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# Language evaluation and use during early childhood: Adhesion to social norms or integration of environmental regularities?

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*Abstract*

Whether social uses of language, in concert with their acquisition, are driven by the awareness of the social value assigned to linguistic variants remains unanswered. The present study examines how 185 French native speakers, aged from 2 to 6 years from different social backgrounds, produce and evaluate a well-known French phonological alternation, the *liaison*: obligatory liaisons, which are categorical and do not vary sociolinguistically for adults, and variable liaisons, which are a sociolinguistic variable and are more frequently produced by higher-class adults. Different developmental and social patterns were found for obligatory and variable liaisons. Children's productions of obligatory liaisons were related to their judgments when 3–4 years old, regardless of the children's social backgrounds. However, a developmental gap was observed between higher- and lower-class children that appeared earlier in production than in evaluation. For variable liaisons, children's productions were related to their judgments, irrespective of their social backgrounds, at 4–5 years. Social differences appeared in both children's productions and judgments a year later. Although the ability to evaluate different linguistic forms emerges at an early developmental stage, the awareness of the social value of the variants does not seem to precede the ability to select the standard varieties in formal situations.

## 1. Introduction

Socialization, including social uses of language, has long been considered the process by which children progressively learn to adhere to social norms, namely socially shared rules of appropriate and expected behavior. According to this acceptance, profoundly marked by sociology, socialization was first viewed as a unilateral process that imposes social bounds on individuals, thus leading to a certain homogeneity among group members (Allès-Jardel et al. 2003). Norms can be observed not only in actual language use, but also in its evaluation, that is, listeners' perceptions of and attitudes towards language (Kauhanen 2006). However, whether social uses of language, as well as their acquisition, are guided by norms and the social value assigned to language varieties remain a matter of debate.

Language is inherently variable at several structural levels (e.g., phonology, morphology, and syntax in particular). Variability in language is not unstructured or random, but is instead socially structured along various dimensions (Labov 1972, 2001; Coupland and Jaworski 1997 for a review). For example, variations correlate with speakers' socio-demographic characteristics (e.g., socio-economic status, gender, age…), situational contexts of speech (e.g., formal versus informal situations, addressees, topics…) and speakers' integration in social networks (Milroy and Milroy 1998). Given within-language variations, the use of particular variants can be evaluated as either socially prestigious or socially stigmatized (Wolfram 1998).

Overt prestige norms assign a positive value to standard variants (Labov 1972, 2001). These widespread norms are overtly perpetuated/imposed by standardization agents in society, namely institutions and/or higher status groups though education, literacy, or the media for instance. The linguistic consequence of standardization is a tendency to structural uniformity in a language, namely variability is resisted and suppressed by stigmatization of nonstandard variants (Milroy and Milroy 1998). However, nonstandard or low-status varieties can persist. Speakers' behavior does not necessarily reflect their evaluation. The fact that speakers may produce variants they evaluate negatively (Labov 1972) raises the puzzling question of why speakers use variants they know they should not. Overt prestige norms are also balanced by a set of covert norms, which confer a positive value on nonstandard forms (Trudgill 1975). Whereas standard variants are associated with social prestige, higher education and competence, nonstandard variants are related to social skills, attractiveness, integrity and solidarity, especially towards the speaker's native group (Lafontaine 1986; Trudgill 1975). Therefore, while overt prestige norms constitute institutional pressures to

conform to standard or legitimized language varieties, covert norms represent an informal pressure for nonstandard varieties and vernacular maintenance (Milroy and Milroy 1998). Social evaluations of language varieties and styles are thus considered important factors in linguistic maintenance and shift and have been extensively studied in adults and adolescents (Garrett et al. 1999). However, questions concerning when young children begin to perceive and to assign a social value to language varieties and, whether and how their linguistic behavior is related to their linguistic knowledge and attitudes raise important issues that have been notably neglected.

A first attempt to integrate developmental accounts of sociolinguistic variation (Labov 1964) considered that the tendency to limit the use of nonstandard variants in formal situations did not appear until adolescence, when young speakers, exposed to a wide variety of uses, discovered the social meaning of linguistic forms and showed patterns of evaluation similar to those of adults. The awareness of the social value of variants was assumed to appear late in language learning and to precede the ability to adjust language registers across situational contexts of speech.

Empirical evidence concerning phonological variations indicates the emergence of adult-like evaluations at earlier ages. Various reports measured young listeners' evaluations, such as ratings of speakers' socioeconomic status or occupational suitability, self-evaluations, and judgments of acceptability of sets of varieties with or without providing explicit choice. When they are 10–12 years old, children are able to acknowledge the social prestige of standard forms whatever their social background (French, 6–7 and 10–12 years old: Chevrot et al. 2000; Belgian French, 8 to 18 years old: Lafontaine 1986; Australian English, 10 years old: Martino 1982), as adults do (Labov 1972). Nevertheless, positive evaluations of standard forms appear earlier in higher-class than in lower-class children, suggesting a developmental gap among children according to their social background (Labov 1964, 1972; Lafontaine 1986). Interestingly, the tendency, evidenced in adults (Trudgill 1975), to prefer nonstandard varieties that are commonly used in their native group appears at the same age as the awareness of the social prestige of standard forms (Martino 1982). Positive evaluations of standard forms seem to appear even earlier, when children are 8 years old, when regional dialectal utterances are opposed to the standard language (Italian, 6 to 10 years old: Cremona and Bates 1977). This literature indicates that children under 8 to 10 years old do not seem capable of perceiving the social value of linguistic varieties or to verbalize explicit judgments concerning varieties that conform to those of adults. However, studies exploring children's perception and evaluation of linguistic varieties during early childhood are notably lacking.

Nevertheless, children do acquire socially influenced variable patterns and demonstrate stylistic variation from the very start of language acquisition (Roberts 2002; Foulkes and Docherty 2006, for reviews). Increasing evidence shows that some aspects of the structured variation found in adult speech are evident in the speech of 3-year-old children, and that children may begin the sociolinguistic use of variation at that time (Diaz-Campos 2005; Patterson 1992; Roberts 1994; Smith et al. 2007). The situational context of speech (i.e., conversation, storytelling, pictures naming tasks), the addressee, and the topic, all modulate children's use of standard variants (Patterson 1992: American English /ιvγ/ in 4, 6 and 8 year-olds). In particular, children use nonstandard or local variants more frequently in informal than in formal situations (Diaz-Campos 2005: Venezuelan Spanish, intervocalic /δ/ in 3;6 to 5;11 year-olds), with another child than with an adult (Roberts 1994, 1997: American English /-ιvγ/, but not in /-τ,δ/ in 3;2 to 4;11), and in routine and play activities than in teaching and discipline-oriented exchanges with their mother (Smith et al. 2007: Scottish English "hoose" variable in 2;10 to 3;6). Children's adjustments to the situational context seem to be even more precocious, as soon as 2, in syntactic switching (Ainsworth-Vaugh 1990) or in code-switching in a bilingual context (Lanza 1992; Youssef 1991). Thus, stylistic skills are likely to precede rather than to follow the evaluation of linguistic varieties and the ability to discuss the relationships among variants, social groups and situations (Patterson 1992), contrary to the developmental script proposed previously (Labov 1964).

Therefore, it appears to be time to delve more deeply into young children's knowledge of variation and to re-examine the relationship between children's production and evaluation of language varieties during early language development that, to our knowledge, has not yet been investigated. In this perspective, we focused on how young children produce and evaluate a frequent phonological alternation in French: the *liaison*, which has a heuristic value as it is a strong indicator of the frequency effect (i.e., liaisons occur to a greater extent in high-frequency word combinations than in low-frequency combinations) (Bybee and Hopper 2001) and as it reveals interactions between various structural levels of language (i.e., phonology, morphology, syntax, lexicon, sociolinguistic variation and literacy) (Chevrot et al. 2005a).

