

Relative Gradable Adjective Recursion is More Challenging for Acquisition than Possessive Recursion:

Insights from a story-based experiment with *the deer's friend* and *big small mushrooms*

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Our experiment brings evidence that children handle recursive possessives (R-Poss) in a more adult-like manner than recursive relative gradable adjectives (R-RGA). While the abstract notion of indirect recursion underlies both R-Adj and R-Poss, we ask whether individual syntactic-semantic properties determine different acquisition paths for R-Poss and R-Adj.

Background: Children <6 have difficulty understanding and producing R-Poss and R-Adj, e.g., misinterpreting *Tom's friend's dog* as the coordinate phrases 'Tom's dog and his friend's dog' (Limbach & Adone 2010, Pérez-Leroux et al. 2012, Terunuma et al. 2017) and *the second green ball* as 'the second and the green ball' (Matthei 1982, Bryant 2006, Gu 2008). We ask how children handle R-RGA phrases that represent smaller and larger sets and whether a comparison of children's development of adult-like R-Poss and R-RGA would reveal advantages for possessives.

Aim: We investigated children's comprehension and production of R-RGA phrases representing particular sets (e.g. *small big mushrooms*), to determine whether the evidence supports a different developmental path for possessives and adjectives. We expect children to have more difficulty with R-RGA (*big small mushrooms*) than R-Poss (*the deer's mushroom's circle*). Syntactically, R-Adj involves composing recursive adjectives inside the NP (first, merging the set adjective to the head, then merging the subset one to the resulting nominal), while R-Poss involves composition outside the head: first, creating a Poss-object, then merging it to the head (See Structure-1). Semantically, building subsets inside sets with adjectives is more challenging than the semantics of relations expressed by possessives. Morphologically, R-Poss could be easier to handle by children, since the possessive /'s/marker might act as a recursion cue.

Participants: 39 TD English-speaking children (Age range: 4-12, Mean age: 7;3) and 10 adult-controls.

Procedure: Children helped *the deer*, *the deer's friend*, and *the deer's friend's sister* within a story framework. Children selected and produced recursive big/small mushroom sets for them, put the R-RGA mushrooms in recursive big/small trucks, and sold them to three squirrels (Chippie, Chippie's father, Chippie's father's friend) (Fig.1). Recursive phrases (2- and 3-adjectives/possessives) were tested (Table 1), alongside control coordinative phrases. For

comprehension, children identified R-RGA sets by drawing circles and possessives by linking arrows from sets to possessors. For production, children named sets.

Results: Overall, recursion is significantly easier for possessives than for R-RGA, with older children performing better (Table 2). 16 (72.73%) out of 22 children ≥ 7 and 3 (17.65%) out of 17 children < 7 handled 3-level recursion for both adjectives and possessives. A similar trend was found for 2-level recursion. Children showed non-adult responses for R-RGA (deletion/insertion, misordering, inversion, etc.). While ellipsis was prevalent for R-Poss, fewer errors occurred (e.g., Poss marker omission).

Account: We conclude that R-RGA syntax, where computation is within the noun phrase, is more complex than R-Poss syntax, where computation is within the possessive. Moreover, set/subset semantics is more difficult than possessive relational semantics, as it may be easier for children to relate two entities than to ascribe properties to subsets. Therefore, syntax-semantics mapping is more challenging for R-RGA than R-Poss.

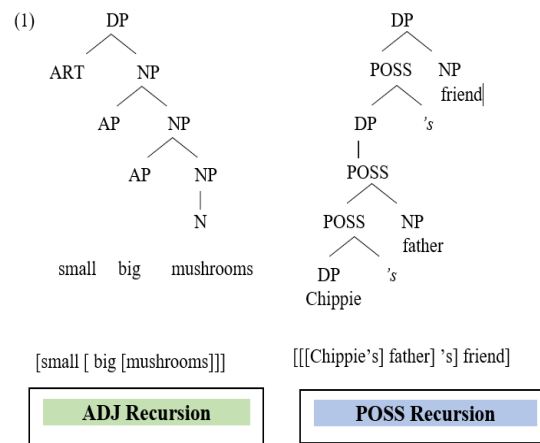


TABLE 1. Sample R-RGA and R-Poss

2-adjective recursion	The big big truck is mine, because only I can drive it.
3-adjective recursion	Which box has the SMALL big small mushrooms?
2-possessive recursion	And this is Chippie's father's friend.
3-possessive recursion	Can you tell me what color the deer's friend's mushrooms' circle is?

Figure 1. Sample Pictures from the Protocol

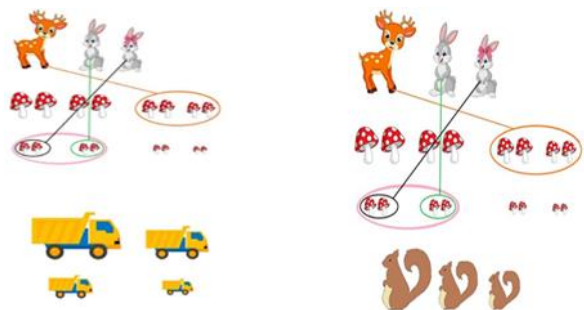


Table 2. Accuracy (>70%) of recursion for R-RGA and R-Poss by age group

	Age <= 6 (n = 17)	Age => 7 (n = 22)
2-level R-RGA & R-Poss > 70%	5 (29.41%)	14 (63.64%)
3-level R-RGA & R-Poss > 70%	3 (17.65%)	16 (72.73%)
Mean score for 3-level R-Poss	67.73%	89.43%
Standard deviation for 3-level R-Poss	0.3741	0.1328
Mean score for 3-level R-RGA	47.40%	66.05%
Standard deviation for 3-level R-RGA	0.2803	0.2285
3-level R-Poss > 70%	11 (64.71%)	19 (86.36%)
3-level R-RGA > 70%	5 (29.41%)	11 (50.0%)

References: Bryant 2006, Gu 2008, Limbach & Adone 2010, Matthei 1982, Pérez-Leroux et al. 2012, Terunuma et al. 2017