How Stimuli Availability Effects Novel Noun Generalization in a Free-Choice Design.

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Abstract

A common result in novel word generalization is that comparison settings (i.e., several stimuli introduced simultaneously) favor conceptualization and generalization. We investigated which type of items four-, five- and six-year-old children would choose as referents in a free-choice novel noun generalization task. We manipulated the generalization items availability at test (i.e., generalization stimuli introduced sequentially or simultaneously). We also manipulated the semantic distance between items. In a signal detection theory framework, results showed that a simultaneous presentation of generalization items improves children's sensitivity and helps them use a neutral strategy to generalize. Conceptual distance at learning also affects generalization performance. We discuss the cognitive constraints that both types of presentation bring into the task, and how distance might impede or favor conceptual alignments.

Keywords: Categorization, generalization, novel noun, forced-choice, free-choice, conceptual distance, stimuli availability

Introduction

When children learn to categorize and name novel objects, they have to understand which dimensions are important to define the corresponding concept (Murphy, 2002). Identifying which word learning format(s) promote concept construction and novel word generalization is an important topic for cognitive sciences.

The present study capitalizes on recent evidence showing that comparing stimuli from the same category during learning favors conceptually based novel word generalization. However, the benefits of comparison have mainly been evidenced with forced-choice design. In contrast, we used a free-choice task and manipulated the "temporal" availability of the generalization stimuli, either *sequential* (one-by-one) or *simultaneous* (all stimuli displayed together), as a function of semantic distance. We analyzed the answers, in a signal detection theory (SDT) framework, in order to study sensitivity and response bias across ages and the generalization stimuli's availability.

Comparisons and novel word generalization

Recent evidence shows that the opportunity to compare exemplars while learning a novel word favors conceptually based categorization and the novel word generalization compared to the classical single exemplar learning design. This result has been replicated in various linguistic categories (see Gentner & Christie, 2010 for a review).

In a typical comparison choice design, the learning items are both perceptually similar (i.e. they display the same shape, e.g. two similar fruits) and taxonomically similar. In the generalization phase, the child has to choose between an item that is taxonomically-related to the learning items but rated as perceptually dissimilar to them (e.g., a banana) and a perceptually similar lure that is conceptually unrelated to the learning items but perceptually similar (e.g., a red Christmas ball) to them (Gentner & Namy, 1999). Whatever the variations and particulars of the design, these studies have shown that comparison situations and the presence of a unifying name (i.e. label effect) lead to more conceptually-based generalizations than no-comparison situations, which, in turn, tend to favor the perceptually salient (the shape) lure.

The semantic distance between the items compared has also been shown to have an important effect on children's taxonomic generalizations. Thibaut and Witt (2017) studied novel noun generalization with 4- and 6- year-old children. They manipulated the semantic distance between learning items (close vs. far) and between the learning items and the taxonomic item to generalize the word to (near vs. distant). Close learning items were from the same basic level category whereas far learning items were from the same superordinate category. Results revealed that learning pairs from more distant domains led to better taxonomic generalization. The interpretation was that broader conceptual distance at learning helps participants abstract the relevant relations between learning objects and build a more conceptually based representation for generalizing the novel word.

Similar effects of distance between learning items that favor generalization have been demonstrated in various domains like relational noun generalization (Thibaut & Witt, 2015), analogical reasoning (Thibaut, French, Vezneva, 2010), multidimensional stimuli categorization (Hammer et al. 2008), or scientific reasoning (Klahr & Chen, 2011).

Forced-choice and free-choice tasks

Most existing studies on object noun comparison and generalization use a forced-choice design (Alfieri et al., 2013). Forced-choice designs are well-suited to study children's biases in word learning tasks (Landau et al., 1988; Markman, 1989) or to study which commonalities children spontaneously choose as a basis for generalization.

However, in such designs children might also choose the item that is most plausibly related to the learning item(s) but that they would not select as an item of the same category if they were not forced to choose. Conversely, selecting one

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option does not mean that participants would not accept the other option as a member of the category. For example, in a forced-choice, Smiley and Brown (1979) showed that young children could select and justify a taxonomic choice even when their first choice was a thematic choice.