A *liaison* consists of the production of a consonant between two words (word1 and word2) in connected speech. For this consonant to appear, word2 must begin with a vowel when it is pronounced in isolation. For instance, when the French determiner *les* ('the') is combined with the noun *ours* ('bear') in fluent speech, the sequence is pronounced [λεζυ®σ]. Thus, the liaison consonant /z/ appears when the two words *les* and *ours* are combined. The

most frequent liaison consonants are the apicals /n/, /z/ and /t/ (99.7% of realized liaisons) (Boë and Tubach 1992). Word1 determines which of these consonants appears. For example, the word1 *un* (‘a’/ ‘one’) activates the liaison consonant /n/, the word1 *deux* (‘two’) activates the liaison consonant /z/ and the word1 *petit* (‘little’) activates the liaison consonant /t/.

Liaison contexts are divided into two categories: contexts in which the liaison is obligatory and contexts in which the liaison is variable. Our study is based on Durand and Lyche’s (2008) classification that is supported by previous results (Booij and De Jong 1987). By observing 100 French speakers from different geographical areas and social backgrounds, Durand and Lyche found that liaisons appear obligatory, that is have a 100% production rate, only after preverbal clitics (*ils arrivent* [ιλζα®ιϖ] ‘they come/are coming’), after determiners (*un arbre* [↵)να®β®] ‘a/one tree’), in verb + clitic inversion (*Comment dit-on ?* [κομΑ)διτ ))] ‘how do we say?’), as well as in some frozen expressions (*tout-à-fait* [τυταφΕ] ‘quite’). Other contexts appear variable, i.e. their realization rates are less than 100%. For example, between an adjective and a noun, a liaison consonant may or may not be produced by adult speakers: *gros éléphant* ‘big elephant’ is pronounced either [γ®οζελεφΑ)] with a /z/ liaison or [γ®οελεφΑ)] without any liaison.

Previous studies showed that variable liaisons are a stratified sociolinguistic variable in adults. The use of the standard variant, i.e. the realization of the liaison, varies with speech style, its production rates being higher in formal situations (Ågren 1973; Booij and De Jong 1987; Lucci 1983; Moisset 2000), as well as with the speaker’s socio-demographic characteristics. Notably, all the studies investigating the effect of the speaker’s socio-economic status found that people with higher status realize more variable liaisons than do people with lower status (Ashby 1981; Booij and De Jong 1987; De Jong 1991, 1994). For example, production rates of variable liaisons differ largely between upper-middle class (61.6%) and lower-working class (29.6%) (De Jong 1991), and a regular stratification of rates emerges when speakers are divided into five socio-economic groups (Booij and De Jong 1987). Variable liaisons are thus a well-known sociolinguistic variable in French adult speakers, but little is known about their production by children who are yet exposed to a variable input from the very beginning of their language acquisition.

Therefore, our study aimed to investigate the developmental dynamics of the relationship between evaluation and production of both obligatory and variable liaisons in 2 to 6 year-old children, from two contrasting social backgrounds. First, using the matched guise technique (Lambert et al. 1960), an approach based on eliciting listeners’ reactions to sets of linguistic

performances that differ in specific and controlled ways (Campbell-Kibler 2009), we investigated the abilities of children to perceive and to evaluate phonological varieties. Second, we developed refined statistical devices to evaluate the existence and magnitude of the relationship between children's evaluation and production, that is, whether children who evaluate correct or standard varieties positively, produce them more frequently, and to evaluate their modifications in relation to time. When analyzed together, the judgment and the production tasks should allow us to compare the developmental courses of categorical and variable linguistic forms, that is, to assess whether variable forms are evidenced from the start of the acquisition process at the same time as categorical forms or later, and how the children's socio-economic status (SES) influences the developmental pathway of their acquisitions.

## 2. Methods

### 2.1 *Participants*

Participants were 185 children (92 boys and 93 girls). They were French native speakers, from 2;3 to 6;0 years old (mean age ± SD = 50.7 ± 11.9 months) from two contrasting socio-economic groups (upper-SES versus lower-SES). The composition of our sample is given in Table 1.

Table 1. *Age and SES composition of the sample (M: mean age in months, SD: standard deviation, n: number of children)*

| | 2–3 years old | | | 3–4 years old | | | 4–5 years old | | | 5–6 years old | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | SD | n | M | SD | n | M | SD | n | M | SD | n |
| Upper-SES | 35.3 | 2.4 | 21 | 43.1 | 2.6 | 25 | 54.4 | 3.5 | 27 | 66.7 | 3.5 | 25 |
| Lower-SES | 34.3 | 2.9 | 17 | 43.5 | 2.8 | 20 | 54.0 | 3.1 | 27 | 65.9 | 3.2 | 23 |
| Overall | 34.9 | 2.6 | 38 | 43.3 | 2.7 | 45 | 54.2 | 3.3 | 54 | 66.3 | 3.4 | 48 |

The children were selected in relation to both parents' occupations. This information was available for consultation at the children's schools after receiving the schools' and the parents' permissions. Following the INSEE[1] nomenclature (Desrosières and Thévenot 1988),

children with both parents in group 3 (e.g., teachers and scientific professions, senior managers, engineers) were considered to belong to the upper-SES group, and children with both parents in group 6 (e.g., industrial, artisanal, agricultural workers and drivers) were classified in the lower-SES group. When one of the parents was unemployed (i.e., did not work outside the household), only the occupation of the other working parent was taken into consideration.

Following a cross-sectional design, children were divided into four age groups: 2–3, 3–4, 4–5 and 5–6 years old (Table 1). These age groups were not chosen arbitrarily, but instead correspond to the four grades in French nursery schools. Indeed, all the children in our sample attended nursery school, except three 2-year-old children. Note that in France[2], nearly all 3 year-olds, but only 20.9% of 2-year-olds, attend nursery school. Each age group included approximately equal numbers of upper- and lower-SES children. Statistical analysis evidenced no interaction between SES and age (two-way ANOVA, SES: $F_{1, 177} = 1.01$, $p > 0.30$, Age x SES: $F_{3, 177} = 0.48$, $p > 0.60$).

## 2.2 *Procedure*

Two verbal tasks were devised to induce children to evaluate and to produce obligatory or variable liaisons. These experimental tasks were conducted individually at school, except in the case of three of the youngest children who were recorded in their homes. In all cases, the experimenter was not familiar with the children. This design was chosen so as to place children in a formal situation.

### 2.2.1 *Linguistic material.*

In order to compare children's performances in judgment and production tasks, the same linguistic material was used in both tasks. Children were asked to evaluate and to produce sequences of two words (word1-word2) that induce either an obligatory or a variable liaison.

Word2s were six nouns starting with a vowel: *ours, arbre, avion, escargot, éléphant, ordinateur* (respectively, *'bear, tree, plane, snail, elephant, computer'*). An important selection criterion was that these nouns should be familiar to young children. Previous studies showed that 2 to 6 year-old children accurately identified and named these objects in picture tasks at a rate between 85% and 100% (Cannard et al. 2006; Dugua 2002). As previous studies showed that children's liaison errors increased with the syllabic length of word2s

(Wauquier-Gravelines 2005), the syllabic length of words was also controlled, with the same number of short (*ours*, *arbre*, *avion*) and long words (*escargot*, *éléphant*, *ordinateur*).

These word2s were combined with two types of word1s in order to elicit the production of the two types of liaisons. According to previous studies involving adults (Booij and De Jong 1987; Durand and Lyche 2008), a liaison following a determiner is obligatory, whereas a liaison following a prenominal adjective is variable. Thus, for obligatory liaisons, word1s were two determiners: *un* and *deux* (respectively 'a/one' and 'two'), which induce respectively liaisons with /n/ and /z/. For variable liaisons, word1s were two prenominal adjectives: *petit* and *gros* ('small' and 'big') that induce liaisons with /t/ and /z/ respectively.

