Auxiliary-initial declaratives as a window into competing grammars during early stages of first language acquisition

Multiword utterances in infants usually reflect their target variety's canonical word order for different speech acts astonishingly early: in English-acquiring children, early assertions start with a subject and early polar questions start with an auxiliary (Brown & Bellugi 1964; Gleitman *et al.* 1984). In this paper, we present diary data and recordings from three neurotypical, early talking children acquiring British English. They defy this pattern of early canonicity by producing auxiliaries in sentence-initial position (AuxS) in their early production of statements. We will account for this non-canonical mapping of form and function by assuming that Yang's (2016) Tolerance Principle works in concert with Variational Leaning (Yang 2002 et seq.). The data in (1) to (3) exemplify three instances of this phenomenon with utterances from a child called Paddy.

(1) *Context:* *Paddy throws two books straight up into the air and they fall to the floor.*
　　Paddy:　Did you [=Paddy] throw them – did you catch them in the air!　　　　　(2;4)

(2) Friend:　Has the dinosaur got little teeth?
　　Paddy:　Has he not.　　　　　　　　　　　　　　　　　　　　　　　　(2;3)

(3) *Context:* *Paddy wears a toy as a hat. No-one else has anything on their heads.*
　　Paddy:　Is it on your [=Paddy's] head!　　　　　　　　　　　　　　　　(2;4)

We propose that Paddy treats the mapping of speech acts onto word order configurations (i.e., clause types) like any other regularization problem: variation in the input—here the distribution of auxiliaries—requires a certain amount of data for patterns to emerge and to be translated into conventionalized mappings. What is particularly noteworthy about Paddy's input is that his input exhibits a high proportion of auxiliary-initial constructions, which we believe makes him choose this word order as the unmarked one, which makes it suitable for mapping it onto statements. Yet, Paddy is not the exception he may seem at first glance. We found productions from two further earlier talkers that reflect the same mapping of statements onto auxiliary-initial declaratives. What may be exceptional about these three children is that we captured these declaratives at just the right moment: a moment at which their productions were complex enough to express verbally what other children may develop in their internal grammars well before they ask multiword questions.

We explain the striking differences between the acquisition paths of these children and what is usually reported in the literature by two frequency-driven learning strategies which become active in slightly different input scenarios: Yang's (2016) Tolerance Principle (TP) model in combination with his Variational Learning (VL) model proposed for the clausal domain (Yang 2002). VL predicts acquisition of competing grammars that reflect the child's input up to a point where input frequency helps the child determine which grammar is correct. TP complements VL in that it predicts that a non-canonical variant prevails as lexicalized if its proportional frequency does not exceed that supporting the canonical variant. Our core claim is that a threshold-based account seems to explain the overall linguistic behaviour of children with auxiliary-initial declaratives better than simply appealing to the frequency of AuxS in input.

Since learned mappings must deal with exceptions, a combination of these mechanisms can help account for exactly when changes in rule application occur in the course of acquisition; namely after a point where input frequency reaches a certain threshold. TP restricts the requirement for revising learning hypotheses by determining a threshold that is relative to the number of exceptions

to a rule. By extension, we expect that children will only hypothesise competing rules (cf. Kroch 1989) —i.e. enter into a process of Variational Learning—once there is sufficient evidence that exceptions to a one-to-one mapping rule cannot be analyzed as listed lexical exceptions. This means that the child now has evidence for multiple rules applying to the same set of lexical items, and neither can be reduced to a list of lexical exceptions to the other. The child has no choice but to posit two productive rules in competition (i.e., variation) with each other, and to track their probabilities as the VL model suggests. Once there are two productive rules in variation (VL), each rule can admit its own list of lexical exceptions (TP). Pursuing the combination of VL and TP to its logical conclusion provides a simple analysis for what appears to be inconsistent output by our learners. If we apply this proposal to Paddy's acquisition of word order mapping, the large number of auxiliary-initial utterances in his input suggests that any and every speech act that is expressed by an utterance containing an auxiliary is initially mapped onto an AuxS construction. As long as the frequency of auxiliary types in SAux constructions in the input does not exceed the threshold calculated over all auxiliary types subject to the rule considered, the unmarked word order for all utterances containing an auxiliary will be AuxS.

The motivation for assuming a complementary relation between TP and VL comes from a process observed in diachronic language change. Mapping questions onto constructions with sentence-initial verbal elements is a key property of Germanic languages. Modern-day English has an auxiliary-initial word order in canonical questions; modern-day German has a verb-initial word order in the same context. It can be assumed that this word order difference has roots in two different transformations: English moves the auxiliary to the sentence-initial position (known as T-to-C movement) while German first moves the verb into the auxiliary position (V-to-T movement) and then progresses to T-to-C movement. This diachronic development very much resembles what is attested for Faroese and Mainland Scandinavian. Heycock & Wallenberg (2013) show that the modern Mainland Scandinavian grammar, which lacks V-to-T movement, will win out over time once it comes into competition with the older V-to-T grammar in languages like Faroese and Mainland Scandinavian. In such languages, a certain frequency of V-to-C verb movement in certain embedded clauses masks instances of the V-to-T grammar, restricting its ability to be tracked. VL rightfully predicts that the grammar with the fewest ambiguous structures will emerge as the winner, a grammar without T-to-C, as both main and embedded clause order can be captured this way. Our talk will show that the same mechanics can account for the relation between input and output of Paddy and two further early talkers during the period in which they produce auxiliary-initial declaratives. Specifically, we will show how each child children starts out with a single rule for as long as exceptions are below the threshold predicted by TP. Exceptions from that single rule are initially treated as lexicalized. However, when the input displays too many lexical types in multiple constructions, the child must abandon this approach and posit multiple rules, which may serve as a first approximation of categorizing illocutionary force.

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