

Je peux ou je dois ? Faudrait savoir !

Acquiring modals' force: evidence from French

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Learning the “force” of modals raises a *subset problem* for children. Given that necessary entails possible, what prevents learners from assuming possibility meanings for necessity modals like *must*? Acquisition studies show that children struggle with necessity modals. But they tend to focus on English, where necessity modals are rare in the input. By looking at French, this study first shows that frequency alone can't explain English results: despite being more exposed to necessity modals, French children still display a ‘Necessity Gap’. Second, we discuss *how* children figure out force, focusing on one logical way to solve *subset problems*: negation. We show that learners need other cues: given irregularities of scope, informative cases are almost absent from their input.

1 Introduction

Modals can express different forces: possibility (e.g. *can*), or necessity (e.g. *must*). Learning modals' force raises a semantic *subset problem* for children (Berwick 1985; Wexler & Manzini 1987). Given that *necessary* entails *possible*, possibility modals (e.g., *can*) are used in contexts where necessity modals (e.g., *must*) are also true: What prevents children from hypothesizing possibility meanings for necessity modals? One logical solution is that children rely on negative (Downward-entailing) environments, since these reverse the direction of logical relationships (Gualmini & Schwarz 2009).

The acquisition literature reports an asymmetry in children's early mastery of modals' force. Studies on English show that by age 2, children use possibility modals (e.g. *can*) frequently, productively, and in an adult-like way. But they use necessity modals (e.g. *have to*) later on, less frequently, and in a non-adult-like way: they use them when adults prefer possibility modals (Dieuleveut et al. 2019). Comprehension experiments also report difficulties: 4 to 5-year-old children tend to both accept possibility modals in necessity situations—for instance, they consider as appropriate “There might be a bear in the box” in a situation where it is certain that there is one—; and necessity modals in possibility situations (e.g. “There must be a bear in the box” when it is just a possibility that there is one) (Noveck 2001; Ozturk & Papafragou 2013; Cournane et al. 2021). The source of children's difficulties, sometimes called the ‘Necessity Gap’, is debated. One possibility is that children would have issues with the *meaning* of necessity modals: they might not have figured out their underlying force yet.

This literature mostly focuses on English, where necessity modals are actually quite rare in parents' speech (children's ‘input’) (Dieuleveut et al. 2019). Previous corpus studies on French tend to focus on how children learn the other dimension of modals, flavor (the type of modality modals express: possibility and necessities given some rules, some goals, some capacities, or given what we know) (Bassano 1996; Cournane & Tailleux 2020), or how they interact with negation (Jeretič 2018). By looking at French, where necessity modals are more frequent in the input, this study assesses how differences in exposure might affect children's proficiency. Based on a detailed assessment of French young children's modal input and of their own modal production, we show that the delay for necessity modals reported for English-speaking children extends to French. While hearing more necessity modals, French children still produce them later on and less frequently. Second, we focus on the role negation might play in figuring out force, and argue that children need other cues: given irregularities of scope, informative cases are almost absent from their input.

2 Methods

We use the Lyon Corpus of French (Demuth & Tremblay 2008) (5 children; 3 females; age range: 1;00-3;00), and the Paris corpus (Morgenstern & Parisse 2007); 6 children; 3 females; age range: 0;7-6;03), on CHILDES (MacWhinney 2000). Children are recorded during

spontaneous interactions with their parents at home. Both corpora contain audio/video data. 14,596 utterances (adults: 11,082; child: 2,939; other children (excluded): 575; excluding repetitions: adult (2.4%): 10,813; child (8.3%): 2,695) containing modal auxiliaries (*pouvoir/devoir/falloir/avoir-à*) were extracted and coded for force ((1)), negation ((2)) and flavor ((3)).

(1) **Force** POSSIBILITY (P): *pouvoir*
NECESSITY (N): *falloir, devoir, avoir-à*

(2) **Negation** *absent*: Il doit partir. ('He must leave.')

present: Il (**ne**) doit {**pas**/...} partir ('He (NEG) must NEG leave.')

other DE-environments: **Personne (ne)** doit partir ('**Nobody** must leave.')

(3) **Flavor** *Root*: MOTHER: y a plein d'habits sales ! ('There are many dirty clothes!')

MOTHER: elle **doit** laver tout le linge. ('She **must** do all the laundry')

(Lyon corpus, Marie, 3;06,19)

Epistemic: CHILD: je trouve pas la grosse. ('I can't find the big one')

MOT: elle **doit** être restée dans la voiture. ('It **must**'ve stayed in the car')

(Lyon corpus, Marie, 2;05,16)

3 Results

Utterances containing modal auxiliaries represent 3.8% of all French adults' utterances (vs 5.8% in English), and 1.9% of children's utterances between age 2 and 3 (1.6% in English).