2.2.2 *Judgment task: matched guise.* Children were asked to determine which of two word1-word2 sequences they heard was correct. The two linguistic forms were produced by the experimenter who made two puppets talk. Children had to show which puppet they guessed was speaking correctly (Table 2). For obligatory liaisons, one puppet produced a sequence of the type determiner + noun with the correct liaison, that is with the appropriate consonant (e.g., [↵)νυ®σ] / '*a bear'*). The other puppet produced the sequence with an inappropriate liaison consonant (e.g., [↵)ζυ®σ]), as this is the most common error in young children's speech in this context (Chevrot et al. 2005b). Thus, in these pairs of sequences, children had to choose between the correct and the incorrect form of the liaison. For variable liaisons, one puppet produced a sequence of the type adjective + noun with a liaison correctly realized (e.g. [π↔τιτυ®σ] / '*small bear'*) and the other puppet produced the sequence without a liaison (e.g. [π↔τιυ®σ]). The children then had to choose between the standard and the nonstandard variant. Children had to evaluate 24 pairs of word1-word2 sequences: 12 pairs for obligatory liaisons and 12 pairs for variable liaisons (for more details about the procedure, see Nardy 2008).

Table 2. *Matched guise task for obligatory and variable liaisons*

| Obligatory liaisons | | Variable liaisons | |
|---|---|---|---|
| correct | incorrect | standard | nonstandard |
|   |   |   |   |
| "Who is a good speaker?" | | "Who is a good speaker?" | |
| 12 pairs to evaluate | | 12 pairs to evaluate | |

To avoid bias due to the order of presentation of the two linguistic forms, the order of sequences was counterbalanced within pairs. In order to reduce the number of pairs children had to judge, two sets of pairs were designed. Indeed, the combination of the four word1s and the six word2s for the four linguistic forms would have made children evaluate 48 pairs of sequences, and this would be too time-consuming and attention-demanding for young children. In the first set, word2s were divided into two groups of similar syllabic length and were combined with the different forms of word1s (Table 3). Half the children had to evaluate this set of pairs. For the other half, the sequences were the same, but the order of the two linguistic forms within pairs was reversed. The presentation of pairs in each set was also pseudo-randomized (i.e., two identical word1 or word2 could not be presented in succession) and the order was changed for each child. Therefore, the correctly realized liaisons were not always the first sequences heard by children and no linguistic form was systematically associated with one puppet.

Table 3. *Compositions of sets of pairs: Order of presentation of the two forms of word1-word2 sequences within pairs and numbers of pairs for obligatory and for variable liaisons*

| | Obligatory liaisons<br>word1s: *un, deux* | | Variable liaisons<br>word1s: *petit, gros* | |
|---|---|---|---|---|
| word2s | pairs | n | pairs | n |
| *ours, avion, éléphant* | correct *vs* incorrect | 6 | realized *vs* non realized | 6 |
| *arbre, escargot, ordinateur* | incorrect *vs* correct | 6 | non realized *vs* realized | 6 |

The judgment task followed immediately the production task. The task started only after the experimenter was sure that the child had understood the instructions by presenting an example involving a word with an initial consonant. The child's attitudes towards linguistic forms were recorded by the experimenter using a checklist. For a given pair of sequences, a child could answer that the puppet that realized the liaison correctly was the one that spoke correctly, and which form corresponded to the correct form for obligatory liaisons and to the standard form for variable liaisons. On the contrary, she/he could answer that the puppet that realized the liaison incorrectly or that did not realize the liaison was the one that spoke correctly, and which form corresponded respectively to the incorrect form for obligatory liaisons and to the nonstandard form for variable liaisons. Finally, a child could also say that she/he did not know, or stay silent, or even answer that both puppets were good speakers. These three types of attitudes were considered to be non-responses. We recorded a non-response when a child designated the two puppets as we considered that she/he had not followed the instructions. However, this latter type of answer was relatively rare. We present the relative frequencies of the different types of the children's responses in the results section.

2.2.3 *Production task: picture naming.* Children were asked to produce word1-word2 sequences from pictures of animals and objects that represented the six selected vowel-initial word2s. Word1s and word2s used in this task were the same as in the judgment task. To elicit the production of obligatory liaisons after the determiners *un*/'one' and *deux*/'two', the animal or object was presented in one or two exemplars. Thus, 12 target sequences contained an obligatory liaison. To elicit the production of variable liaisons after the prenominal adjectives *petit*/'small' and *gros*/'big', the animal or the object was presented in small or large size. Thus 12 target sequences contained a variable liaison.

While previous studies showed that the production of liaisons is sensitive to priming (Chevrot et al. 2009; Dugua et al. 2009; Gallot et al. 2009), target sequences with vowel-initial word2s were alternated with sequences containing consonant-initial word2s that do not induce a liaison. The six consonant-initial word2s were: *lit*, *singe*, *ballon*, *balai*, *cochon*, *camion* (*'bed, monkey, ball, broom, pig, truck'*). They were combined with the two determiners in the set of obligatory liaisons, thus forming 12 sequences with consonant-initial word2s. The same procedure was followed for the set of variable liaisons in which consonant-initial word2s were combined with the two adjectives, again forming 12 sequences with the previous consonant-initial word2s.

Therefore, 48 word1-word2 sequences were presented to the children during the task: 12 sequences “determiner + vowel-initial word2” and 12 sequences “determiner + consonant-initial word2” for the series of obligatory liaisons; 12 sequences “adjective + vowel-initial word2” and 12 sequences “adjective + consonant-initial word2” for the series of variable liaisons. Half the children started with the obligatory liaisons series, and the other half started with the variable liaisons series. Moreover, the order of sequences was changed for each child: the order was pseudo-randomized within each set of liaisons, although the alternation between the target sequences and the filler trials was maintained.

At the beginning of the task, the experimenter told the child “I am going to show you pictures and you will tell me what there is on the picture.” To ensure that children understood the instructions and that answered with a determiner + noun (e.g., *deux ours* / ‘two bears’) for obligatory liaisons or adjective + noun (e.g., *un petit ours* / ‘a small bear’) for variable liaisons, each series of liaisons started with an example given by the experimenter illustrating sequences with a consonant-initial word2. Namely, the experimenter showed the pictures and said “there is a monkey (‘*un singe’)* and there, two monkeys (‘*deux singes’)*” for obligatory liaisons or “there is a small monkey (‘*un petit singe’)* and there, a big monkey (‘*un gros singe’*)” for variable liaisons. During the task, children’s productions were audio-taped for later transcription. A liaison was considered to be correctly realized when a child produced the appropriate liaison consonant (for more details about the procedure, see again Nardy 2008).

### 2.3 *Measures and statistical analyses*

2.3.1 *Children’s evaluations of obligatory and variable liaisons.* To evaluate children’s performances in the judgment task first, children’s raw scores for obligatory and variable liaisons were analyzed separately. These scores were calculated according to the children’s attitudes towards the linguistic forms of each type of liaison. Therefore, three scores were calculated for obligatory liaisons: the number of correct answers (i.e., the total number of correct answers for the 12 pairs of sequences), the number of incorrect answers, and the number of non-responses (i.e., the total number of cases when the child said that she/he did not know, stayed silent, or answered “both puppets”). Similarly, three scores were calculated for variable liaisons: the number of standard answers, the number of nonstandard answers, and the number of non-responses.

Two-way ANOVAs were then carried out separately on raw scores for obligatory and variable liaisons to evaluate the effects of age (4 groups) and SES (2 groups) and their interaction. Fisher's PLSD and pair-wise t-tests were performed for post hoc comparisons (Statistica, version 8, Statsoft 2008). Differences were considered significant at an alpha level of $p < 0.05$. The different types of children's attitudes towards obligatory and variable liaisons are given in percentages in the results section.

2.3.2 *Relationship between children's judgments and productions.* To assess relationships between children's evaluation and production of obligatory and variable liaisons, we analyzed the relative scores of both judgments and productions. We aimed to evidence which linguistic form children evaluated positively and produced when they actually answered, replicating the procedure used in similar studies on the production of obligatory liaisons (Dugua 2006).

For judgments, non-responses were discarded from the total number of pairs of sequences presented. The percentages of correct answers for obligatory liaisons and of standard answers for variable liaisons were calculated as followed: number of answers for correctly realized liaisons / (12 – non-responses).

For productions, both non-responses and atypical responses were discarded from the total number of word1-word2 sequences. Non-responses were recorded when children remained silent. Atypical responses were errors produced when a child dropped the initial vowel of word2 (e.g., [δOλεϕA)] instead of *deux éléphants* 'two elephants') or named a wrong word2 (e.g., *mammouth* 'mammoth' instead of 'elephant'). The percentages of correct productions for obligatory liaisons and of standard productions for variable liaisons were calculated as followed: number of correctly realized liaisons / (12 – (non-responses + atypical responses)).