Free-choice designs can therefore be considered better suited to study the extension children give to novel words because children can select all or none of the generalization options, whatever their conceptual relation with the training items (perceptual lure, taxonomically related choice, or theme related choice). Therefore, free choice designs might give a clearer picture of the items children believe belong to the category.

Goals of the present experiment

We use a free-choice task with 4- to 6-year-old children with the following questions. First, will comparison, semantic distance and attractive lures still affect children's conceptually based generalization in a free choice design? Indeed most of the available has been obtained under "forced" circumstances? Indeed, it might be argued that only close items will be accepted as "natural" extension of terms when given the possibility to overlook items. Second, how will the generalization item's availability - a new parameter that can only be considered in free-choice designs and the effect of which has not yet been analyzed - influence generalization and interact with parameters already recognized as important during generalization?

Indeed, in daily life, children might see generalization items simultaneously (e.g., a fruit with other target fruits, or a fruit in a kitchen with other fruit-related objects, or a fruit with a perceptually similar object that is not a fruit). They might also encounter the same generalization items one by one, sequentially. We therefore used two different generalization availability conditions (simultaneous and sequential) to present the generalization items. These items were selected to approximate the diversity of generalization items children may encounter in daily life. They were taxonomically related, thematically related, perceptually related or non-related to the learning items.

Because we used a free-choice design, we analyzed our results in the signal detection theory framework, analyzing children's sensitivity to the signal, (i.e., ability to discriminate between taxonomically related items, the signal, and the other generalization items, the noise). Sensitivity is distinguished from their response strategy known as the response bias, which can be conservative (i.e., tendency to reject answers that leads to missing correct answers), neutral or liberal (i.e., tendency to accept, leading to many false alarms. Combining different measures of performance (e.g., correct answers, false alarms) in one index will give us information that percentage of choices do not provide. Indeed, the number of incorrect choices will be taken into account by the inclusion of false alarms. It is also interesting to consider the extent to which different conditions might or might not boost the overall probability of accepting.

In this experiment we also manipulated age as a between factor, predicting that sensitivity should increase and bias decrease with age; and conceptual distance between the compared items in order to study whether this might interact with availability and influence bias and sensitivity.

We predicted that a larger semantic distance between learning items would lead children to build a broader learning representation. In the far learning condition children should therefore include more distant generalization items and have a higher level of sensitivity.

We also predicted that the generalization item's availability will influence children's sensitivity because the two availability conditions (i.e., sequential or simultaneous) constrain the task – and children's generalization - differently. However, how generalization item availability will affect sensitivity is an open question. The two availability conditions enable different comparisons between learning and generalization items that children may use to find their answer. On the one hand, sensitivity may be lower in the simultaneous condition, because children's attention may be attracted by the perceptual items and diverted from the taxonomic answers reducing sensitivity, whereas no such interference is possible in the sequential condition. On the other hand, sensitivity might be higher in the simultaneous condition, because multiple comparisons between learning and generalization items might help to highlight conceptual commonalities and reject irrelevant dimensions, thus reducing false alarms.

As for children's strategy (response bias), we predict that the simultaneous condition should reduce the bias compared to the sequential one because of the possibility to compare all the stimuli and decide which items belong to the category in terms of a reference set of features.

We will also follow up with a control no-comparison situation in a second step. Our aim is to have results in a no-comparison design as reference in a free choice design, because this type of data is not available in the literature.

Experiment 1

Methods

Participants

One-hundred-and-eighty French speaking children were tested individually in a quiet room at their school. Informed consent was obtained from their parents. Three age groups were tested, 58 four-year olds (47 months; 41 – 53), 62 five-year-olds (60 months; 56 – 65) and 60 six-year-olds (72 months; 68 – 83).

Materials

Color pictures of real objects were used as stimuli. The pictures were organized into sixteen stimulus sets, each associated with a semantic category (e.g., accessories, foods, clothing, tools, etc), each set was designed with three learning stimuli and ten generalization stimuli. The sixteen trials were divided into two learning conditions (close or far learning).

Each trial was constructed around a semantic category. In each learning condition, one of the two pictures was considered as the standard picture. In the close learning condition, the two learning items were two pictures of objects from the same basic level category (e.g. a pear and a cut pear). In the far learning condition, the two learning items were from the same superordinate category (e.g., a pear and a raspberry).

