

Lexical and Syntactic Effects on Auxiliary Selection: Evidence from Child French

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1. Introduction

This paper investigates children’s knowledge of the auxiliary selection patterns in French. “Auxiliary selection” is the label used to describe the syntactic phenomenon found in a number of languages, where the auxiliary used with compound tenses is varyingly BE or HAVE. In such “split auxiliary selection” systems, each of the two auxiliaries appear with a subclass of verbs or constructions, but the precise rules determining when each auxiliary is used is subject to a great degree of cross-linguistic variation. Auxiliary selection systems may be uniform in selecting one auxiliary or the other, e.g. exclusively HAVE in English and Spanish versus exclusively BE in Slavic languages. Languages may also make auxiliary splits based on various criteria. For instance, in certain Italian dialects, the choice of auxiliary depends on the person or number of the subject; yet others make the split based on tense and/or mood (McFadden, 2007). A greater number of languages make a split based on aspects of the verbal domain, but we find finer-grained distinctions here, as well: whereas auxiliary selection in Dutch and German is determined on the basis of VP-level properties like telicity, French and Italian select auxiliaries based on the lexical properties of the verb alone. Another set of criteria is also at play in French and Italian: these languages have reflexive clitic constructions, which obligatorily take BE regardless of the specific verbal semantics.

This paper focuses on French, which makes the auxiliary selection split along two dimensions, one based on the lexical semantics of specific verbs, and one based on reflexivization. A small set of intransitive verbs, generally characterizable as unaccusative verbs, take the auxiliary *être* ‘to be’, and the rest take *avoir* ‘to have’. Henceforth, we refer to this type of alternations in French as involving “lexical” domain, as it is modulated by the lexical-semantics of individual verbs. While transitive verbs uniformly select *avoir*, in reflexive clitic constructions, i.e. constructions where a clitic coreferential with the subject appears is used as the object, *être* appears. The split between reflexive and non-reflexive transitive sentences is not conditioned by the lexical semantics of the verb, but rather seems

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to be a property of reflexive vs. non-reflexive structures. Therefore, we refer to this aspect of the split as the “syntactic” or “structural” domain.

1.1. Theoretical Perspective

An important theoretical question raised by the French system is whether it involves two fundamentally different kinds of alternations, or whether there is a unifying generalization that covers both the lexical and structural domains of auxiliary selection. Following Perlmutter’s Unaccusativity Hypothesis, both the lexical split and reflexive clitic constructions have been linked to a *syntactic* split based on the status of the surface subject (Perlmutter, 1978). More specifically, it has been argued that *être* is selected when the surface subject is the underlying object, in turn making the selection of *être* a diagnostic of unaccusative syntax. The advantage of such an approach is that auxiliary selection patterns in both the lexical and structural domains could be subsumed under the same “unaccusative” generalization. Lexical verbs that select *être* are simply those that do not project an external argument, forcing the internal argument to surface as the subject. Reflexive clitic constructions involve a process of valency-reduction that renders the external argument inaccessible, which forces the underlying object to occupy the surface subject position, much in the same way as with the lexical unaccusatives (Grimshaw, 1982; Kayne, 1993; Marantz, 1984; Sportiche, 1990, a.o.)

Despite the appeal of a unifying approach, the direct link between auxiliary selection and a particular sort of syntactic derivation has been challenged, with both lexical verbs and reflexive clitic constructions. With lexical verbs, a number of authors have argued that auxiliary selection is sensitive to various semantic properties of verbs or verb classes (Dowty, 1991; Levin and Rappaport Hovav, 1995; Randall, 2007; Shannon, 1995; Sorace, 2000; van Valin, 1990, a.o.). An influential approach due to Sorace (2000) proposes that verbal predicates fall into a hierarchically ordered set of semantic classes, or Auxiliary Selection Hierarchy (ASH), ranging from telic verbs of directed motion that more or less consistently select BE to atelic verbs of non-motional controlled processes that select HAVE. Verbs towards the center of the hierarchy (“variable” verbs) show variability across languages in terms of which auxiliary is selected, while those at the edges (“stable” verbs) are invariant. Recent analyses of reflexive clitic constructions have also challenged the unaccusativity-based approach, arguing instead that reflexive constructions are in fact unergatives, with the surface subject being an external argument (Doron and Labelle, 2011; Reinhart and Siloni, 2005; Sportiche, 2013, a.o.). In sum, a number of issues regarding auxiliary selection, in French and across languages, are areas of ongoing theoretical debate.

