in Table 4. Note that the DP subject *garçon(s)* is always pronounced /garsõ/, regardless of number.

Each sentence was recorded twice by a female native speaker of French. Then, for each verb, four sentences were constructed by cross-splicing the original recordings: grammatical singular subject, grammatical plural subject, ungrammatical singular subject, ungrammatical plural subject. The twelve

sentences of each kind were then separated into two groups and used to create two six-sentence passages. All the passages were 13.5 s long. Each child was presented with only one passage of each of the four conditions. For further procedural details see Nazzi et al. (2009, in prep).

Sixteen monolingual children from diverse socio-economical backgrounds were tested in Paris at 14 months (11 girls, 5 boys), 18 months (5 girls, 11 boys), and 24 months (8 girls, 8 boys). Their data was included in the analysis.

4.3. Results and discussion

Mean orientation times (OTs) to the grammatical passages and to the ungrammatical passages were calculated for each child. A 3-way ANOVA with the main between-subject factors of age (14, 18, and 24 months) and condition (Subgroup 1 versus Subgroup 2) and the main within-subject factor of grammaticality (grammatical versus ungrammatical) was conducted. There was a significant grammaticality effect ($p = .001$) indicating that children tended to have longer orientation times to the grammatical passages than to the ungrammatical passages. However, this effect changed over development. The grammaticality effect was significant at both 18 months ($p = .004$; OTs to grammatical passages: 7.89 s; OTs to ungrammatical passages: 6.36 ms) and 24 months ($p = .012$; OTs to grammatical passages: 8.28 s; OTs to ungrammatical passages: 6.97 ms). However, the grammaticality effect failed to reach significance at 14 months ($p = .81$; OTs to grammatical passages: 7.23 s; OTs to ungrammatical passages: 7.12 ms).

Overall, the results show that 18- and 24-month-olds, but not 14-month-olds, are sensitive to grammaticality contrasts in *uncontroversial* cases of subject-verb agreement. For the earliest known verbs, 18-month-olds know that the plural form of verbs goes with *les* but not *le* and the singular form goes with *le* but not *les*. How general this knowledge is remains unclear but we can entertain (at least) four hypotheses (A-D), from least to greater amount of knowledge.

According to Hypothesis A, the pattern of behavior revealed in the HPP experiment is not evidence of any generalization process on the children's part. Rather, 18-month-olds have merely memorized associations between specific verb forms with *le*, others with *les*. However, further analysis of the experimental results and comparing them with properties of the adult input reveals a pattern incompatible with Hypothesis A. As shown in Table 4, stimuli verb forms are found in combination with a subject clitic but never with a full DP subject in our large sample of adult input (54,000 utterances). They hear far more singulars than plurals. There is no corresponding perceptual asymmetry between grammatical singular and plural sentences in the experimental results. In fact, the preference for grammatical over ungrammatical sentences is stronger with plural dependencies than with singular ones: Listening times are significantly longer for grammatical *les* dependencies than for ungrammatical *le/les* dependencies for both 18- and 24-month-olds; listening times are significantly longer for grammatical *le* dependencies only for 18-month-olds.

Table 4. CDS frequency of verbs used in HPP stimuli

Child's name & age range	Camille 1;3-2;1	Pierre 1;4-2;3	Pauline 1;2-2;6	Anne 1;10-2;6	Grégoire 1;9-2;5
Singular, with third person masculine subject clitic	1 veut 3 boit	1 veut 1 prend	1 veut 4 boit 2 prend 2 tient	13 veut 1 boit 1 prend 15 tient 2 mord	4 prend 1 tient
Plural, with third person masculine subject clitic	1 boivent	0	1 veulent	2 veulent 1 boivent 3 tiennent	0
Total, with third person masculine subject clitic	5	2	10	38	5
Singular, with subject DP	0		0		0
Plural, with subject DP	0		0		0
Total, with subject DP	0		0		0
<i>Total child-directed utterances</i>	1,875	1,558	8,873	35,480	6,430

The phonological properties of the verbs used in the HPP stimuli (see Table 5) suggest an alternative account in terms of phonological generalization (Hypothesis B).

Table 5. Phonology of verbs used in HPP study

Infinitive	Singular	Plural	Phonological contrast
<i>Faire</i> 'do, make'	/fe/	/fõ/	vowel change
<i>Boire</i> 'drink'	/bwa/	/bwav/	[v] consonant added in plural
<i>Lire</i> 'read'	/li/	/liz/	[z] consonant added in plural
<i>Dire</i> 'say'	/di/	/diz/	[z] consonant added in plural
<i>Conduire</i> 'drive'	/kõduʎi/	/kõduʎiz/	[z] consonant added in plural
<i>Finir</i> 'finish'	/fini/	/finis/	[s] consonant added in plural
<i>Mettre</i> 'put'	/me/	/mɛt/	[t] consonant added in plural
<i>Mordre</i> 'bite'	/mõr/	/mõrd/	[d] consonant added in plural
<i>Prendre</i> 'take'	/prã/	/prɛn/	vowel change + [n] added in plural
<i>Tenir</i> 'hold'	/tjĩ/	/tjɛn/	vowel change + [n] added in plural
<i>Pouvoir</i> 'can'	/pø/	/pœv/	vowel change + [v] added in plural
<i>Vouloir</i> 'want'	/vø/	/vœl/	vowel change + [l] added in plural