We used multigroup structural equation modelling (MSEM) to estimate age group differences in the relationship between children's evaluation and production of obligatory and variable liaisons. With MSEM, the systems of structural equations are solved for all age groups together with SES as a co-variable, yielding separate parameter estimates - with the same values as when estimated separately, but data-model fit indices are calculated across both age groups with SES as a co-variable. Differences among groups can be evaluated for their appropriateness by constraining parameters to be equal for different groups and then by allowing some parameters to be estimated freely. Several models were tested, all with SES as covariate, for obligatory liaisons on the one hand and for variable liaisons on the other. The first model we estimated, the universal model, was the constrained model in which the parameters estimated for each age group (regression coefficients of children's judgments and

productions on SES respectively, residual correlation between children's judgments and productions) were constrained to be equal to each other. This model is equivalent to estimating the full model using classic regression path analysis. In the fully saturated model, these parameter estimates were freely estimated across age groups. The universal model was used to compare other alternative nested models built on the knowledge of the estimates predicted by the saturated model. Non-significant parameter estimates as predicted by the saturated model were fixed at zero and equality constraints were specified for parameters with neighboring values. The likelihood ratio test (LRT) was used to test directly the hypothesis of interest, namely for example, whether or not a residual correlation parameter between evaluation and production was equal to zero in a given age group. For all models, the variance-covariance matrix was used as input and the maximum likelihood estimator was used for the calculation of standard errors and statistical significance of the parameters. Robust fit indices (CFI and RMSEA) were examined to evaluate model fit. Values of CFI above 0.95 and values of RMSEA below 0.05 were considered to indicate a good fit (Hu and Bentler 1999). Mplus 5.2 was used for the MSEM analysis (Muthén and Muthén 1998–2009).

## 3. Results

### 3.1 *Children's evaluation and production of obligatory liaisons*

3.1.1 *Children's performances in the judgment task.* A two-way ANOVA revealed a major effect of age ($F_{3, 177} = 34.91$, $p < 0.0001$) (Figure 1, see also Appendix - Table A for complete descriptive statistics): children's judgments in favor of correct liaisons increased significantly during preschool years, especially after 3–4 (Fisher's PLSD, 3–4/4–5 years, 4–5/5–6 years, $p < 0.0001$).

At the same time, both judgments in favor of incorrect liaisons ($F_{3, 177} = 20.95$, $p < 0.0001$) and non-responses ($F_{3, 177} = 8.67$, $p < 0.0001$) decreased significantly. Incorrect answers followed the exact reverse course to that for correct answers, while significantly decreasing after 3–4 (3–4/4–5 years, 4–5/5–6 years, $p < 0.002$). Non-responses decreased significantly at an early age (2–3/3–4 years, $p < 0.03$) and then disappeared. Among non-responses, undetermined judgments, i.e. when children designated both puppets, were rare (2.85% ± 1.55, 4.07% ± 1.49, 0.93% ± 0.78, 0.35% ± 0.35) and tended to decrease with age ($F_{3, 177} = 2.29$, $p < 0.08$).

Therefore, we found that children began to perform the judgment task accurately (i.e., above chance level, namely > 50%) as soon as they were 3–4 years old, when they began to produce significantly more judgments favoring correct liaisons than incorrect liaisons (pair-wise t-tests, all $t > 2.9$, all $p < 0.006$, except at 2–3). Non-responses were significantly less frequent than correct or incorrect answers, whatever the age group (all $t > 4.1$, all $p < 0.0002$).

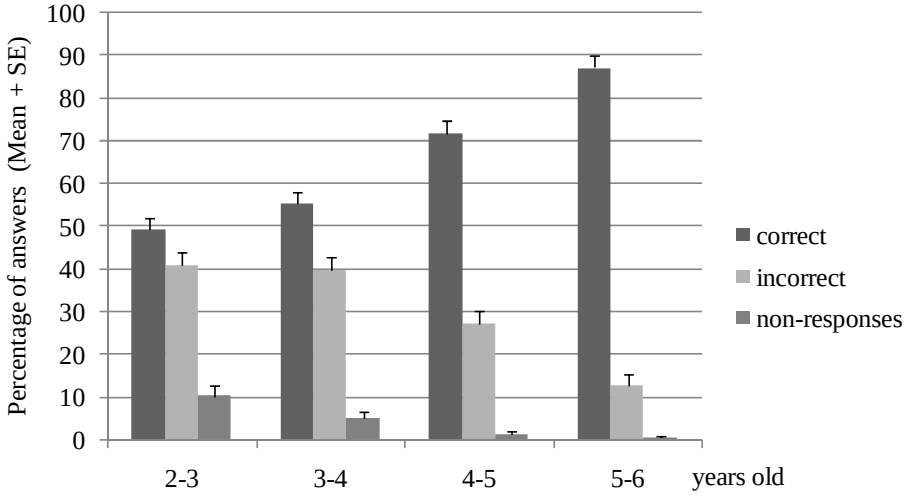


Figure 1. C*hildren's performances in the judgment task for obligatory liaisons in relation to age: percentages (mean and standard error) of judgments in favor of correctly realized liaisons, incorrectly realized liaisons and of non-responses*

The children's social background also had a major effect ($F_{1, 177} = 8.07$, $p < 0.006$) (Figure 2; see also Appendix - Table A). Children's judgments in favor of correct liaisons increased significantly over time in both SES groups (age x SES: $F_{3, 177} = 1.70$, $p > 0.10$), but with a developmental gap between upper- and lower-SES children. Indeed, upper-SES children's correct judgments (Figure 2a) increased significantly between 3–4 and 4–5 ($p < 0.0001$), whereas lower-SES children's correct judgments (Figure 2b) increased significantly, later, between 4–5 and 5–6 ($p < 0.0001$), leading to a significant difference between upper- and lower-SES children at 4–5 ($p < 0.0006$).

Similar results were found for incorrect answers (SES: $F_{1, 177} = 8.85$, $p < 0.004$; age x SES: $F_{3, 177} = 2.05$, $p > 0.10$). The numbers of incorrect answers given by upper-SES children (3–4/4–5: $p < 0.0009$) decreased significantly earlier than did those given by lower-SES children (4–5/5–6: $p < 0.0001$), leading to a significant difference between 4–5-year-old upper- and lower-SES children ($p < 0.0003$). Neither SES nor age x SES interaction

influenced non-responses significantly (both $F < 1$, $p > 0.50$). As early as 2–3, non-responses were significantly less frequent than correct or incorrect answers, for both upper- and lower-SES children (all $t > 2.2$, all $p < 0.04$).

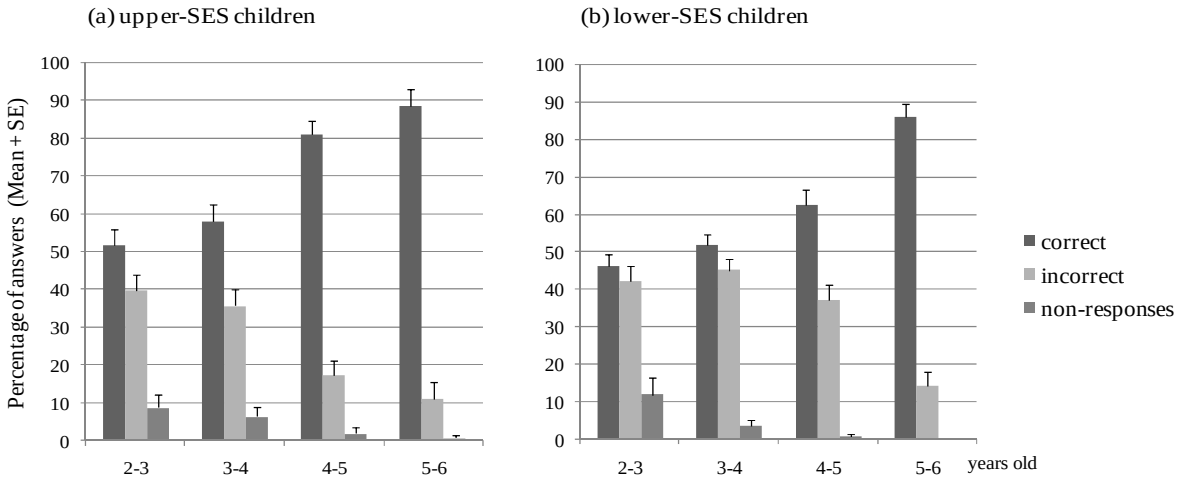


Figure 2. *Upper-SES (a) and lower-SES (b) children's performances in the judgment task for obligatory liaisons in relation to age: percentages (mean and standard error) of judgments in favor of correctly realized liaisons, incorrectly realized liaisons and of non-responses*

Thus, upper-SES children began to perform accurately in the obligatory liaisons judgment task at a younger age than lower-SES children. Upper-SES children produced significantly more evaluations favoring correctly realized liaisons than incorrectly realized liaisons from 3–4 (pair-wise t-tests, all $t > 2.7$, all $p < 0.05$, except at 2–3), whereas lower-SES children did so from 4–5 (4–5 years: $t = 2.96$, $p < 0.007$, 5–6 years: $t = 9.84$, $p < 0.0001$).