1.2. Developmental Perspective

The phenomenon of auxiliary selection also raises interesting developmental questions, which will be the central focus of this paper. Consider what a child

acquiring French has to learn before converging on the adult-like grammar of auxiliary selection in her language. Given the range of variation found in auxiliary selection systems across the world and the intricate details with which they can be instantiated, the child faces a non-trivial learning challenge. She must first establish that she is learning a split-auxiliary system. Next, she must learn the rules that govern the selection of the two different auxiliaries. She would need to learn that the French auxiliary selection cares about the lexical-semantic properties of verbs, with certain verbs consistently appearing with HAVE and others uniformly appearing with BE, and she would need to identify which verbs fall into which class. Moreover, she would need to identify that the criterion of verb-semantics does not apply to reflexive clitic constructions, which invariably select BE, even when their non-reflexive counterparts select HAVE. When and how does this learning take place? Is there a single generalization that unifies auxiliary selection along the two dimensions relevant for the split in French, which the learner can use to bootstrap into the particulars of the system, as might be predicted by the Unaccusativity Hypothesis? Or, are the two domains independent of each other, with part of the learning process involving identifying separately the scope of each domain?

The present paper seeks to investigate these questions by conducting an analysis of French-speaking children's spontaneous production of constructions involving auxiliary selection, in both lexical and structural domains. Both areas have received some attention in the developmental literature: Randall et al. (1992) has explored one French child's production of compound tenses with various intransitive verbs and Snyder et al. (1995) has looked at one French child's command of reflexive clitic constructions. However, to our knowledge, the question of how these two components of French auxiliary selection system relate to each other in development has not been seriously investigated. Our goal in this paper, therefore, is two-fold. First, we seek to provide a verification of the earlier findings using a larger sample of children. Second, we ask whether the emergence of competence in the two domains of French auxiliary selection is concurrent, i.e. is the auxiliary selection patterns of French learned as a single system encompassing both lexical verbs and reflexive clitics, or as two independent systems?

2. Previous developmental work

In the lexical domain, Randall et al. (1992) (as cited in Snyder et al. 1995) examined the corpus of one French child and found over-extension of HAVE to BE, but that this had resolved by age 4, when the child had adult-like competence. In later work, they conducted a novel verb study eliciting productions of auxiliaries in Dutch and German children and adults (Randall et al., 2004; van Hout et al., 1993). Compared to adults, children overextended HAVE to novel verbs where adults selected BE. They used this difference to argue that the HAVE auxiliary is the default in acquisition, which children fall back on in the absence of strong cues otherwise.

In the syntactic domain, Snyder et al. (1995) conducted corpus work on French and Italian children's acquisition of auxiliary selection. They examined the auxiliary selection for reflexive and non-reflexive clitic constructions of one French child and three Italian children. The children were overwhelmingly correct in using *être* 'to be' for the reflexive clitic constructions and *avoir* 'to have' for the non-reflexives, and all mistakes were overextensions of *avoir* to reflexive clitics¹. Snyder et al. (1995) use this as evidence of early knowledge of A-chains and unaccusativity; while this claim is now controversial; their work still suggests that auxiliary selection for clitics is early and accurate.

Thus, while prior developmental work in French has not been extensive, the research that has been done in French and other auxiliary selection languages has found that performance on lexical verb is generally accurate, but some overgeneralization of HAVE occurs. On clitic constructions, children are found to make very few errors across the board.

3. Questions and Methods

Our goal in this present research is to expand upon previous findings by investigating whether the patterns hold in a larger sample of children (recall that prior studies each look at samples from just one child). Prior research has also examined each domain of auxiliary selection separately, looking exclusively either at lexical verbs, or reflexive clitics. The question remains as to whether the learner acquires the patterns concurrently, as a single system, or whether they posit separate rules for auxiliary selection in each of two separate domains. By examining the corpora of a larger group of French children for auxiliary selection in both paradigms, we seek to answer this question.

