

Linguistic constraints on the acquisition of epistemic modals

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1 Introduction

The form and meaning of modal verbs (MVs) has been under debate in theoretical and historical linguistics for many years. The problems at issue in this still ongoing debate concern the status of MVs as (i) auxiliaries / non-auxiliaries (functional / non-functional categories), (ii) as raising vs control verbs, (iii) as sources of coherent infinitive constructions and (iv) as systematically polysemous items, interpretable by reference to either circumstantial, epistemic or evidential discourse backgrounds. Whereas the linguistic literature on MVs focusses on the question, whether epistemic MV readings have a grammatical correlate in (some of) the properties (i-iii), developmental psychologists are mainly concerned with the cognitive base of modal reasoning and the use of epistemic MVs as reflecting a developing *Theory of Mind* (TOM). Taking up some of these issues in the present talk, I will report the results of a case study in language acquisition based on corpus data (*Caroline-Corpus*) from CHILDES (<http://childes.psy.cmu.edu>).

Recent generative analyses converge on the assumption that MVs are full verbs (lexical categories) in deontic interpretations, but auxiliary verbs in epistemic or evidential readings. This view is also shared by grammaticalization approaches to the diachrony of MVs. Rejecting the auxiliary hypothesis, Reis (2001), however, shows that in German (as opposed to English) MVs are full verbs in any of their readings. She also argues against the assumption that epistemic MVs must be analyzed as raising verbs (RAISING HYPOTHESIS, RH) and assumes that the semantic polyfunctionality of MVs is syntactically rooted in STRICT COHERENCE (SC). SC is a combination of two essential MV features: MVs (i) govern the bare infinitive (1. Status) and (ii) occur in obligatorily coherent constructions.

The case study to be reported here concentrates on the controversy between RH- vs. SC- accounts for epistemicity, but also extends to some linguistic reflexes of a developing TOM.

First epistemic usages of MVs are reported in the acquisition literature for children as young as 2;6. Data from the Caroline corpus support these reports.

(1) @Comment:***File\11\caroline\bcd\caroline1\annotations\CHI020708.cha":
line 383;

*CHI: des **muss** ein #1 mal rund #1 **gewesen sein** ## weil dis #2 ein Knetgummi#3.
this must one once round be_{Part.II} be_{Inf} because this a kneading gum
'Once, this must have been round, because it is a kneading gum'

Caroline's early (albeit rare) productions of epistemic modals thus raise the question, whether she masters RAISING and /or STRICT COHERENCE by the age of 2.7.

2 Testing for RAISING, CONTROL and COHERENCE in German MVs

2.1 RAISING and CONTROL

Raising verbs do not assign a theta-role to their matrix subject and therefore leave the subject position empty at the level of deep structure, such that the subject of the embedded verb must be raised to the subject position of the matrix sentence, in order to receive case. Control verbs, on the other hand, base-generate their matrix subject. These differences in derivational history are reflected in various distributional properties, serving as diagnostic tests for the distinction between RAISING and CONTROL: Raising verbs as opposed to control verbs occur in impersonal constructions, allow for expletive *es* ('it'), and their active-passive alternants are truth-functionally equivalent. Applying these diagnostics to German MVs yields the results summarized in Tab. 1 below.

	<i>muss</i> (<i>'must'</i>)	<i>kann</i> (<i>'can'</i>)	<i>mag</i> (<i>'may'</i>)	<i>soll</i> (<i>'shall-should'</i>)	<i>darf</i> (<i>'may – be allowed'</i>)	<i>will</i> (<i>'will-want'</i>)
RAISING	+	+	+	+	+	-
CONTROL	-	-	-	-	-	+

Tab. 1: Syntax and Semantics of German MVs

2.2 COHERENCE

Matrix verb and embedded infinitive fuse into one verbal complex (VC) in coherent constructions. The VC (built out of MV plus embedded infinitive) can (i) be entirely fronted to a pre-verbal position (pre-field), and may (ii) not be teared apart by extraposition of the infinitive, accordingly. Fusion of matrix and embedded verb to a common VC (iii) furthermore yields systematic scope ambiguities for negation and negative quantifiers.

