How to Make a Proceedings Paper Submission

Anonymous CogSci submission

Abstract

Include no author information in the initial submission, to facilitate blind review. The abstract should be one paragraph, indented 1/8 inch on both sides, in 9˜point font with single spacing. The heading 'Abstract' should be 10˜point, bold, centered, with one line of space below it. This one-paragraph abstract section is required only for standard six page proceedings papers. Following the abstract should be a blank line, followed by the header 'Keywords' and a list of descriptive keywords separated by semicolons, all in 9˜point font, as shown below.

Keywords: Add your choice of indexing terms or keywords; kindly use a semi-colon; between each term.

Background

Basis of generalizations

What does "dog" mean to a 2-year-old? This old question reflects the evolving nature of our understanding of early label categorization. For young children, a dog might initially be identified by a set of perceptual features that expands with experience (Clark, 1972). Over time, deeper attributes, such as its internal composition, behavior and interaction with the world, or sound, may also become relevant (Carey, 1985). The defining features of the lexical category manifest in the way the word is used to label other objects. Understanding how children generalize a noun learned in the presence of a few examplars remains critical to deciphering the underlying processes of lexical concept formation. Overextensions are common in early word acquisition [Rescorla LA. Overextension in early language development], yet the nature of the underlying representations and their developmental trajectory remain debated. For example, The semantic features hypothesis (Clark, 1973) suggests that categorization begins with schemas of basic perceptual attributes, such as [four legs, tail, fur] for dog, hence we see overextensions of the word "dog" to beings that share these set of features like cats for example. In contrast, the functional core hypothesis (Nelson, 1974) posits that children extract probabilistic relationships among features to identify future category members without treating these features as defining. In this view, perceptual attributes like [four legs, tail, fur] act as identifiers rather than encapsulating the category's essence. Both frameworks agree, however, that shared perceptual features facilitate identification and labeling, forming the foundation for the well-studied shape bias (Baldwin, 1992; Graham & Poulin-Dubois, 1999; Landau et al., 1988). The shape bias is a word learning constraint that is argued to facilitate early noun acquisition, to be an important route to vocabulary growth, and found to be weaker in children with language delay (Smith et al. 2002; Jones, 2003; Jones and Smith 2005). Nevertheless, the shape bias observed in word learning experiments is highly variable across ages,cultures, languages, and experimental conditions, which led to some theoretical debates.

The cross-linguistic debate

The word extension task literature reveals cross linguistic differences in the prevalence of the shape bias that are thought to be theoretically important. For instance, East Asian languages' speakers like Mandarin and Japanese, show less reliance on shape compared to English speakers in the US (Gathercole & Min, 1997; Imai & Gentner, 1997; Jara-Ettinger et al., 2022; Larissa K. Samuelson & Smith, 1999; Nancy N. Soja et al., 1991; Subrahmanyam & Chen, 2006; Yoshida & Smith, 2003b). These differences are thought to reflect syntactic structure (e.g., count-mass syntax vs. classifier systems), or lexical and environmental statistical regularities in the language and the environment (Imai & Gentner, 1997; Jara-Ettinger et al., 2022, Abdelrahim & Frank 2024).

The Perception or conception debate

Another key debate centers on the mechanism underlying the shape bias. It is thought to be an automatic attentional bias that tunes attention to only the relevant perceptual cues that have been probabilisticlly associated with naming events and learning lexical categories in the past (smith et al 2002) (Smith colunga 2010) (e.g., Brady & Chun, 2007; Chun & Jiang, 1998). These perceptual cues are often correlated and integrated with the contextual cues of multiple sources like syntax, environment, and existing vocabulary. Then, this perceptual bias can constitute the actual representation of the lexical category i.e. a dog is the shape of dog. On the other hand, it can be a bias that acts as a heuristic to recognize objects,and is controlled by general world knowledge and conceptual understanding that can be exerted upon this bias and override it when necessary. These debates highlight the complexity of the shape bias's origins and mechanisms, as well as the conflicting interpretations of existing evidence. A meta-analytic effect size of 0.8, derived from over 300 standardized effects across 40 studies (Abdelrahim & Frank, 2024), confirms the robustness of the shape bias. However, substantial heterogeneity in the data (with over 90% of variance unexplained by age or language) suggests that cross-cultural, linguistic, and developmental differences remain masked.