Preliminary research on auxiliary selection showed that the earliest occurrences of auxiliaries were around 2;0, so only corpora from age 1;6 or later were examined fully. When selecting corpora to use, we included all longitudinal corpora for French children in the CHILDES database that extended past 2;6 (MacWhinney, 2000). This left us with 17 children: Marie (Hamann et al., 2003); Clara (Rose, 2000); Phillipe (Suppes et al., 1973); Anais, Marie, Marilyn, and Nathan (Demuth and Tremblay, 2008); Anae, Antoine, Leonard, Madeline, and Theophile (Leroy et al., 2009); Pauline (Bassano and Maillochon, 1994); Adrien (Yamaguchi, 2012); and Lea, Anne, and Max (Plunkett, 2002). The duration and frequency of recording varied from child to child, so some children supplied more data than others.

Searches were done using the *combo* command. Utterances were included if they included an auxiliary and an identifiable past participle, but a subject

¹Snyder and Hyams (2015) extended their previous work to a few more children, but this later study focused exclusively on formally reflexive clitic constructions, a subset of *se* constructions that are semantic middles. While this research is clearly connected, our current study is interested in reflexive clitic constructions as a whole, including true semantic reflexives.

was not required. Tokens were excluded if the relevant parts (auxiliary and past participle) were marked as dubious on the transcript. Memorized routines such as songs or reading, imitations (including of adult corrections), and exact or substrings repetitions were all excluded. Clitic productions were searched for by the combination of clitic and auxiliary, while lexical items were searched for by their past participle. Searches were conducted for all clitic-auxiliary combinations for reflexive clitics and, for comparison, object clitics. Searches were conducted on all lexical verbs that take BE in adult French, as well as selected HAVE verbs. A preliminary frequency analysis of verbs in the child productions was conducted using the *freq* command, and the results were used to choose which unergative and transitive verbs to search for. Unergative verbs were searched for in order of frequency, until the point when *combo* searches consistently returned fewer than four tokens per verb; this should have included nearly all unergatives with appreciable data. Transitive verbs do not display interesting auxiliary selection patterns, so we only conducted *combo* searches for eleven of the more frequent transitive verbs, to serve as a baseline comparison for the intransitive verbs.

4. Results

4.1. Lexical Verbs

We turn first to children's auxiliary selection patterns with lexical verbs. Within this domain, we were interested in whether children reach mastery in auxiliary selection with certain verbs or verb classes before others. One possibility, based on previous findings from van Hout et al. (1993), is that children are adult-like in their use of *avoir*-selecting verbs earlier than *être*-selecting verbs, perhaps suggesting a HAVE-bias in the development of auxiliary selection. Sorace's Auxiliary Selection Hierarchy suggests another possibility that ties the cross-linguistic variability in auxiliary selection to the developmental path (Sorace, 2000). Children may converge on adult-like auxiliary selection patterns with "stable" HAVE and BE selecting verbs earlier than the "variable" ones.

Results from our analysis are summarized in Table 1. Children were overwhelmingly adult-like in their selection of auxiliaries for different verb types, though the errors were greater for the intransitives than for the transitives. Of over 1500 total productions of compound tenses with transitives, children made no auxiliary selection errors. That is, children consistently selected *avoir* 'have' for all transitives, as required in the adult grammar. Children made errors in both directions with intransitives, occasionally using *être* with *avoir*-selecting verbs and vice versa. Most of the errors were made at younger ages, with children reaching ceiling-level accuracy rates by around 3 years of age, as shown in Figure 1.