3.1.2 *Relationship between children's evaluations and productions.* MSEM analyses[4] revealed social differences both for the children's evaluation and their production of obligatory liaisons (Tables 4 and 5).

Table 4. *Production and evaluation favoring correctly realized obligatory liaisons for upper- and lower-SES children and the overall sample (mean percentages and standard errors).*

| | | 2–3 years | | 3–4 years | | 4–5 years | | 5–6 years | |
|---|---|---|---|---|---|---|---|---|---|
| | | M | SE | M | SE | M | SE | M | SE |
| Upper-SES | Production | 67.49 | 6.93 | 73.96 | 5.72 | 82.77 | 5.16 | 96.27 | 2.05 |
| | Judgment | 56.73 | 4.66 | 62.28 | 4.20 | 82.72 | 3.80 | 88.93 | 4.56 |
| Lower-SES | Production | 25.15 | 4.24 | 60.17 | 5.84 | 65.40 | 4.93 | 85.87 | 3.22 |
| | Judgment | 53.34 | 3.16 | 53.45 | 2.91 | 62.65 | 4.27 | 85.87 | 3.65 |
| Overall | Production | 48.55 | 5.46 | 67.83 | 4.18 | 74.08 | 3.73 | 91.28 | 2.00 |
| | Judgment | 55.21 | 2.92 | 58.35 | 2.72 | 72.68 | 3.15 | 87.46 | 2.92 |

Table 5. *Influence of children's social background (lower-SES: 1, upper-SES: 2) on both production (Prod.) and evaluation (Eval.) favoring correctly realized obligatory liaisons across the 4 age groups: Maximum Likelihood parameter estimates and standard errors (in brackets) for the final model* ($\chi^2$ = 4.84, *df* = 8, *p* = 0.774, CFI =1.00, RMSEA = 0.000)[3].

| | Regression coefficients β | | Residual correlation |
|---|---|---|---|
| Age group | SES -> Eval. | SES -> Prod. | between Eval. and Prod. |
| 2–3 years | - | 0.423 (0.084) | - |
| 3–4 years | - | 0.110 (0.029) | 0.202 (0.059) |
| 4–5 years | 0.185 (0.054) | 0.110 (0.029) | 0.202 (0.059) |
| 5–6 years | - | 0.110 (0.029) | 0.202 (0.059) |

First, these analyses confirmed our previous results evidencing a transitory difference in judgments between upper- and lower-SES children during preschool years. Indeed, at 4–5, the positive bias towards correctly realized liaisons was significantly greater in upper-SES children (82.72%) than in lower-SES children (62.65%) ($\beta$ = 0.185, *t* = 3.403, *p* = 0.001). No differences were revealed for the other age groups. Second, our analyses showed that social differences appeared at an earlier age in production than in evaluation. Indeed, SES influenced children's productions significantly as early as 2–3 ($\beta$ = 0.423, *t* = 5.052, *p* = 0.000): upper-SES children produced more than twice as many correctly realized obligatory

liaisons as did lower-SES children (67.49% against 25.15%). Moreover, a chi-square difference test rejected the hypothesis of equal regression coefficients for the 2–3 year-old group as well as for the other age groups ($\Delta\chi^2$ = 11.00, *df* = 1, *p* = 0.001). The significantly greater regression coefficient in the first age group indicated that the magnitude of social differences in the production of obligatory liaisons decreased with age.

However, a positive relationship was found between children's evaluations and productions of obligatory liaisons even when children's socio-economic statuses were controlled (Table 5). This relationship indicated that the children's production and evaluation profiles were coherent, namely that children who evaluated correctly-realized liaisons more positively also produced them more frequently than children who did not, whatever their SES. No significant correlation was found for the first age group ($H_0$: *r* equals zero; $\Delta\chi^2$ = 0.01, *df* = 1, *p* = 0.97). This relationship appeared at 3–4 and did not vary significantly in the older groups ($H_0$: equality of *r* across the second, third and fourth age groups; $\Delta\chi^2$ = 0.43, *df* = 2, *p* = 0.81).

## 3.2 *Children's evaluation and production of variable liaisons*

### 3.2.1 *Children's performance in the judgment task.*

Our analyses failed to evidence any significant effect of age on children's evaluations of either realized or non-realized variable liaisons during the preschool period (Figure 3; see also Appendix - Table B for complete descriptive statistics). Indeed, we found no significant changes in the judgments of the children in our overall sample favoring either the standard variant ($F_{3, 177}$ = 1.64, p > 0.10), the nonstandard variant ($F_{3, 177}$ = 0.81, p > 0.40) or non-responses ($F_{3, 177}$ = 1.94, p > 0.10). The percentages of judgments favoring realized liaisons remained close to 50% during preschool years. The percentages of judgments favoring non-realized liaisons were consistently around 40%. Non-responses represented less than 10% of children's responses during this task. Among non-responses, frequency of undetermined judgments, i.e. when children designated both puppets, did not change significantly with age ($F_{3, 177}$ = 0.52, p > 0.60), but accounted for most of the children's non-responses (2.41% ± 1.04, 5.00% ± 1.58, 2.47% ± 1.52, 4.51% ± 2.29).

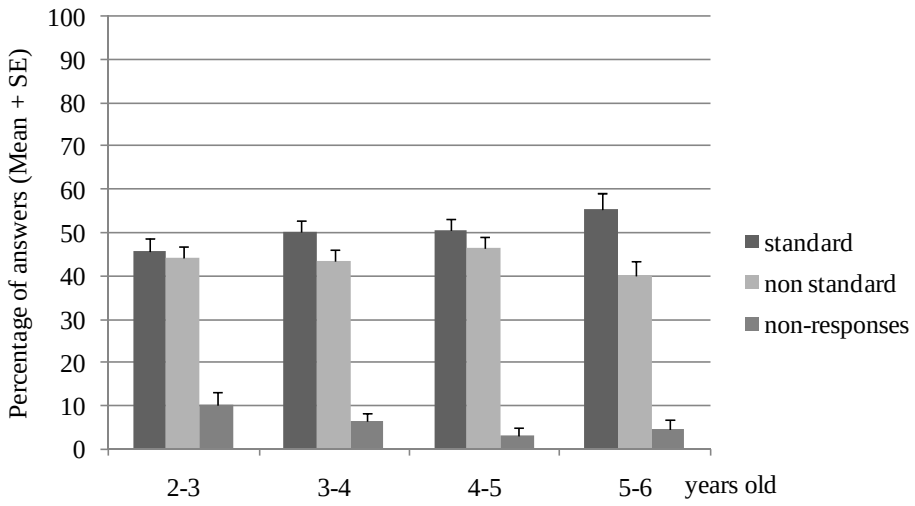


Figure 3. C*hildren's performances in the judgment task for variable liaisons in relation to age: percentages (mean and standard error) of judgments in favor of correctly realized liaisons (standard variant), non-realized liaisons (nonstandard variant) and of non-responses*

However, we found a significant effect of children's social background (Figure 4; see also Appendix - Table B). Both SES and age x SES interaction had a significant effect on judgments of non-realized liaisons (SES: $F_{1, 177} = 10.91$, $p < 0.002$; age x SES, $F_{3, 177} = 4.45$, $p < 0.005$). Indeed, upper-SES children's nonstandard judgments decreased significantly between 4–5 and 5–6 ($p < 0.002$; Figure 4a), whereas lower-class children did not show any significant change during preschool years (all $p > 0.30$; Figure 4b), leading to a significant difference between upper- and lower-SES children at 5–6 ($p < 0.0001$).