The ten generalization items were : two pictures of objects from the same superordinate level category as the learning-items (near generalization items, TaN, e.g., apricots and pineapple), two pictures from a more distant superordinate category as the learning-items (distant generalization items, TaD, e.g., chips and pasta); two stimuli perceptually similar to the standard learning item but not taxonomically related to the learning items (perceptual distractors, P, e.g. a punching ball and a pear shaped candle); two pictures thematically but not taxonomically related to the learning-items (thematically related distractors, Th, e.g., a fruit basket and a fruit knife); two lures semantically and perceptually unrelated to the learning items (non-related distractors, NR, e.g. a car and a note book). Twenty 3-year-old and twenty 4-year-old children were arsked to recognize the trails objects and succeeded, controlling that all items are known by children.

The trials' order during the task was balanced, as was the order in which were presented the different learning conditions. All 16 trials in a task were presented with the same generalization availability. In the sequential generalization availability, the generalization-items' order was balanced between trials. In the simultaneous generalization availability, the position of the generalization items on the screen appeared was balanced between trials. Generalization availability was set as a between factor to avoid that answers given in simultaneous cases influence answers given in sequential cases, if for example taxonomic answers are more obvious in simultaneous cases were all items are available together. Figure 1 shows an example of a trial built using the stimuli from the food/fruit/pear category. The pictures were displayed on a 13inch touchscreen laptop.

We forged 16 different bisyllabic labels (pseudo-words) which are, as shown by Gathercole and Baddeley (1993), easier to remember than monosyllabic pseudo-words (e.g., buxi, dajo, zatu, xanto, vira). Syllables were of the CV type which is the dominant word structure in French (from Lexique.org, New, Pallier, Brysbaert, & Ferrand, 2004).

Ratings on a 1 to 10 scale (1: far rating, 10: close rating) were obtained from undergraduate students to control generalization items. Twenty-eight students' ratings confirmed that taxonomically related items are considered to belong to the same category as the standard learning item (average ratings: Ta: 7.6, Th:4.5, P:2.1, NR:1.5, average p between Ta-Th p<.001). And twenty-four students rated near taxonomically related generalization items conceptually

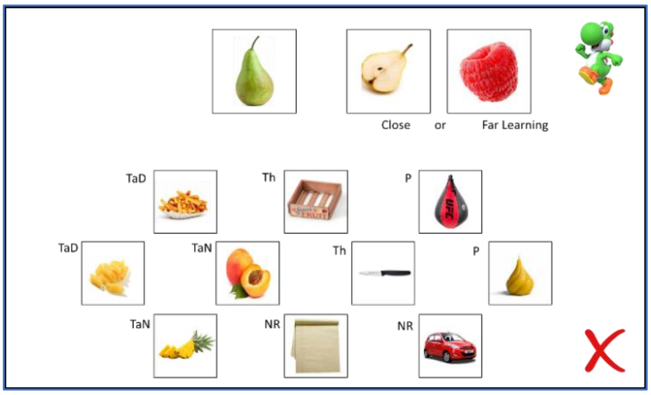

Figure 1: Trial built for the food category
Note: Participant saw either the close or the far learning item
TaN : taxonomically near, TaD: taxonomically distant, Th: thematically related, P: perceptually related, NR : non related generalization items

closer to the standard item compared to distant taxonomically related items.

Perceptual similarity and thematic similarity ratings from 36 and 21 students respectively, controlled that the item were perceptually more similar (average ratings: Ta: 3.0, Th:2.2, P:6.3, NR:1.7, average p between P-Ta p<.001) or thematically more strongly related (average ratings: Ta: 6.4, Th:7.5, P:2.2, NR:1.8, average p between Th-Ta p<.05) to the standard learning item than the taxonomically related items. Unrelated distractors scored significantly below all other generalization items in all ratings (p<.01)