Force. Table 1 summarizes adults' and children's modal productions in French (1a), with English as comparison point (1b). Data for English are taken from Dieuleveut et al. (2019). We see that while hearing more necessity modals in their input (French: N=61.9%; P=38.1%, vs English: N=28.4%; P=71.6%), French children produce more possibility modals (N=39.9%; P=60.1%) (Fig1a/1b).

Flavor. As reported in other languages (Kuczaj & Maratsos 1975; Papafragou 1998, a.o.), French children produce few epistemic modals, and tend to produce them later on (the so-called 'Epistemic Gap', Cournane 2014). We see that the asymmetry is reflected in their input: there is a huge bias towards root uses in adult speech (5.9% of epistemic modal uses in adults' speech, and 0.4% in children's).

Negation. Children don't produce necessity modals with negation frequently (14.3% of necessity modals with negation; 17.4% for adults). We find no negated *devoir* between age 2 and 3. A noteworthy difference between French and English is that, while English children produce many negated *possibility* modals, much more than adults (51.0%, vs 20.9% for adults), French children produce them less often than adults (children=16.1%; adults=22%).

Figure 1a/b Distribution of possibility and necessity modals with and without negation, by force and speaker (1a: French; 1b: English).

Figure 1a

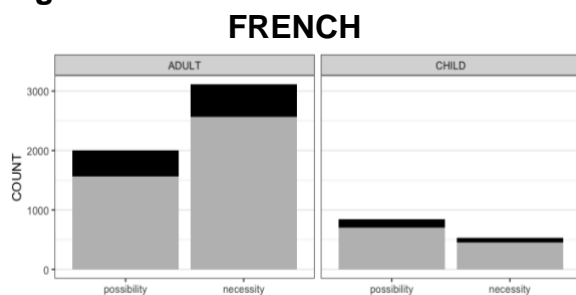
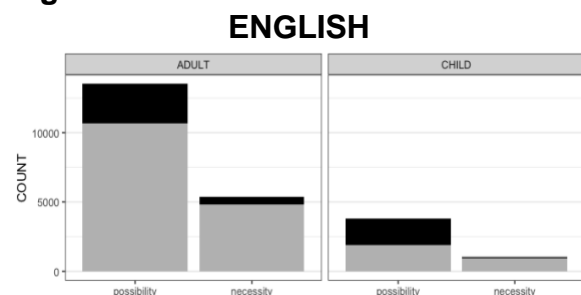


Figure 1b



no negation negation

Table 1a/b Counts and percentages of modal uses by force and lemma for adults and children, ordered by lemma frequency in adult speech (repetitions excluded), with usage frequency with negation and proportion of root/epistemic uses. Instances taking NP complements (e.g. “il faut du pain”, ‘we need some bread’), are excluded (*falloir*: 6.5%; *devoir*: 0.4%; *avoir-à*: 64.7%).

Table 1a

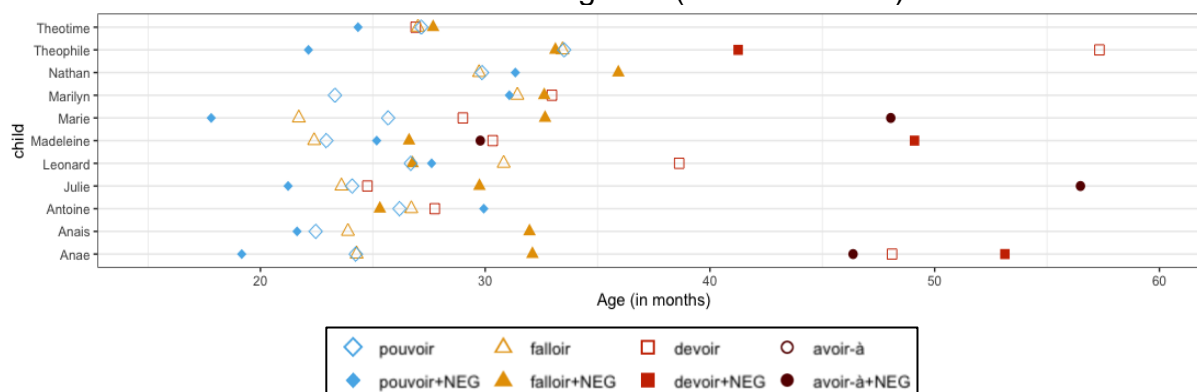
	ADULTS (n=5116)				CHILDREN (n=1378)			
	all	%mod	%Neg	%Epi	all	%mod	%Neg	%Epi
POSS								
<i>pouvoir</i>	2008	38.1%	22.0%	2.9%	849	60.1%	16.1%	0.4%
NECE								
<i>falloir</i>	2659	53.2%	17.6%	0.0%	492	36.8%	12.0%	0.0%
<i>devoir</i>	403	7.7%	6.6%	60.0%	21	1.8%	0.0%	14.3%
<i>avoir-à</i>	46	1.0%	93.3%	0.0%	16	1.3%	100.0%	0.0%
ALL	5116	100.0%	19.2%	5.9%	1378	100.0%	15.4%	0.4%