Only SES influenced significantly standard judgments (SES: $F_{1, 177} = 5.49$, $p < 0.03$; age x SES, $F_{3, 177} = 1.42$, $p > 0.20$). However, post hoc analyses were congruent with the previous results for nonstandard judgments. Namely, a significant difference between upper- and lower-SES children appeared at the end of the preschool years (5–6, $p < 0.004$): upper-SES children's standard judgments increased significantly between 4–5 and 5–6 ($p < 0.04$), whereas lower-SES children's standard judgments did not (all, $p > 0.50$).

Neither SES nor age x SES interaction influenced non-responses (both $F < 1.4$, $p > 0.20$). From 2–3 years, children gave non-responses significantly less frequently than standard or nonstandard answers, whatever their background (all $t > 2.4$, all $p < 0.03$).

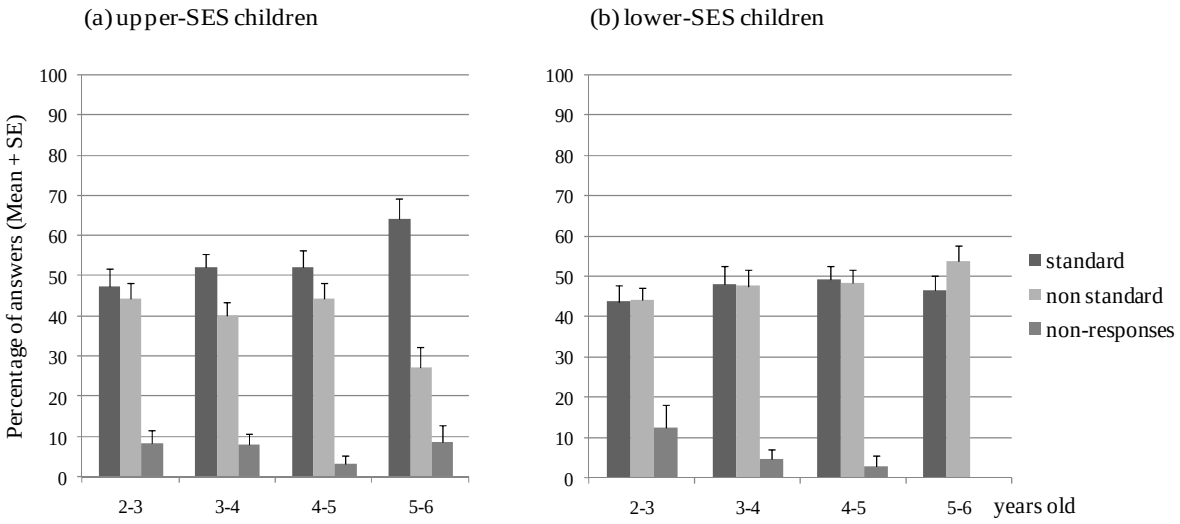


Figure 4. *Upper-SES (a) and lower-SES (b) children's performances in the judgment task for variable liaisons in relation to age: percentages (mean and standard error) of judgments in favor of correctly realized liaisons (standard variant), non-realized liaisons (nonstandard variant) and of non-responses*

Therefore, children from both SES did not judge the standard variant of variable liaisons to be more acceptable than the nonstandard variant until they were 4–5 years old (pair-wise t-tests, all $t < 1.9$, all $p > 0.07$). The choices of children in the first three age groups did not reach the chance level indicating that their answers were given randomly. At 5–6 years, only upper-SES children began to perform accurately when judging variable liaisons. They produced significantly more evaluations favoring realized liaisons than non-realized liaisons (64% versus 27.33%; $t = 3.93$, $p < 0.0007$), whereas lower-SES children still did not prefer one of the two linguistic forms (46.38% versus 53.62%; $t = -0.94$, $p > 0.30$).

3.2.2 *Relationships between children's evaluations and productions*. MSEM analyses[5] revealed social differences both in the children's evaluation and in their production of variable liaisons (Tables 6 and 7).

Table 6. *Production and evaluation favoring correctly realized variable liaisons for upper- and lower-SES children and for the overall sample (mean percentages and standard errors).*

| | | 2–3 years | | 3–4 years | | 4–5 years | | 5–6 years | |
|---|---|---|---|---|---|---|---|---|---|
| | | M | SE | M | SE | M | SE | M | SE |
| Upper-SES | Production | 19.99 | 3.59 | 26.59 | 5.19 | 28.39 | 6.01 | 40.68 | 6.92 |
| | Judgment | 50.11 | 4.48 | 56.53 | 3.49 | 53.51 | 4.05 | 71.66 | 4.91 |
| Lower-SES | Production | 15.33 | 4.74 | 16.42 | 3.35 | 15.83 | 4.71 | 21.05 | 4.58 |
| | Judgment | 46.31 | 3.99 | 49.63 | 4.41 | 50.93 | 3.12 | 46.38 | 3.84 |
| Overall | Production | 17.91 | 2.89 | 22.07 | 3.30 | 22.11 | 3.88 | 31.27 | 4.41 |
| | Judgment | 48.41 | 3.03 | 53.47 | 2.77 | 52.22 | 2.54 | 59.55 | 3.62 |

Table 7. *Influence of children's social backgrounds (lower-SES: 1; upper-SES: 2) on both production (Prod.) and evaluation (Eval.) favoring correctly realized variable liaisons across the 4 age groups: Maximum Likelihood parameter estimates and standard errors (in brackets) for the final model* ($\chi^2$ = 9.98, *df* = 10, *p* = 0.44, CFI = 1.000, RMSEA = 0.000)[3].

| | Regression coefficients β | | Residual correlation |
|---|---|---|---|
| Age group | SES -> Eval. | SES -> Prod. | between Eval. and Prod. |
| 2–3 years | - | - | - |
| 3–4 years | - | - | - |
| 4–5 years | - | - | 0.328 (0.089) |
| 5–6 years | 0.238 (0.058) | 0.238 (0.058) | 0.328 (0.089) |

These analyses confirm our previous results showing that a difference in judgments appeared between upper- and lower-SES children at the end of their preschool years. Indeed, 5–6 year-old upper-SES children showed a preference for realized variable liaisons (71.66%), whereas lower-SES children did not (46.38%) ($\beta$ = 0.238, *t* = 4.076, *p* = 0.000). Social differences in judgments were not significant for the other age groups. Second, our analyses revealed that social differences appeared simultaneously in evaluation and production. Indeed, a significant difference was found between upper- and lower-SES children's productions in the oldest age group ($\beta$ = 0.238, *t* = 4.076, *p* = 0.000): at that age, upper-SES children produced nearly twice

as many liaisons as lower-SES children did (40.68% against 21.05%). Social differences did not influence production significantly in the other age groups.

However, a positive correlation was found at 4–5 and 5–6 years between children's evaluations and productions of variable liaisons, even when social background was controlled (Table 7). This indicates that, whatever their SES, the 4–5 and 5–6 year-olds who evaluated realized liaisons more positively also produced them more frequently than children who did not. Residual correlations were not significant for the first two age groups.

## 4. Discussion

Our findings revealed that children are able to perceive and evaluate the different forms of a phonological alternation early during childhood, earlier than previously evidenced (Labov 1964; Lafontaine 1986; Macaulay 1977; Martino 1982). Moreover, children's productions can be related to their evaluations at an early stage of language acquisition, contrarily to previous reports concerning school-age children (Chevrot et al. 2000). Children's abilities to evaluate linguistic varieties, as well as the relationship between production and evaluation, appeared earlier for categorical liaisons that are used in a uniform way by all adult speakers, than for variable liaisons that are used more or less according to speakers' SES. Moreover, we evidenced social differences in children's acquisition rates of both evaluation and production of obligatory liaisons as well as of their evaluation of variable liaisons. Variable liaisons were progressively realized more frequently by children but at rates varying according to their SES. Thus, our study highlights different developmental and social patterns for obligatory and variable liaisons in both judgments and productions of children between 2 and 6 years old that could be related to the characteristics of the children's linguistic input.