Procedure

Participants were seated at a low table, in a quiet room at their school, facing the laptop, next to the experimenter. They were randomly assigned to one of the generalization availability conditions (sequential, or simultaneous). In both conditions, children were introduced to a puppet named "This is Yoshi, we are going to play with him. But he lives far away from here and speaks a different language. In the game we are going to learn his language." The experimenter then showed the fifteen trials. In all two learning conditions learning items appeared one by one near the top of the screen and the experimenter announced their name as they appeared using the instruction: "Yoshi's mummy says that this is a *buxi*, and this one is also a *buxi*; Yoshi must find other *buxis* for his mummy….". Then, the generalization items appeared on the lower part of the screen, generalization availability one by one in the sequential condition, the experimenter said "is this a "*buxi…?*"for each of the 10 generalization items. In the simultaneous condition, they were displayed simultaneously: "which ones of these are also *buxis*, show me the *buxis* but not the other things". The experimenter finished the instructions by "Take your time, don't give me your answer before Yoshi appears on the screen".

Table 1: Mean proportion of answers as a function of generalization items, generalization availability and age

Availability	Sequential						Simultaneous					
Learning distance	Close			Far			Close			Far		
Age	4	5	6	4	5	6	4	5	6	4	5	6
Near	.44 *(.04)*	.49 *(.04)*	.60 *(.05)*	.44 *(.04)*	.57 *(.04)*	.63 *(.05)*	.64 *(.04)*	.75 *(.04)*	.72 *(.05)*	.65 *(.04)*	.75 *(.04)*	.72 *(.05)*
Distant	.44 *(.03)*	.37 *(.04)*	.45 *(.05)*	.48 *(.03)*	.34 *(.04)*	.46 *(.05)*	.55 *(.03)*	.51 *(.04)*	.52 *(.05)*	.58 *(.03)*	.57 *(.04)*	.51 *(.05)*
Thematically related	.38 *(.03)*	.24 *(.03)*	.33 *(.04)*	.26 *(.03)*	.10 *(.03)*	.19 *(.04)*	.30 *(.03)*	.27 *(.03)*	.17 *(.04)*	.32 *(.03)*	.22 *(.03)*	.17 *(.04)*
Perceptually related	.33 *(.03)*	.22 *(.03)*	.26 *(.04)*	.28 *(.03)*	.19 *(.03)*	.15 *(.04)*	.44 *(.03)*	.35 *(.03)*	.26 *(.04)*	.38 *(.03)*	.29 *(.03)*	.30 *(.04)*
Non-related	.27 *(.03)*	.07 *(.03)*	.11 *(.05)*	.19 *(.03)*	.07 *(.03)*	.06 *(.05)*	.38 *(.03)*	.23 *(.03)*	.15 *(.05)*	.37 *(.03)*	.22 *(.03)*	.15 *(.05)*

Note : Means and *Standard deviations in brackets.*
Generalization item (Near, Distant, Thematically related, Perceptually related, Non-related) Generalization availability (Sequential or Simultaneous), Learning distance (close, far), Age (4-, 5-, or 6-years-old).

Table 2 : Proportion of responses and signal detection indexes as a function of the comparison situation, learning distance and generalization availability

	Learning distance	Generalization availability	Hits	Misses	False Alarms	Correct rejections	D'	β
Comparison situations	Close	Sequential	.43	.57	.17	.83	.65	.55
		Simultaneous	.61	.39	.27	.73	.83	.23
	Far	Sequential	.45	.55	.24	.76	.47	.42
		Simultaneous	.63	.37	.28	.72	.85	.18
No-Comparison situations	*NA*	Sequential	.17	.83	.06	.68	.23	1.63
		Simultaneous	.49	.51	.32	.94	.35	.40

Design

Four-, five- and six-year-old children were compared. They were randomly assigned to one of the two generalization availabilities (sequential, 88 children or simultaneous, 92 children) a between subject factor. Age was crossed with generalization availability, and learning distance (close, far) a within-subject factor.

Results

Signal detection theory indexes

For the data analysis we calculated a sensitivity index *D'* and a response bias index *β* derived from signal detection theory (Macmillan & Creelman, 2004) adapting them to experiments based on small numbers of stimuli (see, Rioux et al., 2018b). D' (range 0 : 1) indicates participants ability to discriminate (high values for better discrimination) and β (range -1 : 1) indicates their strategy (liberal, for negative values of *β; conservative for positive values ; neutral for β=0).*

Data analysis

Proportion of choices for each type of generalization item are given as an indication in Table 1.