Table 1b

	ADULTS (n=18853)				CHILDREN (n=4800)			
	all	%mod	%Neg	%Epi	all	%mod	%Neg	%Epi
POSS								
<i>can</i>	11934	63.3%	20.4%	1.3%	3700	77.1%	50.9%	0.2%
<i>might</i>	1213	6.4%	17.1%	95.2%	86	1.8%	2.3%	93.0%
<i>able</i>	315	1.7%	57.5%	0.0%	3	0.1%	66.7%	0.0%
<i>may</i>	38	0.2%	10.5%	42.1%	9	0.2%	0.0%	55.6%
NECE								
<i>have to</i>	2398	12.7%	4.5%	0.3%	352	7.3%	2.0%	0.3%
<i>got to</i>	937	5.0%	1.2%	0.7%	288	6.0%	1.7%	0.0%
<i>should</i>	696	3.7%	22.8%	7.5%	21	0.4%	19.0%	9.5%
<i>need to</i>	493	2.6%	17.0%	0.0%	217	4.5%	6.0%	0.0%
<i>must</i>	411	2.2%	15.8%	64.2%	114	2.4%	17.5%	15.8%
<i>supposed</i>	335	1.8%	31.3%	2.7%	9	0.2%	33.3%	0.0%
<i>ought to</i>	83	0.4%	8.4%	0.0%	1	0.0%	0.0%	0.0%
ALL	18853	100%	18%	8.8%	4800	100%	41%	2.4%

Age of first production. As reported for English, children tend to produce possibility modals earlier. The mean age of 1st production for *pouvoir* is 1:11; for *falloir*, 2:03; for *devoir*, 2:11; and for *avoir-à*, 5:06 (Figure 2).

Figure 2. Age (in months) of first productions of *pouvoir*, *falloir*, *devoir* and *avoir-à* with and without negation (n = 11 children).



4 Discussion

While more exposed to *necessity* modals, French children use *possibility* modals earlier and more frequently. This suggests that the delay for English necessity modals are not just due to their low frequency.

Why are necessity modals delayed? Several hypotheses have been proposed, and several factors might be involved. It does not have to reflect deep semantic or conceptual issues: the production asymmetry could simply come from differences between children and adults’ conversational goals: children might be less prone to giving orders, or to expressing certainty, than their parents. Moreover, children’s first modals tend to express ability flavor, which lack clear necessity counterparts (Horn 1972; Hackl 1998). Another factor, specific to the syntax of French *falloir*, could participate in the delay: *falloir* only takes expletive subjects, and might therefore be acquired later. But this could reflect deeper *semantic* issues, with the meaning of necessity modals: If children are unsure about the force of necessity modals, they might produce them less often. Future research will probe further whether French children use them in an adult-like way, using the same variant of the Human Simulation Paradigm (Gillette et al. 1999) used to assess English-speaking children productions (Dieuleveut et al., 2019).

The second question this study addresses is *how* children might solve the *subset problem*. Our results suggest that as previously argued for English (Dieuleveut et al. 2022), as well as for the acquisition of *every* (Rasin & Aravind 2021), it is unlikely that French children can rely on negative environments to figure out the force of necessity modals: given irregularities of scope, informative cases are almost absent from their input. But the problem in French is even more acute than in English: both *falloir* and *devoir* outscope negation (Iatridou & Zeligstra 2013; Homer 2015), cases in which using negation might be even confusing. The one French necessity modal that scopes under negation, *avoir-à* ('have-to'), is extremely rare and almost only occurs in exceptive constructions (*n'avoir-qu'à*, '~ only have-to'), where it means possible (von Fintel & Iatridou 2007) (adults: 40/43 cases of negated *avoir-à*; children: 16/16 cases). Children thus need other cues to solve the subset problem, which we will probe in future research.

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