Production mismatches in the development of recursion in English

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Production mismatches: Early child productions that seem 'unanalyzable' have been recognized since the beginning of language acquisition studies in the early 1970's (e.g., Bowerman 1973). There are various reasons productions may be seen as unanalyzable: for example, there may be multiple corresponding adult targets (1), the mapping from the child production to the target may be too complex to be plausible (2), or the child may add material not modeled in the input (3). The latter two categories can be understood as **production mismatches:** we cannot be confident that there is a unique explanatory mapping between the child production and an adult target**.** Production mismatches have not been a focus of research, perhaps because there has been no obvious way to deal with such productions on the leading generative analyses, which typically treat divergence from target through omission (e.g., root infinitives, subject drop). A common approach is to implicitly discard production mismatches from analysis.

Comprehension mismatches and direct recursion: On the other hand, *comprehension* mismatches in (older) children have received promising analyses. In recent research, Roeper (2007, 2011) and Hollebrandse & Roeper (2014) have accounted for a variety of examples (e.g., recursion of PPs, nominal compounds, genitives, relative clauses, sentential complements) using the notion of **direct recursion**, a first or default symmetrical operation which does not build hierarchical structure, and which corresponds to a conjunctive interpretation.

What we do here: We build on and extend the notion of direct recursion to explain production mismatch. We propose that children can use direct recursion alongside adult-like indirect recursion in production at the two-word to early multi-word period of language acquisition, resulting in production mismatches. Calling on the operation of direct recursion allows us to capture individual differences in paths of language acquisition in a generative framework.

Method: We analyze the first four months of spontaneous predicative utterances from three typically developing monolingual children acquiring English (CHILDES; MacWhinney, 2000: McCune Corpus). Analyses begin when five predicative two-word combinations are identified; Alice: 1;6-1;9, Aurie: 1;9-2;0, and Rick: 1;9-2;0.

Results: All children show evidence of systematic but idiosyncratic production mismatches, which suggest that they all use direct recursion, but with individual differences. Alice shows extensive use in varied contexts (4), Rick shows selective use in relation to the nominal domain (5), and Aurie uses it very little.

Conclusion: We propose a novel measure (maximum syntactic depth of hierarchical structure over mean length of utterance) which tracks how much the increase in mean length of utterance is due to use of indirect vs. direct recursion. While the children look similar by 24 months, they seem to take different trajectories of syntactic development toward more consistent use of adult-like indirect recursion. We hypothesize that age of onset of the two-word stage inversely correlates with cumulative use of direct recursion in production.

(1) *farm-set go* (Rick)*; want shoprite baby* (Alice)*;*
  daddy read Kendall (Bowerman 1973:243)
(2) *that girl have take that jacket mommy* (Alice)*;*
  too warm hold baby mommy hold (Alice)
(3) *banana put it back* (Rick);
  truck Nanna she made that (Rick)

(4) **Alice**:   ('+' denotes *direct* recursion)
a. play eat + make tea   1;7 *child wants to play eating and making tea*
b. too warm + hold baby + mommy hold 1;7 *child gives doll to mother for help undressing it*
c. fill up + brim + tea   1;8 *child wants to fill cup up to brim with tea*
d. have these toys + no   1;8 *child agrees that she doesn't have these toys at home*
e. hat_i + take $that_i$ off too mommy   1;9 *child wants mother to take hat off the doll*
f. put all + $saucer_i$ + on $that_i$ 1;9 *child wants to put all toys on saucer*
g. baby + have + put over   1;9 *child wants to put blanket she's holding on doll*
h. don't have coat on + baby + no   1;9 *child comments on baby not wearing a coat*
i. that girl have + take that jacket mommy 1;9 *child requests help removing doll's jacket*
j. $elephant_{(theme)}$ + find   1;10 *child is looking for elephant toy*

(5) **Rick**:
a. fix it_i + $truck_i$ 1;10 *child hammers on truck with a hammer*
b. I fix $them_i$ + $mommy's_i$ 1;10 *child fixes mother's shoes*
c. $truck_i$ + $Nanna_j$ + she_j made $that_i$ 1;10 *child shows truck to mother*
d. cat_i + do it_i 1;11 *child straightens a picture of a cat*
e. $apple_i$ + I want it_i + $apple_i$ 1;11 *child requests an apple*
f. $banana_i$ + put it_i back   2;0 *child places banana back in bottle*
g. $jingle-bell_i$ + take $that_i$ out   2;0 *child tries to get jingle-bells out of a basket*

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