Sensitivity. In order to test our hypothesis on the learning distance and availability effects on children's sensitivity we ran a three-way repeated measure ANOVA on the sensitivity index D' with age (4, 5, and 6 years), generalization availability (sequential and simultaneous) as between factors and learning distance (close and far) as a within factor (see Table 2). Results revealed a simple effect of all three factors: age $F(2,174) = 6.23$, $p < .001$, $\eta^2_p = .12$; generalization availability $F(1,174) = 14.23$, $p < .001$, $\eta^2_p = .076$ and learning distance $F(1,174) = 7.67$, $p < .01$, $\eta^2_p = .042$.

Children's sensitivity was significantly higher in close learning trials than in far learning trials ($M_{close} = .74$, $SD_{close} = .043$; $M_{far} = .65$, $SD_{far} = .040$) and in simultaneous generalization than in sequential generalization ($M_{simultaneous} = .84$, $SD_{simultaneous} = .053$; $M_{sequential} = .55$, $SD_{sequential} = .055$). Children's sensitivity also increased with age ($M_4 = .43$, $SD_4 = .067$, $M_5 = .82$, $SD_5 = .065$, $M_6 = .84$, $SD_6 = .66$). A posteriori Tukey analysis revealed that sensitivity at 4 years is significantly lower than sensitivity at 5 and 6 years ($p < .001$).

The analysis also revealed an interaction effect between learning distance and generalization availability: $F(1,174) = 6.54$, $p < .05$, $\eta^2_p = .036$ (Figure 2). A posteriori Tukey analysis revealed that in sequential generalization children's sensitivity in far learning is significantly lower than their sensitivity in close learning ($M_{far} = .46$, $M_{close} = .64$, $p < .01$) revealing children's greater difficulty to discriminate generalization items in far learning. This difference did not appear in the simultaneous generalization condition ($M_{far} = .84$, $M_{close} = .84$, $p = .99$) which, overall, revealed a high

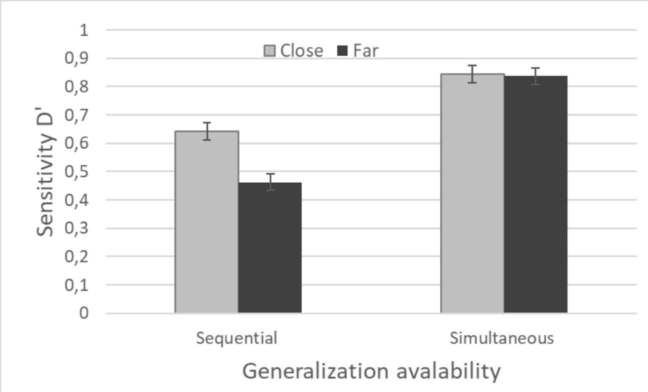

Figure 2 : Sensitivity as a function of learning distance (close, far) and generalization availability (sequential, simultaneous). (error bars are SEM)

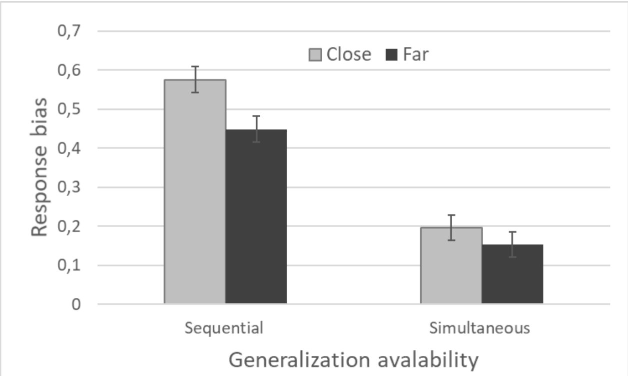

Figure 3 : Response bias β as a function of learning distance (close, far) and generalization availability (sequential, simultaneous). (error bars are SEM)

sensitivity in both learning distance levels in the simultaneous case, whereas the far condition had a more detrimental effect than the close condition in the sequential case. It is likely that children cannot benefit of the simultaneous comparison to monitor their choices in the sequential case.