Obligatory and variable liaisons provide children with different kinds of inputs: children encounter only one form for obligatory liaisons (correctly realized liaison) whereas they encounter two concurrent forms for variable liaisons (realized and non-realized liaisons). The context "determiner+noun" is highly frequent in spoken French. According to usage-based theories, current usage events, namely utterances heard and produced by speakers, constitute the experience on which speakers construct their linguistic knowledge (Kemmer and Barlow 2000). During language acquisition, a child hears and stores concrete pieces of language, linguistic units or constructions of various kinds, and makes abstractions across them (Tomasello 2003). The frequency of linguistic forms in a child's input has been shown to be an important factor in language acquisition (Bybee and Hopper 2001; Huttenlocher et al.

2002; Lieven et al. 2003; Tomasello 2003). The more a child encounters and memorizes word1-word2 sequences with a liaison, the earlier she/he acquires the linguistic materiel to abstract and to generalize the relation between word1 and exemplars of word2s (Chevrot et al. 2007, 2009). Judgments of acceptability imply conscious access to this relation. Thus, as two forms co-exist in the input for variable liaisons, this may slow down the abstraction process and delay a child's ability to evaluate the concurrent forms leading to a developmental gap between obligatory and variable liaisons. However, in addition, variable and obligatory liaisons do not have the same social value, as only variable liaisons are a sociolinguistic variable, and thus we must consider the developmental dynamics of social differences as well as that of the relationship between evaluation and production.

We observed a developmental gap between upper- and lower-SES children earlier in the production than in the evaluation of obligatory liaisons. Upper-SES children produced more correct liaisons than did lower-SES children, especially in youngest children, but social differences decreased over time as children's uses converged towards adult rates. Upper-SES children also showed accurate judgments a year before lower-SES children did, leading to a transitory difference at 4–5 years. Children from all backgrounds are exposed to categorical realizations of this type of liaison in their environment, but the quantity of input perceived by a child varies with her/his social background (Hart and Risley 2003; Hoff 2002; Hoff-Ginsberg 1998; Huttenlocher et al. 2007; Rowe 2008). Thus, upper-SES children may produce and evaluate obligatory liaisons more accurately because they are more familiar with these linguistic forms, given their higher frequency in their input. However, the cumulative effect of input should allow lower-SES children to attain the same level of correctness later in development, leading to transitory social differences in evaluation and production. Social differences appeared simultaneously in the production and in the evaluation of variable liaisons at the end of preschool years: upper-SES children evaluated more positively and produced correct liaisons more frequently than did lower-SES children. Frequency and familiarity with variants can also account for these results. The two variants, realized and non-realized liaisons, are present in all children's inputs, but they are unequally represented according to their social background. Thus, upper-SES children are more familiar with the realized variants as they are more frequent in their environment. Moreover, the metaphonological development of 5–6 year-old children is related to mother's education level (Zorman 1999). As a judgment of acceptability implies a reflexive activity on linguistic material, metalinguistic skills (in a broad sense as the children did not have to explain their choices, Gombert 1988) may also account for the social differences recorded in evaluation.

Finally, above input quantity, input quality also varied in relation to the social milieu in which children live. SES differences have been evidenced in properties of parental child-directed speech (e.g., mean length of utterances, vocabulary diversity...) and parental language teaching practices (e.g., eliciting conversation, book reading...) influencing children's language experiences and consequent language development (Hoff 2002; Hoff and Tian 2005; Rowe 2008).

When investigating the developmental dynamics of the relationship between evaluation and production of obligatory liaisons, we found that children began to favor correctly realized liaisons in production and in evaluation when they were 3–4 years old, when a positive relationship between both abilities also emerged, regardless of the children's social background. These results led us first to conclude that these abilities appear simultaneously and progress in parallel. Nevertheless, children's performance progressed earlier in production than in judgment. Moreover, when considering social backgrounds separately, children from both SES began to favor production of correct liaisons a year before their evaluation (2–3 versus 3–4 for upper-SES children, 3–4 versus 4–5 for lower-SES children). Thus, the developmental dynamics of these abilities as well as the developmental pathway of social differences clearly revealed a complex picture evidencing a developmental gap between production and judgment abilities. Dissociation between verbal and behavioral measures of children's knowledge has been reported frequently in a wide range of domains, especially when studying emergent skills (Woolley 2006). Moreover, children's linguistic knowledge is available first in their productions, as their development is a prerequisite for a reflexive activity on language (Gombert 1988; Karmiloff-Smith 1992).

A relationship between evaluation and production of variable liaisons emerged when children were 4–5 years old. This relationship did not change significantly with age as this correlation was obtained by controlling children's SES. Indeed, the effect of SES is expected to vary with age, as the cumulative effect of the input should reinforce continuously and differently the two variants in different social backgrounds. 5–6 year-old children produced adult-like patterns, differing according to their socio-economic level: upper-SES children produced realized and non-realized liaisons in alternation, whereas lower-SES children mostly produced non-realized liaisons (Nardy et al. 2011). At the same time, only upper-SES children evaluated realized liaisons more positively. These children seemed to favor the use of standard variants as they became aware of the social value of standard varieties. Although our results point to a link between children's evaluation and production, the cross-sectional nature of our study excludes the determination of the causal direction of effect in this association.

Only longitudinal data could determine whether children's use of varieties is driven by an improvement of their evaluative performances. Moreover, previous studies showed that children discriminate linguistic varieties before adolescence, but by using different criteria from those of adults, namely by acknowledging the correctness of varieties instead of their social prestige (Lafontaine 1986). In our study, although children were forced to choose among variants, some of the older, mostly upper-SES children, designated both variants suggesting that they acknowledged the co-existence of the two variants and that they considered them to be equally correct. Finally, lower-SES children produced mostly nonstandard variants although they did not judge one of the variants to be more acceptable than the other. Lower-SES children may produce high rates of nonstandard varieties in a formal situation because they are not aware of the social value of varieties. However, as these patterns of uses are apparent in adults as well, the acquisition of adult-like sociolects is probably not driven by the awareness of the social value of varieties. Social differences evidenced in children's evaluations appear to be transitory and related to their linguistic environment, as previous studies did not report any SES-related differences in 6–7 year-old children (Chevrot et al. 2000). While attending elementary school, children may progressively discover the prestige of standard varieties, leading to uniform evaluations like those of adults within a speech community (Labov 1972, 2001).

## 5. Conclusions and perspectives

Children encounter tremendous variation in the language spoken around them. Our findings demonstrate that children are able to perceive and evaluate linguistic varieties at an early developmental stage. Nevertheless, the awareness of prestige norms socially shared by speakers of a given community does not seem to be the driving force of children's acquisitions, as these appear merely related to the characteristics of the children's input and to their familiarity with linguistic varieties. Exposure frequency is a key factor in language acquisition (Tomasello 2003), and more generally in imitative and learning performances (Barr et al. 2007), as well as in dialect formation and change (Labov 2001). However, evidence indicates also that social interactions are crucial in learning language (Kuhl et al. 2003) that cannot then be reduced to passive exposure. Although social attention has been repeatedly reported to be a key element, little is known about how social information is processed during verbal processing, even by adults (Conty et al. 2010).

