Children's sensitivity to informativeness in naming: basic-level vs. superordinate nouns

June Choe, Anna Papafragou (University of Pennsylvania)

Introduction In both children's word learning and object labelling, the "basic"-level of specificity ("dog") is privileged over the broader, superordinate level ("animal") [1–2]. This bias has been argued to emerge from the perceptual naturalness of basic-level categories (e.g., [3]) and/or children's conceptual difficulties with the superordinate level of abstraction (e.g., [4]). Here, we propose instead that this bias reflects at least in part children's maturing competence in pragmatics – namely, the ability to identify the pragmatically appropriate taxonomic level of a linguistic description [5–6]. The basic level is preferred because it is informative enough for a generic addressee [7–8], whereas a superordinate is typically under-informative, especially for single referents [9–10]. We hypothesize that children are sensitive to pragmatic informativeness and test two predictions (cf. [11–12]). First, children should judge superordinate nouns as infelicitous for single referents when the basic-level is familiar (Exp.1). Second, these judgments should be modulated by task-specific relevance (vs. a global bias against superordinates; Exp.2).

Experiment 1. Methods. Twenty English-speaking 4-to-5-year-olds and 20 adults participated in a game on a computer screen: Mr. Lion named single, familiar objects and participants rewarded him with a small, medium, or large strawberry depending on how well he named the object (small=wrong, large=best, medium=not wrong but also not the best) (Figure 1a; cf. [13]). Critical (n=8) trials involved either a basic-level or superordinate label (e.g., "This is a dog" vs. "This is an animal", within-participants). Of interest was whether superordinate labels, compared to basic-level labels, would elicit more mid-size rewards and fewer large-size rewards, reflecting true but under-informative responses. Filler trials involved logically true (n=8) or false (n=8) statements.
Results. Mixed-effects logistic regression models showed that superordinate labels led to more mid-size rewards than basic-level labels in both adults (55% vs. 14%, $p<0.001$) and children (31% vs. 14%, $p<0.01$), as well as fewer large-size rewards (children: 41% vs. 79%, $p<0.001$; adults: 45% vs. 85%, $p<0.001$), suggesting that both children and adults judge superordinate labels to be under-informative for identifying a single, familiar referent (Figure 2).

Experiment 2. Methods. Forty 4-to-5-year-olds and 40 adults participated in a modified game, where the target image (e.g., dog) was now presented alongside three images from either the same superordinate category (e.g., 3 cats) or a different one (e.g., 3 vehicles) (between-participants; Figure 1b). Mr. Lion offered the same labels as in Experiment 1 after the experimenter said: "This one is different! (a red frame appears around the target) What is it?"
Results. Children flexibly evaluated superordinate labels depending on the visual alternatives present: mid-size rewards for superordinate labels decreased from Same-Superordinate (32%) to Different-Superordinate (12%) conditions ($p<0.001$), with a corresponding increase in large-size rewards (43% vs. 66%, $p<0.01$; Figure 3). This suggests that children relaxed the penalty on superordinates when those satisfied the need to distinguish the target referent from the visual alternatives. However, this effect was absent in adults, whose mid-size responses to superordinate labels were consistent (48–50%; Figure 3). In a replication of Exp.2 (n=40 adults) requiring justifications, adults' reasons for mid-size rewards for superordinates differed (Table 1): in the Same-Superordinate condition (dog among cats), adults penalized the use of "animal" for the dog citing *other visual referents* in the scene; but, in the Different-Superordinate condition (dog among vehicles), adults penalized superordinates citing other*, stronger lexical alternatives* for the target referent ("dog"). Thus, unlike children, adults in the latter case seemed to generate an optimal sentence for a generic addressee beyond the local demands of the task.

Conclusion Four-to-five-year-olds recognize that superordinates are typically under-informative for naming familiar objects but adjust this expectation depending on the local relevance of alternatives. This pragmatic sensitivity may in turn govern the conditions under which children expect to discover superordinate-level meanings in word learning.

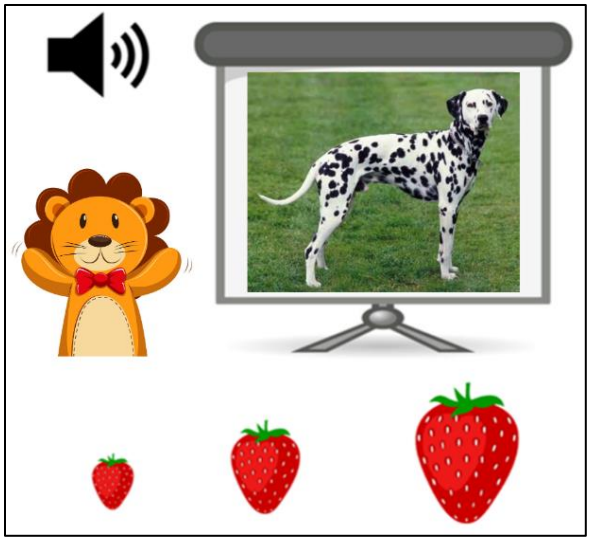

Figure 1a. A sample trial in Experiment 1.