Response bias. In order to test the factors' effects on children's strategy, we ran a three-way repeated measure ANOVA on the Bias criterion Beta with age (4, 5, and 6 years), generalization availability (sequential and simultaneous) as between factors and learning distance (close and far) as a within factor (see Table 2 for values). Results revealed a main effect of generalization availability $F(1,174) = 13.22$, $p <.001$, $\eta^2_P = .071$ and learning distance $F(1,174) = 42.49$, $p <.001$, $\eta^2_P = .20$ but no effect of age.

These two main effects were subsumed by an interaction effect between learning distance and generalization availability, $F(1,174) = 10.62$, $p < .01$, $\eta^2_P = .058$ (Figure 3) that is the most important result. A posteriori Tukey analysis revealed that children's bias is equal in close and far trials in simultaneous generalization whereas in sequential generalization children's bias was less conservative in far learning compared to close learning. This result suggests a neutral strategy in the simultaneous case in both learning conditions whereas in the sequential case children were surprisingly more conservative in the distant case.

Control Experiment

Experiment 1 examined how children might generalize novel nouns in free choice designs. It aimed to analyses the effect of a parameter already known to affect conceptually based generalization in forced choice designs – learning distance - and the effect of a new parameter peculiar to free choice designs – generalization item availability.

However, experiment 1 tells nothing about the distribution of children's choices in a no-comparison and free-choice design. However, no-comparison situations are an important starting point in most novel noun learning paradigms. Moreover, this study aims to give, a comprehensive description of conceptually based generalization in free-choice designs and, for this reason, knowing how children generalize in a no-comparison situations is an important reference to have.

The following control experiment condition addresses this question. We focused on the age of 5 only because there was no interaction involving age in both sensitivity and bias, in the above analyses.

Methods

Participants

Forty-one, children were tested in a no-comparison situation. Children's average age was 5 years (mean: 56 months, range: 48-70). They were randomly assigned to a sequential (20 children) or simultaneous (21 children) availability condition.

Materials and Procedure

Materials and procedure were similar to the main experiment except that there was only one learning item and thus, the learning distance factor disappears.

Design

Five-year-old children in a no-comparison situation were randomly assigned to one of the two generalization availabilities (sequential, 20 children or simultaneous, 21 children) and were compared with the five-year-old children in a comparison situation. Comparison was crossed with generalization availability as a within-subject factor.

Results

We performed the same analyses as in experiment 1.

Sensitivity. The two-way ANOVA on the sensitivity index *D'* with comparison (comparison and no-comparison) and generalization availability (sequential and simultaneous) revealed an effect of comparison $F(1,104) = 19.31$, $p <.001$, $\eta^2_P = .16$. Children's sensitivity is significantly higher in the comparison situation compared to the no-comparison situation ($M_{comp}=0.77$ $M_{NoComp}=0.29$).

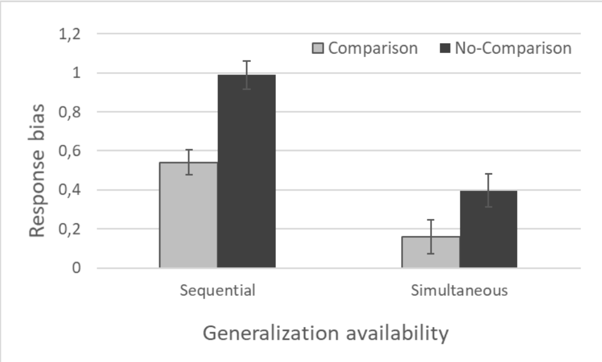

Figure 4: Response bias index β as a function of generalization availability (sequential, simultaneous) and comparison or no comparison situations.
(error bars are SEM)

Response bias. A two-way ANOVA on the response bias index β with comparison (comparison and no-comparison) and generalization availability (sequential and simultaneous) as between factors revealed an effect of comparison $F(1,104) = 18.70$, $p < .001$, $\eta^2_p = .15$, of generalization availability $F(1,104) = 27.86$, $p < .001$, $\eta^2_p = .21$ and an interaction between both factors $F(1,104) = 7.74$, $p < .01$, $\eta^2_p = .07$. The interaction and an a posteriori Tukey analysis reveal that in comparison situations there isn't a significative difference between responses biases in sequential and simultaneous conditions (p = 1.9), but in no-comparison situations children are significantly more conservative in the sequential condition (p < .001) (Figure 4).