#Sources of Heterogeneity

Task format

Generalization in word learning is often assessed using the word extension task. Here, children are taught a novel label for a novel object and tested on their ability to extend it to other objects that share features like shape, or material, etc, with the exemplar object. Word extensions are often measured via Forced-choice tasks, which require restrictive generalizations, yes/no endorsement tasks, allowing broader acceptance of category membership which allows for different levels of similarity and difference (cite), or Open-choice tasks, enabling children to reject all options, assumed to indicate an understanding of category membership that goes beyond shared perceptual features (Cimpian et al 2005). Forced-choice tasks may yield different results compared to yes/no endorsement tasks, and allowing children to select "none of those" reduces shape bias, especially with complex objects (Cimpian, 2005). The choice of the task format is often guided by the theoretical framework of the researchers, leading to what seems like a circular stream of events in which theory informs task selection, and task selection confirms theory. ## Stimuli A significant sources of variation in the word extension findings comes from differences in stimuli. Just like task format, these methodological decisions are often driven by theoretical frameworks as well. For instance, studies focusing on low-level attentional biases typically emphasize contrasts between shape and other perceptual features, such as color or material, using stimuli designed to highlight these attributes. On the other hand, studies investigating conceptual understanding often include cues related to animacy, such as eyes, shoes, or other salient features, and use test objects that share multiple dimensions with the exemplar instead of only one to explore broader conceptual frameworks (cite). When functionality is emphasized, stimuli are often paired with demonstrations of an affordance, stories, or narratives to contrast shape with function. Children aged [X–Y] are frequently found to prioritize shape, even when provided with functional information (Gentner & Rattermann, 1991; Woodward & Markman, 1998; etc.). However, conflicting evidence shows children sometimes prioritize function or other cues (Kemler Nelson, 1995; Gelman & Medin, 1993; etc.), with variation linked to factors like whether test objects were handled or how stimuli were designed (e.g., functional bases vs. appended parts). In addition, some studies use pictures or drawings, while others use physical objects (cite). Lastly, most studies employ between-subjects designs, which do not control for individual differences, further amplifying heterogeneity. These procedural and stimuli variations reflect broader theoretical questions about the origins of the shape bias (Smith & Medin, 1981). Is it a Low-level attentional mechanisms driven by attentional processes that guide children to perceptual features associated with category labels? Or a Top-down conceptual processes in which the perceptual features act as identifiers rather than defining properties? Where should the line be drawn between perceptual feature identification and the core representation of conceptual labels? Are these separate processes, or do they exist on a continuum that develops as children acquire more information? How do attention to perceptual attributes and conceptual understanding interact during development (Madole & Oakes, 1999)? These foundational questions influence procedural decisions and should be kept in mind when investigating label categorization and concept formation.

The nature of Knowledge

Given that task design is influenced by theoretical assumptions, this raises another important question: What type of knowledge do these tasks measure? Two key assumptions can stem out of this: Knowledge as Stable and Fixed: If knowledge is stable, tasks merely elicit pre-existing constructs. Investigating heterogeneity would then focus on ensuring task validity and reliability in capturing the theoretical construct. Knowledge as Dynamic and Task-Dependent: If knowledge is dynamic, categorization depends on the interaction between task specifics and children's behavior. This view suggests that children dynamically select information sources to organize categories, influenced by the context of the task and the nature of the stimuli (Smith et al., 2010). If the second assumption holds, achieving consistency in measures across studies is crucial to isolating the relevant contextual cues that tasks provide specially for cross-cultural studies that aim to adjudicate theoretical debates. Regardless of which assumption holds, it is very important to evaluate the heterogeneity in the word categorization studies which highlights the importance of methodological consistency and the need to consider the theoretical premises underlying procedural decisions. Understanding how these premises shape task designs and influence results is key to advancing our knowledge of label categorization and concept formation.