We also asked whether children's accuracy rates varied between classes of verbs on Sorace's Auxiliary Selection Hierarchy (Sorace, 2000). Based on the hierarchy, we categorized verbs into "Stable-HAVE" (Motional and non-motional controlled process verbs), "Stable-BE" (Change-of-location and Change-of-state verbs) and "Variable" (Continuation-of-preexisting state, existence, and uncon-

Table 1: Lexical Productions by Verb Type

Verb type	Mean Correct (SD)	Productions
Transitives	1(0)	1500+
intransitives (have)	.92(.27)	246
intransitives (be)	.90 (.28)	744

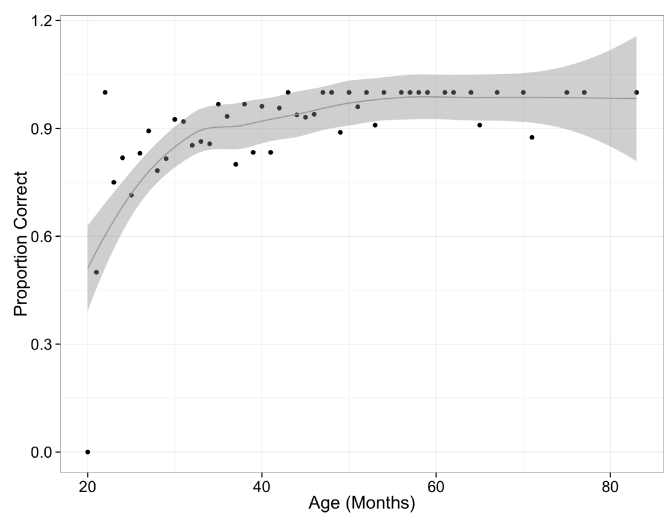


Figure 1: Proportion of adult-like auxiliary selection for intransitives. LOESS curves represent the effect of Age on proportion correct; shaded area represents 95% confidence intervals.

trolled process verbs). The expectation was that variable verbs, which are cross-linguistically less stable in terms of auxiliary selection, are also more likely to elicit errors. This expectation is not borne out in our results, summarized in Table 2.

To see whether these patterns are significant, we conducted a mixed-effects logistic regression, taking correct choice of auxiliary (correct/incorrect) as the binary dependent measure. Verb class (HAVE-selecting vs. BE-selecting), as well as classification of the verb in Sorace’s Auxiliary Selection Hierarchy, were included as predictor variables. We included Age as a covariate, to see whether the patterns of increased accuracy we observe across development is significant.² Comparisons to models not including the relevant factor revealed that including Verb Class and ASH-classification as predictors did not significantly improve model fit. On the

²The full model included correlated random slopes for the relatedness of Child and Age. A maximally specified model that included correlated random slopes of Verb by Child did not reach convergence.

Table 2: Lexical Productions by ASH-Classification

Classification	Mean Correct (SD)	Productions
Stable-HAVE	.89(.31)	153
Stable-BE	.91(.29)	750
Variable	.98 (.15)	87

other hand, Age was found to significantly improve model fit ($\chi^2 = 12.428$, $p < .001$).

The relationship with age would be consistent with a couple of different learning models. It is consistent with a verb-by-verb learning model, where children learn the auxiliary selection pattern with each verb independently, getting better over time. However, a closer look at auxiliary patterns with different intransitives shows an interesting trend: some verbs are produced earlier and prone to errors; others appear in production later, but are error-free from the start. Consider, for illustration, error patterns from the child, Phillipe. Phillipe first produces *aller* ‘to go’ at 2;2, shortly after his corpus begins. He makes intermittent errors on *aller* up until 2;10, after which he uses it frequently and correctly. Another early telic verb of motion is *arriver* ‘to arrive’ which Phillipe produces starting at age 2;2 and makes errors on until 2;8. However, Phillipe acquires new telic verbs of motion error-free towards the end of this stage. He starts using *rentrer* ‘to re-enter’ at age 2;8 and never makes an error with it, and he starts using *venir* ‘to come’ at age 2;8 and never makes an error with it. This points to a developmental trajectory where children gradually converge on generalizations about which classes of verbs take which auxiliary. Verbs that are acquired during this learning period are susceptible to errors, but verbs learned later on are adult-like from the outset.