2.3 RAISING, CONTROL and COHERENCE in child language

Any attempt to isolate features of RAISING, CONTROL or COHERENCE in childrens' language production has to face a severe data gap: children hardly ever produce the structures taken as diagnostic evidence for the constructions in question (expletives, impersonal constructions, passives, pied-piping, etc.). Therefore, the Caroline Corpus was checked for features serving as substitutes of the common diagnostic criteria. The substituting features are:

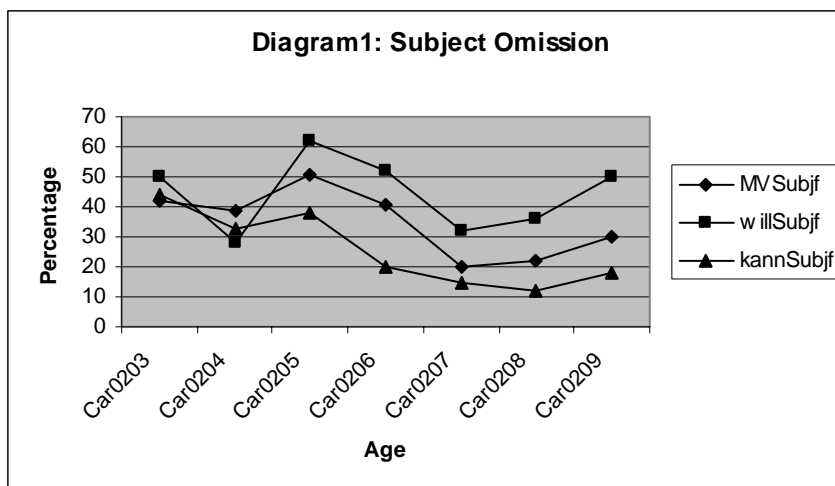
1. The omission / non-omission of subject phrases
2. (Non-emitted) matrix subjects in V2 or in the middle field
3. The embedding of bare infinitives under MV.

The choice of these substitutes is motivated by the following considerations: Firstly, RAISING and CONTROL differ primarily with respect to the syntactic derivation of their surface subjects (substitutes 1 and 2); secondly, bare-infinitives are always coherent (substitute 3).

3 Results of the Corpus Investigation

3.1 The omission / non-omission of the surface subject

Omission of the surface subject is quite common in early child language. In adult German, subject omission is only permitted by way of TOPIC DROP ([Ich] *bin schon gegangen*, '[I] have left already'; [Er] *kann leider nicht kommen*, '[He] can unfortunately not come'; [Wir] *wollen mal sehen*, '[we] will see'.)



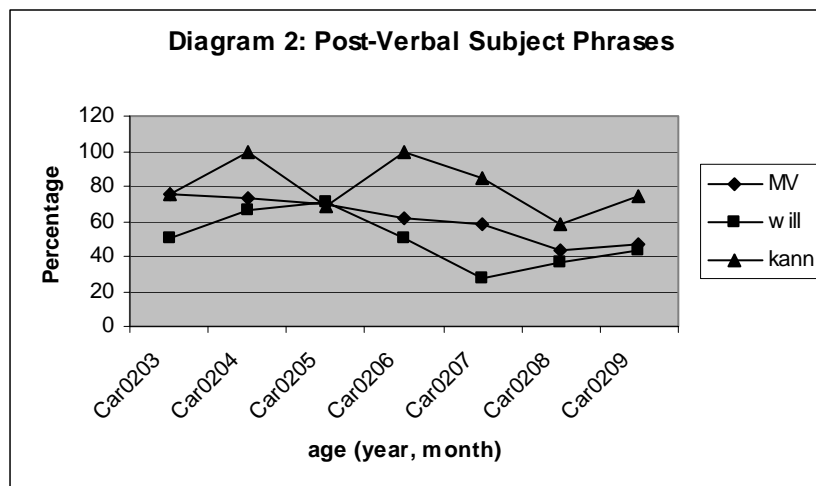
TOPIC DROP occurs where a phrase, which has been moved / could be moved to the topic position SpecC, is not spelled out in this position. Topicalization moves a subject phrase from its deep structure position in SpecI to SpecC. Raising verbs require that RAISING takes place prior to TOPIC DROP, accordingly. CONTROL constructions with base generated subjects impose no such priority constraint on TOPIC DROP. We should, therefore, expect that a child who doesn't yet master RAISING will omit subjects of raising verbs more often than subjects of control verbs. This hypothesis was tested on *will* (CONTROL) and *kann* (RAISING) as used by Caroline between ages 2.0 and 2.9. The results documented in diagram 1 show that subject omission is more frequent for *will* (square dots) than for *kann* (triangular dots); this supports the assumption that Caroline doesn't master RAISING, although she already produces first epistemic MVs.