Current Study

This project attempts to provide a first step into a larger scale assessment of word generalization across age groups and languages. The main goal of this study is to evaluate the effect of procedural design and stimuli design on the heterogeneity seen in word generalization tasks. We utilize a within-subject design, controlling for individual differences which we believe is important for a proper comparison between conditions that require giving different instructions and cues to the participants. We aim to recruit a larger sample size of a wider age group, with a variety of items and test trials. Given our focus on early language acquisition and the noun bias dominating early vocabulary (cite), we prioritize studies examining functional information over other types of conceptual knowledge.

Stimuli design

Seven stimuli sets were hand crafted such that each set contains one exemplar, a material match, a shape match, a function match, and a distractor. In experiment 1, the shape match is contrasted with a material match, it served as a basic check and a replication of previous findings, while in experiment 2, the shape match is contrasted with a function match. The same exemplar is used in both experiments, and color is not shared across any of the objects. Objects are designed in a way that can answer to questions of how much children reason about the whole vs parts similarity, how they reason about material, and the influence of previous experiences with objects (cite Neslon and graham and).

Adults ratings

Experiment 1: a preliminary

Participants 24 typically developing English speaking participants (2-5 years old, mean =, sd =) were recruited from a local nursery school and children's museum in the US. Demographics: - were excluded due to, ### Procedure 7 trials were conducted in which each participant sees an object being labeled "this is a dax", the object is taken away but still in view, both test objects and the distractor are displayed simultaneously while asking the child "can you find another dax by pointing to it?". The child gets to hear the label 3 times while viewing it without touching it. ### Results Participants showed an overall shape bias across all trials (shape:61%, material:30%, distractor: 9%). Figure [1] shows a developmental shift to choose by shape by age 3, replicating what is seen previously in the literature. A generalized linear mixed model (GLMM) shows a significant positive relation with age (1.765:1 odds at average age, P<0.014, a 6.4% increase in odds with unit age). It also shows some variability at the item level intercept. After replicating the shape bias effect using the set of stimuli we created, our next experiment explores an experiment design that tests for both conditions when shape is only contrasted with material without any additional information, and a condition in which shape is contrasted with function after demonstrating the function for the exemplar, while controlling for individual differences with a bigger sample size to capture variability at the item level.

Experiment 2

Participants 31 (target n= 96, 24 per each age group from 2-5 years old) participants (mean age = , sd, n per age group) were recruited from a local nursery school in the US. demographic characteristics....

Stimuli Same stimuli as above, but for the function test object, it is modified in a way that doesn't change the shape at all, but allows for the function (an object that is wrapped all over and a similar one that can clearly open).

Procedure: A within subject manipulation with two conditions: material or function. The material condition is identical to the first experiment. In the function condition, the experimenter introduce the exemplar object "this is a dax", gives the child 15 seconds seconds to play with it, provides functional information " the dax grapes toys", gives another 15 seconds to play with it, and puts the toy away but within view, before introducing the test objects and asks for a response.

Preliminary results A generalized random effects logistic model showed an overall tendency to choose by shape regardless of condition ($p =$) with little variability between participants and a positive trend with age 0.81 ($p = .693$) 1, and a decline in shape bias for material condition 0.01 ($p = .742$). There is a huge variability between stimuli objects and a large effect of condition, but confidence intervals show uncertainty (data collection is still ongoing).

General Formatting Instructions

For general information about authoring in markdown, see **here.**

The entire content of a paper (including figures, references, and anything else) can be no longer than six pages in the **initial submission**. In the **final submission**, the text of the paper, including an author line, must fit on six pages. Up to one additional page can be used for acknowledgements and references.