4.2. Reflexive Clitic Constructions

Children’s production of compound tenses with various lexical verbs suggest that after a brief and early period of learning, they converge on the adult auxiliary selection system. We now turn to auxiliary selection with reflexive clitic constructions and ask whether children show a similar developmental trajectory in this domain. If not, do children achieve mastery of auxiliary selection in this domain earlier or later than in the lexical domain?

Table 3 summarizes our findings from children’s production of reflexive clitic constructions. Children consistently selected *être* with the third-person reflexive clitic *se*, but oscillated between *être* and *avoir* with first and second person clitics.³ The contrast with *se* is the starkest with 1st person clitic *me*, with *avoir* being selected at least half of the time. Because data on 2nd person were sparse and

³Note that children’s auxiliary selection patterns with non-reflexive clitics during the same period were 100% adult-like.

contributed by a small subset of the children examined, we focus on children’s 1st and 3rd person clitics in the remainder of the analysis.

Table 3: Reflexive Productions by Person

Clitic	Mean Correct (SD)	Productions
Se	1(0)	138
Me	.37(.49)	59
Te	.93(.24)	17

Figure 2 displays mean rates of accuracy at each point in time with 1st and 3rd person clitics. The developmental trajectories for both differ from what we saw with lexical verbs. Auxiliary selection with 3rd person clitics is adult-like from the outset, and thus, we see no period of learning. On the other hand, children make errors with 1st person clitics throughout the period of time examined, again, with no clear indication of learning during this period. We constructed a mixed-effects logistic regression model to examine whether children’s accuracy improves over time.⁴ The analysis revealed no effect on age on children’s auxiliary selection behavior over time.

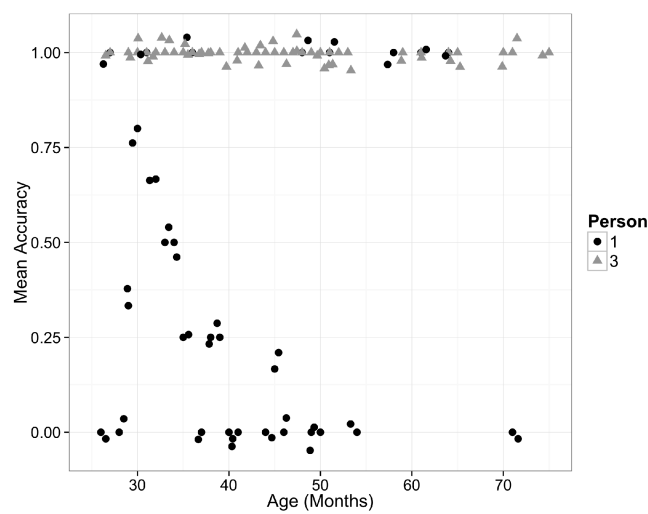


Figure 2: Proportion of adult-like auxiliary selection on reflexive clitic constructions as a function of Age.

⁴The model predicted the effect of Age on Correct choice of auxiliary. Random slopes were included for the relatedness of Age and Child and random intercepts were included for Verb. Our sample was not large enough to specify a more complex model that included Person (1st vs. 3rd) as an additional factor. The model also did not include Verb Class or ASH-classification as fixed factors, since reflexive clitic constructions uniformly involved transitive verbs.

An examination of individual auxiliary selection patterns with the two clitics corroborate these general trends, while also illustrating where children may vary (Figure 3). While all children show early mastery of *se*, children’s use of *me* varies. In Figure 3, we can see that Phillipe has early correct uses of *me*, followed by incorrect uses; Madeline shows learning, with early errors followed by later correct productions; and Lea and Theophile show periods where errors and correct productions co-occur.