Discussion

We used a free-choice design in order to study children's word extension rather than a traditional forced-choice word generalization design. These word extensions in a free-choice design are a good indicator of which items children believe belong to the same category as the items the word was learnt with.

Our specific aim was to assess how children would extend a novel noun in this type of design and how their performances would be influenced by the task's factors: conceptual distance between learning items and generalization items' availability.

Our main result was that learning distance and generalization availability interacted for both sensitivity and response bias indexes which confirmed our main hypothesis that these factors would affect novel word generalization. For both measures (i.e., sensitivity and response bias) children performed better in the simultaneous condition; their sensitivity was higher, and they were less biased (see Figure 2 and 3).

Performance differences between close and far learning cases only appeared in the sequential condition. In far learning trials, children's sensitivity and response bias were lower than in close learning trials.

In a control experiment we analyzed results from a no-comparison noun generalization situation versus results from our comparison situations: children were less sensitive as they rejected 71% of taxonomically related items. They were also more biased (i.e., extremely conservative strategy) in the no-comparison situation. Thus, in the no-comparison condition, they took fewer items, mostly incorrect perceptual lures.

Informal remarks at the end of the no-comparison condition suggest that children would have selected taxonomically and perceptually similar items, comforting the idea that shape similarities are important in their decision process (Kucker et al., 2019). This is interesting and important, as it shows that comparisons increase sensitivity and reduces the bias with respect to no-comparison conditions.

These results lead us to conclude first that simultaneous availability helped children generalize and that in this condition children are both discriminating well between generalization items and are unbiased. This confirms are predication for response bias and reveals that simultaneous availability does improve sensitivity a question we had left open. In the light of these results, simultaneous availability appears a powerful factor that can promote conceptually based generalization by improving both children's sensitivity and strategies thanks to the multiple comparisons between learning and generalization this condition allows.

Second, we can consider the sequential condition in which children's sensitivity is lower, children's strategies are more conservative, and both indexes are affected by learning distance. The main difference between learning conditions is due to the proportion of false alarms (see Table 2). In sequential availability and close learning children make few false alarms. It is in this crossing of conditions that children are the most conservative.

It is only in this availability condition that we can consider the effect of learning distance. We predicted that a far learning distance would improve children's sensitivity because such a learning situation should favor a broader category representation and word extension to higher category level members like the taxonomically related generalization items given here. However, in the present results, far learning – and the broader representation that it should enable – helps children be less conservative (i.e., far learning reduces the response bias) but it is close learning situations that improve sensitivity not far learning situations. Only a free-choice design could reveal that conceptual distance between items, can have this diverging effect on children's sensitivity and response strategy.

These result help us rethink the debate about the effect of amount of category knowledge and item's category level in the domain of novel noun generalization, and children's ability to extend novel words to items beyond the category's basic level (Jenkins et al., 2015; Xu & Tenenbaum, 2007). The stumbling block in this debate is that extra category knowledge from items at the category's subordinate level has opposite effects in different studies : it either promotes narrow generalization (Xu & Tenenbaum, 2007) or broader generalization (Jenkins et al., 2015). In the present study, both amount of knowledge and item's category level are manipulated, even if this is in a slightly different way, and an increase in the amount of knowledge available about the category (in simultaneous availability vs sequential or comparison vs no comparison situations) improves both sensitivity and generalization strategy. But conceptual distance (far learning) can improve strategies while reducing sensitivity which may be the source of what seems to be conflicting evidence in the previously cited papers. This debate is in the case of forced-choice designs and we think a free-choice approach, in which on can analyze sensitivity and strategies independently, may help find an outcome.

Finally, it is rather suppressing to notice that the sequential condition – which of the two availability conditions may be the closest to a daily life situation – is the condition in which children are highly conservative. This could mean that children in daily life situations may not name items for which they notice a conceptual relation because their strategy is conservative and would need further investigation to be confirmed.

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