The text of the paper should be formatted in two columns with an overall width of 7 inches (17.8 cm) and length of 9.25 inches (23.5 cm), with 0.25 inches between the columns. Leave two line spaces between the last author listed and the text of the paper; the text of the paper (starting with the abstract) should begin no less than 2.75 inches below the top of the page. The left margin should be 0.75 inches and the top margin should be 1 inch. **The right and bottom margins will depend on whether you use U.S. letter or A4 paper, so you must be sure to measure the width of the printed text.** Use 10~point Times Roman with 12~point vertical spacing, unless otherwise specified.

The title should be in 14~point bold font, centered. The title should be formatted with initial caps (the first letter of content words capitalized and the rest lower case). In the initial submission, the phrase "Anonymous CogSci submission' ' should appear below the title, centered, in 11~point bold font. In the final submission, each author's name should appear on a separate line, 11~point bold, and centered, with the author's email address in parentheses. Under each author's name list the author's affiliation and postal address in ordinary 10~point type.

Indent the first line of each paragraph by 1/8~inch (except for the first paragraph of a new section). Do not add extra vertical space between paragraphs.

First-Level Headings

First level headings should be in 12 point , initial caps, bold and centered. Leave one line space above the heading and 1/4~line space below the heading.

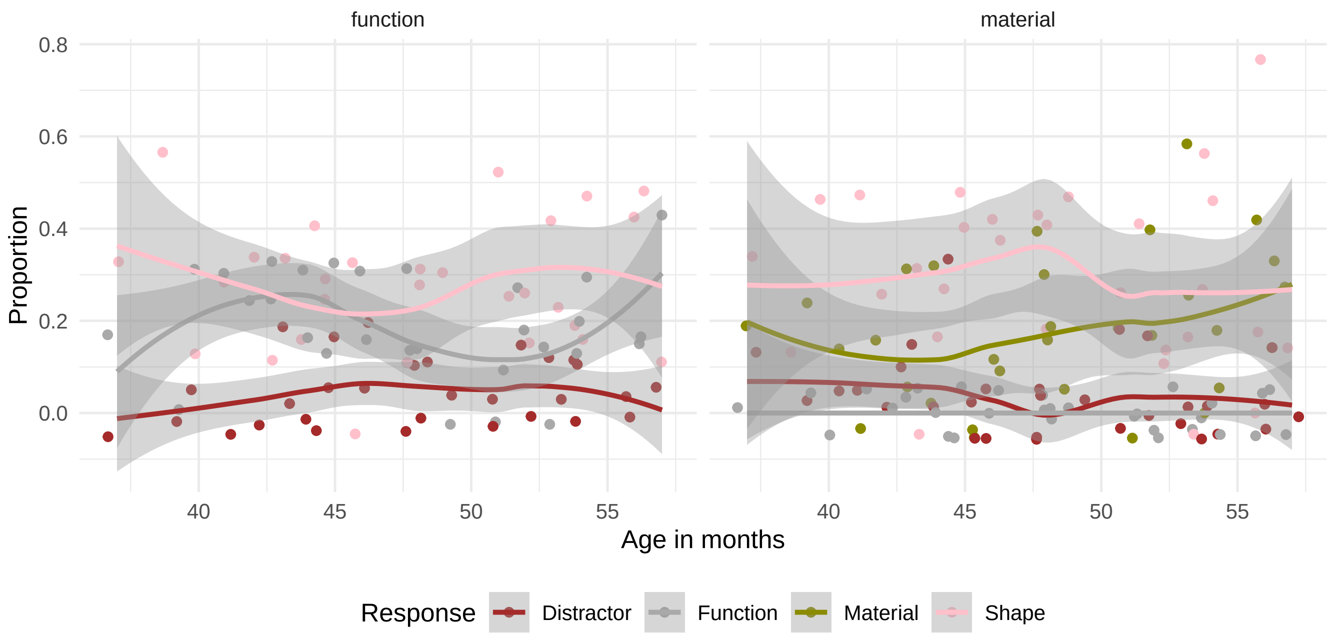

Figure 1: Effect size plotted by average participant age. Points indicate individual effect, and error bars show variance. Points are colored based on language, and model fits for Indo-European and non-Indo-European languages are shown in black.