3.2 Surface Subject in V2 or in the Middle Field

A child who is not yet in command of RAISING will leave the subject position of the matrix verb empty and generate the subject post-verbally (in the middle field). See (2) for illustration:

- (2) @Comment:***File"F:\11\caroline\bcdata\caroline1\annotations\CHI020714.cha":
line 430;
- *MOT: noch eine Katze # ?
*CHI: ja # **muss ich** noch einen Hund machen #7.
yes must I yet a Dog make

Caroline's productions of *kann* (raising) and *will* (control) were compared for pre-verbal and post-verbal positions of non-emitted subjects. The results are documented in Diagram 2.



The data show a higher frequency of post-verbal subject phrases for *kann* (triangular dots) than for *will* (square dots). This may, again, be taken as evidence that Caroline doesn't yet master RAISING at 2.7, while producing first epistemic MVs at that age. In other words, the data presented in Diagrams (1) and (2) suggest that RAISING is neither necessary nor sufficient for the acquisition of epistemicity.

3.3 The embedding of bare infinitives under MV

A child who has acquired the strict coherence constraint on German MVs should be able to distinguish between bare infinitives and the infinitive with *zu* ('to') and always embed a bare infinitive under MV. Although Caroline produces embeddings of bare infinitives right after she uses her first MVs, she tends to overtly express either the subject phrase or the embedded bare infinitive, but not both.

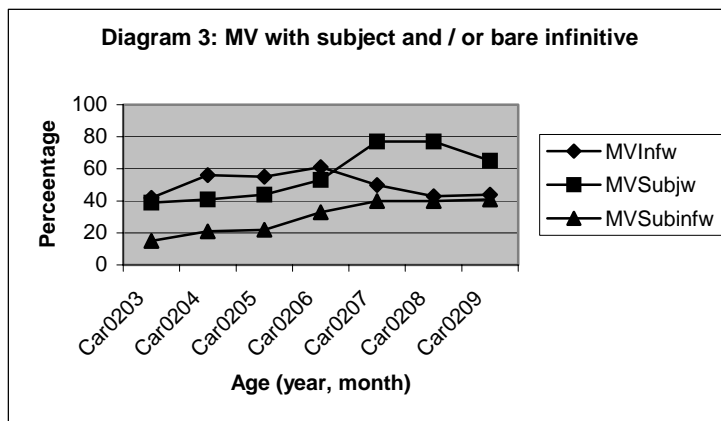


Diagram (3) shows that Caroline's command of the full-fledged infinitive construction improves at exactly the age at which she starts using epistemic MVs (though resting at a level of only 40%). This result may be seen as support, but certainly not as a confirmation, of the strict coherence hypothesis.

The corpus was therefore checked for Caroline's productions of deliberative adverbs (*vielleicht* 'perhaps', *bestimmt* 'certainly') and conditional statements as indicators of the ability to relate the actual world to possible alternatives. In view of the evidence collected, I argue for an integrated account of MV acquisition, based on syntactic as well as semantic and cognitive pre-requisites for the rise of epistemicity.

References

- Reis, M. (2001). Bilden Modalverben im Deutschen eine syntaktische Klasse? In: R. Müller & M. Reis (eds.) *Modalität und Modalverben im Deutschen. Linguistische Berichte, Sonderheft 9*. Hamburg: Buske, 287-318.