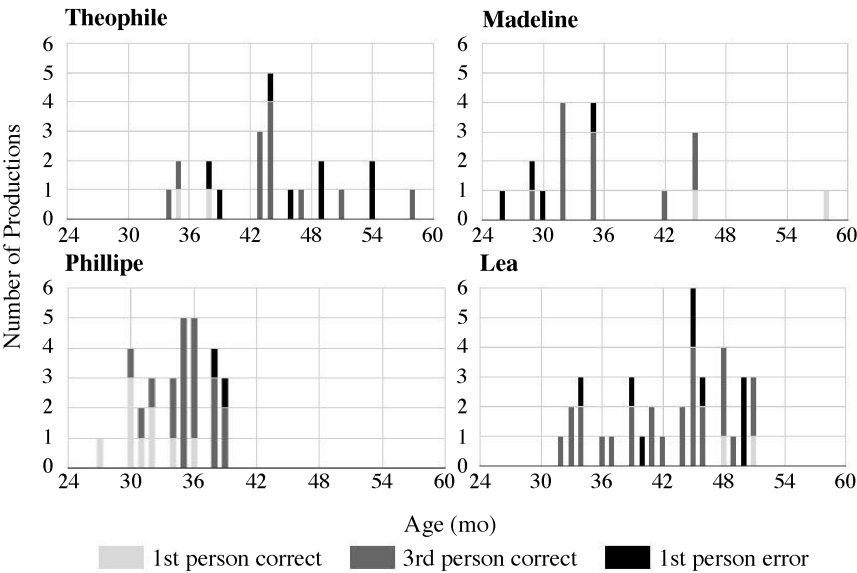


Figure 3: Individual Productions by Person

4.3. Relationship between the two subdomains

The discussion in the previous subsections suggests that overall, children’s auxiliary selection behavior with lexical verbs and reflexive clitic constructions do not seem to show parallel developmental trajectories. Children were not entirely error-free in either domain, but errors with lexical verbs subsided by 3 years of age, whereas 1st person reflexive-clitic errors persist until at least age 6 in some children. It is nevertheless possible that during earlier stages of development, the errors in the two domains are related. To explore this possibility, we conducted a regression analysis asking whether children’s performance in one domain predicted their performance on the other at any point in development.

Because not all children’s productions included reflexive clitic constructions of the relevant sort, we analyzed only a subset of the data. We included in the analysis all children whose data contained at least 20 observations of both reflexive clitic constructions and intransitives. This left us with six children (Phillipe (Suppes

et al., 1973); Anae, Antoine, Madeline, and Theophile (Leroy et al., 2009); Lea (Plunkett, 2002)) and a total of 873 observations. We constructed two linear mixed-effects regression models, which took participants' overall performance in one domain (lexical verbs or reflexive clitic constructions) as the response variable and performance in the other domain as a fixed effect, along with Age as a fixed factor interacting with it.⁵ In neither case did we find a relationship between the two domains: Performance on reflexives was not predicted by performance on lexical verbs ($\chi^2 = 0.6928$, $p = .41$); similarly, performance on lexical verbs was not predicted by that on reflexives ($\chi^2 = 0.281$, $p = 0.59$).

5. Discussion

The present study investigated children's knowledge of two facets of the French auxiliary selection system, with a special focus on the question of how they relate in development. We found that with lexical verbs, children are overwhelmingly correct on the transitive verbs, and show a fairly rapid learning trajectory for intransitive verbs. Though the learning trajectory matches the results of previous work, we did not find the same directionality (i.e. asymmetric overextension of HAVE) to the errors (Randall et al., 2004; van Hout et al., 1993): while we found numerically more errors that overextended HAVE to BE, the accuracy rates for BE-intransitives and HAVE-intransitives were not significantly different. Within this domain, we find only a performance split between transitives and intransitives, and a strong effect of age. Our data also do not straightforwardly support predictions made for acquisition by certain semantic accounts of auxiliary selection, e.g. Sorace's (2000) Auxiliary Selection Hierarchy: aspects of the lexical semantics of intransitives relevant for the hierarchy did not turn out to be a predictor of how early children master auxiliary selection for individual verbs.