Although young children do not seem to share widespread adult-like norms, they are not totally devoid of sociolinguistic knowledge. Young children actively and progressively construct their linguistic knowledge from concrete experience within their linguistic and social environment (Patterson 1992). In early infancy children already are able to process environmental regularities both in linguistic structure (Tomasello 2003) and social roles (Hill and Flom 2007). During their preschool years, children become increasingly aware that language variation predicts variation in a range of social groups and can map linguistic information onto social categories (Hirschfeld and Gelman 1997). They are also able to adjust their linguistic behavior to social situations (Diaz-Campos 2005; Patterson 1992; Roberts 1994, 1997; Smith et al. 2007) and to the social roles they are enacting in pretend play for instance (Andersen 1990, Andersen et al. 1999, Corsaro 1979, Ervin-Tripp 2002). Linguistic cues also drive children's social preferences and intergroup attitudes (Kinzler et al. 2007; Patterson and Bigler 2006). Thus, preschoolers clearly demonstrate an implicit knowledge of the speech of various categories of speakers and not merely the speech they use to address others; they use this knowledge to adjust their behavior within social situations, interactions and relationships. Nevertheless, again, still little is known about the cognitive process by which children map language variations onto social group differences and situations.

Finally, socialization should no longer be considered as a unilateral process by which social groups impose social bounds on individuals by means of widespread norms of appropriate and expected behavior, but merely as a constructive process in which children take an active part through everyday interactions (Allès-Jardel et al. 2003; Garrett and Baquedano-Lopez 2002; Schieffelin and Ochs 1986) from which they gather the concrete material to construct their communicative skills and their implicit knowledge about sociolinguistic use.

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**Appendix**

Table A. *Children's raw scores in the judgment task for obligatory liaisons in relation to age and SES: percentages (mean and standard error) of judgments in favor of correctly realized liaisons, incorrectly realized liaisons and of non-responses.*

| | 2–3 years | | 3–4 years | | 4–5 years | | 5–6 years | |
|---|---|---|---|---|---|---|---|---|
| | M | SE | M | SE | M | SE | M | SE |
| Upper-SES | | | | | | | | |
| Correct | 51.59 | 4.13 | 58.00 | 4.26 | 80.86 | 3.80 | 88.33 | 4.59 |
| Incorrect | 39.68 | 4.14 | 35.67 | 4.24 | 17.28 | 3.80 | 11.00 | 4.56 |
| Non-responses | 8.73 | 3.38 | 6.33 | 2.47 | 1.85 | 1.56 | 0.67 | 0.67 |
| Lower-SES | | | | | | | | |
| Correct | 46.08 | 3.12 | 51.67 | 3.00 | 62.35 | 4.32 | 85.87 | 3.65 |
| Incorrect | 42.16 | 4.13 | 45.00 | 2.99 | 37.04 | 4.25 | 14.13 | 3.65 |
| Non-responses | 11.76 | 4.47 | 3.33 | 1.75 | 0.62 | 0.62 | 0.00 | 0.00 |
| Overall | | | | | | | | |
| Correct | 49.12 | 2.68 | 55.19 | 2.73 | 71.60 | 3.12 | 87.15 | 2.93 |
| Incorrect | 40.79 | 2.91 | 39.81 | 2.76 | 27.16 | 3.13 | 12.50 | 2.92 |
| Non-responses | 10.09 | 2.71 | 5.00 | 1.58 | 1.23 | 0.84 | 0.35 | 0.35 |

Table B. *Children's raw scores in the judgment task for variable liaisons in relation to age and SES: percentages (mean and standard error) of judgments in favor of correctly realized liaisons (standard variant), non-realized liaisons (non-standard variant) and of non-responses.*

| | 2–3 years | | 3–4 years | | 4–5 years | | 5–6 years | |
|---|---|---|---|---|---|---|---|---|
| | M | SE | M | SE | M | SE | M | SE |
| Upper-SES | | | | | | | | |
| Standard | 47.22 | 4.68 | 52.00 | 3.48 | 52.16 | 4.23 | 64.00 | 5.26 |
| Non standard | 44.44 | 3.83 | 40.00 | 3.44 | 44.44 | 3.93 | 27.33 | 4.99 |
| Non-responses | 8.33 | 3.20 | 8.00 | 2.66 | 3.40 | 1.95 | 8.67 | 4.26 |
| Lower-SES | | | | | | | | |
| Standard | 43.63 | 4.14 | 47.92 | 4.56 | 49.07 | 3.31 | 46.38 | 3.84 |
| Non standard | 44.12 | 2.93 | 47.50 | 4.06 | 48.15 | 3.43 | 53.62 | 3.84 |
| Non-responses | 12.25 | 5.72 | 4.58 | 2.30 | 2.78 | 2.78 | 0.00 | 0.00 |
| Overall | | | | | | | | |
| Standard | 45.61 | 3.16 | 50.19 | 2.78 | 50.62 | 2.67 | 55.56 | 3.51 |
| Non standard | 44.30 | 2.46 | 43.33 | 2.66 | 46.30 | 2.59 | 39.93 | 3.69 |
| Non-responses | 10.09 | 3.08 | 6.48 | 1.79 | 3.09 | 1.68 | 4.51 | 2.29 |

**Footnotes**

1. INSEE: *Institut National de la Statistique et des Etudes Economiques* (French National Institute of Statistic and Economic Studies).

2. *Ministère de l'Education Nationale*. 2008. L'état de l'Ecole : 30 indicateurs sur le système éducatif français, n°18. Paris: DEPP - Département de la valorisation et de l'édition.

3. Regression coefficients and residual correlations are standardized estimates. Parameter estimates are all statistically significant ($p < 0.001$).

4. We tested several models successively. First, the analysis showed that the universal model in which the estimated parameters were constrained to be equal across age groups did not fit the four age groups equivalently ($\chi^2 = 21.50$, $df = 9$, $p = .01$, CFI = 0.770, RMSEA = 0.173). Analysis of the modification indices and of predicted estimates of the saturated model suggested that fixing at zero the correlation between evaluation and production for age group

2–3 years old as well as fixing at zero the regression coefficients of evaluation on SES across age groups 2–3, 3–4 and 5–6 years old, would contribute to a significant reduction of $\chi^2$. The overall fit indices for this model (M1) indicated that it provided an adequate fit for the data ($\chi^2$ = 3.86, *df* = 6, *p* = 0.69, CFI = 1.000, RMSEA = 0.000; 90 Percent C.I., 0.000 - 0.147) and generated a significantly smaller $\chi^2$ than did the universal model ($\Delta\chi^2$ = 17.64: *df* = 3, *p* < 0.001). Finally, a more parsimonious model (M2) was tested in which regression coefficients of production on SES on the one hand, correlation between evaluation and production on the other hand, were constrained to be equal across the 3–4, 4–5 and 5–6 age groups. The $\chi^2$ value of this "equal parameters model" was 4.84 with 8 degrees of freedom (*p* = 0.774). The other indices indicated a very good fit (CFI =1.00, RMSEA = 0.000; 90 Percent C.I., 0.000 - 0.117). The non-significant difference of $\chi^2$ values between models M2 and M1 provided a test of the parameter equality hypothesis ($\Delta\chi^2$ = 0.98, *df* = 2, *p* = 0.627). Estimations of the final "equal parameters model" are presented in table 5.

5. The analysis showed first that the hypothesis of equal parameters across age groups did not fit the four age groups equivalently ($\chi^2$ = 19.81, *df* = 9, *p* = 0.02, CFI = 0.626, RMSEA = 0.161). Analysis of predicted estimates of the saturated model suggested that fixing at zero the regression coefficients of evaluation and production on SES across the 2–3, 3–4 and 4–5 year age groups, would contribute to a significant reduction of $\chi^2$ ($\Delta\chi^2$ = 11.75, *df* = 3, *p* = 0.009). In addition, fixing at zero the correlations between evaluation and production across the 2–3 and 3–4 year age groups did not make the fit worse ($\Delta\chi^2$ = 0.518, *df* = 2, *p* = 0.77). Similarly, constraining to equality the correlations between evaluation and production across the 4–5 and 5–6 year age groups did not impair the fit either ($\Delta\chi^2$ = 0.953, *df* = 1, *p* = 0.33). Lastly, adding the hypothesis of equal regression coefficients of evaluation and production on SES in the 5–6 year age group yielded $\chi^2$ = 9.98 with 10 *df,* CFI = 1.000, and RMSEA = 0.000 (90 Percent C.I., 0.000 - 0.159). A $\chi^2$ difference test did not reject this equality hypothesis ($\Delta\chi^2$ = 0.20, *df* = 1, *p* = 0.655). Estimations of this last model are presented in table 7.

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