Given that 11 out of 12 verbs end in a consonant in the plural vs. vowel in the singular (except for *mordre*), 18-month-olds may have generalized dependencies to $[le - V_{\text{vowel}}]$ and $[les - V_{\text{consonant}}]$. Without further testing via a pseudo-verb experimental study it is impossible to eliminate Hypothesis B. At any rate the

results obtained suggest a previously undocumented degree of abstraction over variant morpho-phonological patterns in HPP studies (which have tended to focus on *regular* non-adjacent dependencies like *is V-ing* vs. **can V-ing* in English; see Santelmann & Jusczyk (1998) and Hoehle et al. (2006) on their German counterparts.)

A third hypothesis (Hypothesis C) is that 18-month-olds have in fact formed abstract categories (say I and II) devoid of semantic content like number and have also figured out that verbs and their DP subjects must match in category I vs. II. The experimental results are consistent with Hypothesis C.

A fourth hypothesis (Hypothesis D) is that in addition to forming abstract categories and figuring out that verbs and their DP subjects must match in category, 18-month-olds have semantic content of *singular* (Cat I) vs. *plural* (Cat II). However, comprehension of number instantiated by resyllabification (as in *il arrive* /i.la.riv/) ‘he arrives’ vs. *ils arrivent* /i(l).za.riv/ ‘they arrive’) is so far only found at 2;6 using a preferential looking study (Legendre et al. 2006; Legendre et al. 2009). That is, 2-year-olds have not yet been shown to be able to match verbal stimuli instantiating number via resyllabification with visual scenes displaying one or two children performing an action. Future studies will have to assess this possibility in simplified testing conditions.

While this experimental study does not itself address the status of subject clitics⁵, it nevertheless provides evidence that young children may already have representations of subject-verb agreement by 18 months of age. If so, they may be able to exploit these representations when they encounter subject clitics marking differences in number. How this could be extrapolated from a suffixal to a prefixal encoding remains to be seen. Nevertheless, the HPP evidence is consistent with spontaneous and grammatical production of subject clitics starting at age 1;8-1;9 (Section 3.1).

5. General Conclusions

We have argued that there is considerable converging evidence for an analysis of subject clitics as affixal agreement markers in SpFrench, both in adult and child speech. First, adult speech in the corpora described here does not have the properties which have led to an argumental analysis of subject clitics in Standard French. In particular, negative *ne* is always dropped in the presence of a subject clitic, questions are never

⁵ Unfortunately, a parallel HPP study of [subject clitic + verb] combinations is impossible for three main reasons: i) All pairings with consonant-initial verbs sound alike and grammatical (/i(l)dās/ corresponds to grammatical *il danse* (singular) or *ils dansent* (plural) as well as ungrammatical **ils danse* or **il dansent*), ii) All pairings with vowel-initial verbs sound grammatical: (/i(l)ariv/ corresponds either to grammatical *il arrive* (singular) or ungrammatical **il arrivent*; /i(l)zariv/ corresponds either to grammatical *ils arrivent* (plural) or ungrammatical **ils arrive*, iii) there are too few vowel-initial verbs with distinct suffixal morphology (e.g. *il a* ‘he has’ vs. *ils ont* ‘they have’) to provide an adequate number of stimuli of this type.

formed by inversion of the verb and a subject clitic, and subject clitics are systematically repeated in conjoined verb phrases in the colloquial spoken register.

Second, full subject DPs overwhelmingly appear together with a clitic copy. This is particularly true of CDS, the input to the child grammar. A prosodic analysis of adult speech supports a clitic doubling analysis with the full DP subject in canonical subject position over the alternative, traditional dislocation analysis.

Third, children acquiring French as their native language spontaneously produce error-free subject clitics very early on (below age 2) and, like adults, typically produce full DP subjects together with a clitic copy. In contrast, they spontaneously produce full DP and strong pronoun subjects in combination with root infinitives and in post-verbal position, two properties which are distinctively ungrammatical in the adult grammar.

We have proposed that their early but adult-like production of subject clitics is tied to their status of affixal agreement markers and made possible by the fact that children as young as 1;6 may already have abstract representations of an independent part of the French subject-verb agreement system.

In sum, French children are acquiring a null-subject language rather than the widely assumed overt-subject language. One important consequence is that the current formulation of Wexler's influential theory of optional root infinitives, designed to explain a correlation between the null-subject status of a language and the absence of an optional root infinitive stage during its acquisition, is being challenged. If, as we have argued, SpFrench is a null-subject language, the D-feature of AGR-S is [+ interpretable], it is not checked by the subject DP, therefore not constrained by the Unique Checking Constraint responsible for the appearance of root infinitives (whenever the D-feature of AGR-S is [-interpretable] it must be eliminated by checking by LF). While the proposal may be saved by relativizing the feature [+/- interpretable] to the suffixal/prefixal distinction wide-ranging predictions will need to be tested.

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