The learning trajectory for lexical verbs contrasts with the results for reflexive clitic constructions. In the reflexive clitic paradigm, we found a sharp division between performance on the 3rd person clitic *se* and the 1st person clitic *me*. Our results on the 3rd person clitics were in accordance with the previous results on this topic (Snyder et al., 1995). Children's complete and early competence on *se* constructions contrasts with their early errors for lexical items, perhaps indicative of the strongly rule-based nature of this system which is more compatible with one-shot learning. On the other hand, our results for 1st person differ dramatically, with at-chance performance that does not seem to improve with age, at least within the age range available in the corpora. Snyder et al. (1995) did not find this discrepancy as the child they looked at (Phillipe) happens to be one of the children

⁵The form of the model specification in common *lmer* syntax is as follows:

(1) ReflexiveAccuracy ~ LexicalAccuracy * Age + (Age | Child)
 LexicalAccuracy ~ ReflexiveAccuracy * Age + (Age | Child)

with better performance on 1st person (though his last two 1st person productions are erroneous).⁶

This interesting and robust error pattern in 1st person clitic constructions is not predicted by the French system, which is not a person split system. Nor is the pattern predicted by the person-based splits in related languages (e.g. Italian dialects), as these splits tend go the opposite direction, with 1st person consistently taking BE (McFadden, 2007). In the absence of explanations from the auxiliary selection system, we look to the French clitic system for a possible explanation. A potentially relevant aspect of the French pronominal system is that it shows syncretism between reflexive and non-reflexive object clitics in the 1st and 2nd person, but not the 3rd person. This pattern of 1st and 2nd person syncretism is not limited to French, but rather, is a cross-linguistically robust pattern, leading some researchers to argue against treating it as merely accidental homophony (Burzio, 1989, 1991; Reuland, 2011; Safir, 2004). Rather, paradigms as in French may involve only one genuine reflexive, the 3rd person reflexive *se*. 1st and 2nd person object pronominal clitics serve “double duty”, appearing in both non-reflexive construction and reflexive constructions, getting locally bound in the latter.⁷ Crucially, in adult grammar, pronominal clitics in reflexive constructions participate in the same valency-reduction operation as true reflexives, triggering the selection of *être* rather than *avoir*, which is otherwise selected with these clitics. One possibility is that children may know all they need to know about the structural links between reflexivization and valency-reduction, yet not know that 1st and 2nd person object clitics must behave syntactically like the true reflexive, when and only when they are coreferential with the subject. This view leads to a possible explanation for what children are doing when they use *avoir* in 1st person – they are adopting a transitive syntax, consistent with the use of an object clitic.

A few questions about this proposal remain. A potential issue with this theory is the results from 2nd person clitics. While the contrast between 1st and 3rd person is robust, 2nd person has an intermediate error rate and fewer data points, making it hard to come to conclusions about what the 2nd person pattern really is. The view laid out above makes a strong prediction that 1st and 2nd person should pattern together, in contrast to 3rd person, but our data set is too small to thoroughly test this. More production data on auxiliary selection patterns is needed to investigate 2nd person and determine how and when convergence to the adult-like system eventually occurs. Yet another prediction made by this proposal is that we should find similar patterns of errors between 2 and 6 years of age in languages like Italian, which select BE in reflexive constructions and show syncretism between object and reflexive clitics in 1st/2nd person. A final remaining issue concerns children’s

⁶Snyder and Hyams (2015) does not find this 1st/3rd error pattern as FRCCs are limited to 3rd person productions.

⁷This hypothesis requires a revision of Principle B of binding theory, which states that pronouns cannot be locally bound. Some such modifications can be found in e.g. Burzio (1991), Safir (2004) and Reuland (2011).

optionality in auxiliary selection in the 1st person. Children seemingly accept either *être* or *avoir* in reflexive constructions with the 1st person, suggesting that they know that the relevant object clitic *can* undergo the same syntactic operations as genuine reflexives. On the above hypothesis, auxiliary selection is the main cue that 1st and 2nd person pronominal clitics in reflexive clitic constructions trigger valency reduction. However, children's non-adult productions, which persist even at around age 6, suggest that they may be ignoring the most salient cue. This raises the question of how the child moves from her more flexible grammar to a more restricted one, in which *avoir* is altogether disallowed in reflexive constructions. The present study takes the first steps in providing a description of a non-adult stage in the development of auxiliary selection, but an important goal for future work is to provide a model of the kind of mechanisms the child uses to abandon this stage, and on the basis on what kind of evidence.

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