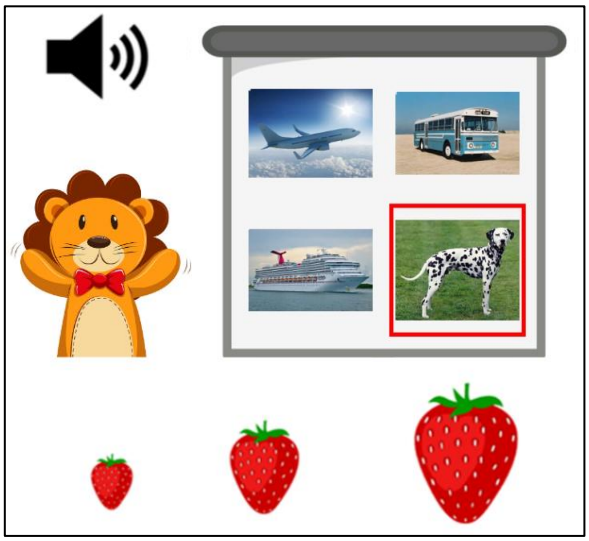

Figure 1b. A sample trial in Experiment 2, Different-Superordinate condition: the target ("dog"/"animal") appears among three vehicles (replaced by three cats in the Same-Superordinate condition).

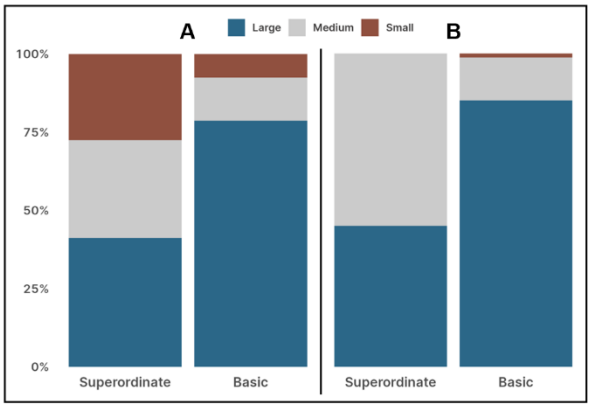

Figure 2. Experiment 1: adult (2A) and child (2B) responses.

Justification coding \ Condition	**Same** (e.g., animals) Superordinate	**Different** (e.g., vehicles) Superordinate
Mentions **other visual referents** in the scene (e.g., vehicles in Fig.1b)	63%	10%
Mentions **stronger lexical alternatives** for the target (e.g., "dog" in Fig.1b)	33%	80%
Other reasons	4%	10%

Table 1: Adults' justifications when they gave mid-size rewards to superordinate labels in Experiment 2 replication. Percentages add up to 100% within each column/condition. Most frequent justification types within each condition are highlighted in yellow.

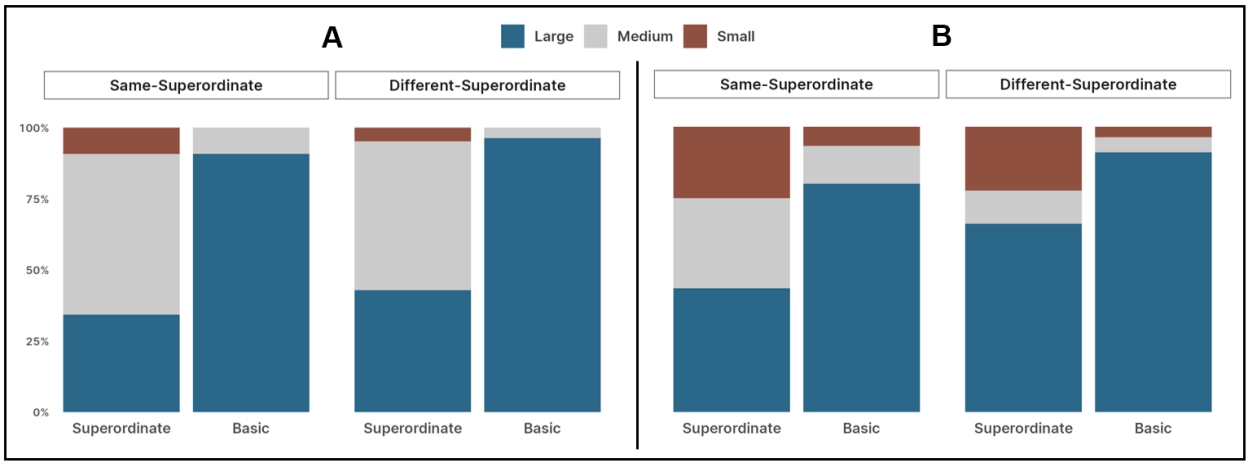

Figure 3. Experiment 2: adult (3A) and child (3B) responses.

References: [1] Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976. *Cog. Psy.* [2] Blewitt, Golinkoff, & Alioto, 2000. *First Lang.* [3] Mervis & Rosch, 1981. *Ann. Rev. Psy.* [4] Inhelder & Piaget, 1964. *The Early Growth of Logic in the Child.* [5] Clark, 2017. *Handbook of Categorization in Cognitive Science*. [6] Choe & Papafragou, 2023. *JML*. [7] Brown & Dell, 1987. *Cog. Psy.* [8] Grigoroglou & Papafragou, 2019. *Cog. Sci.* [9] MacNamara, 1982. *Names for Things.* [10] Levinson, 2000. *Presumptive Meanings*. [11] Noveck, 2001. *Cognition*. [12] Papafragou & Musolino, 2003. *Cognition*. [13] Katsos & Bishop, 2011. *Cognition*.