Second-Level Headings

Second level headings should be 11 point , initial caps, bold, and flush left. Leave one line space above the heading and 1/4˜ line space below the heading.

Third-Level Headings Third-level headings should be 10 point , initial caps, bold, and flush left. Leave one line space above the heading, but no space after the heading.

Formalities, Footnotes, and Floats

Use standard APA citation format. Citations within the text should include the author's last name and year. If the authors' names are included in the sentence, place only the year in parentheses, as in (1972), but otherwise place the entire reference in parentheses with the authors and year separated by a comma (Newell & Simon, 1972). List multiple references alphabetically and separate them by semicolons (Chalnick & Billman, 1988; Newell & Simon, 1972). Use the et. al. construction only after listing all the authors to a publication in an earlier reference and for citations with four or more authors.

For more information on citations in RMarkdown, see **here.**

Footnotes

Indicate footnotes with a number[1] in the text. Place the footnotes in 9 point type at the bottom of the page on which they appear. Precede the footnote with a horizontal rule.[2] You can also use markdown formatting to include footnotes using this syntax [3].

Figures

All artwork must be very dark for purposes of reproduction and should not be hand drawn. Number figures sequentially, placing the figure number and caption, in 10 point, after the figure with one line space above the caption and one line space below it. If necessary, leave extra white space at the bottom of the page to avoid splitting the figure and figure caption. You may float figures to the top or bottom of a column, or set wide figures across both columns.

Two-column images

You can read local images using png package for example and plot it like a regular plot using grid.raster from the grid package. With this method you have full control of the size of your image. **Note: Image must be in .png file format for the readPNG function to work.**

You might want to display a wide figure across both columns. To do this, you change the `fig.env` chunk option to `figure*`. To align the image in the center of the page, set `fig.align` option to `center`. To format the width of your caption text, you set the `num.cols.cap` option to `2`.

One-column images

Single column is the default option, but if you want set it explicitly, set `fig.env` to `figure`. Notice that the `num.cols` option for the caption width is set to `1`.

[1] Sample of the first footnote.
[2] Sample of the second footnote.
[3] Sample of a markdown footnote.

Figure 2: This image spans both columns. And the caption text is limited to 0.8 of the width of the document.

Figure 3: One column image.

R Plots

You can use R chunks directly to plot graphs. And you can use latex floats in the fig.pos chunk option to have more control over the location of your plot on the page. For more information on latex placement specifiers see **here**

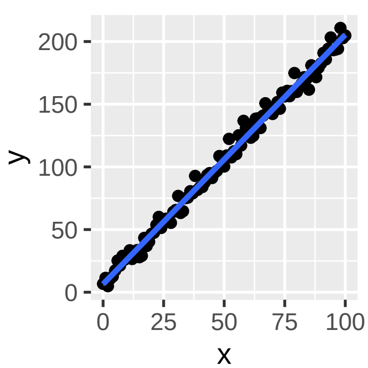

Figure 4: R plot

Tables

Number tables consecutively; place the table number and title (in 10 point) above the table with one line space above the caption and one line space below it, as in Table 1. You may float tables to the top or bottom of a column, set wide tables across both columns.

You can use the xtable function in the xtable package.

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.03	0.10	0.3	0.75
x	1.93	0.10	19.1	0.00

Table 1: This table prints across one column.

Acknowledgements

Place acknowledgments (including funding information) in a section at the end of the paper.

References

10 Chalnick, A., & Billman, D. (1988). Unsupervised learning of correlational structure. In *Proceedings of the tenth annual conference of the cognitive science society* (pp. 510–516). Hillsdale, NJ: Lawrence Erlbaum Associates.

Newell, A., & Simon, H. A. (1972). *Human problem solving*. Englewood Cliffs, NJ: Prentice-Hall.