

Research Proposal

9.85, Fall 2012
Leslie Roldan



Image: Flickr, Blake Facey. CC BY-NC SA.

What is the function of a research proposal?

Your proposal has an hourglass structure.

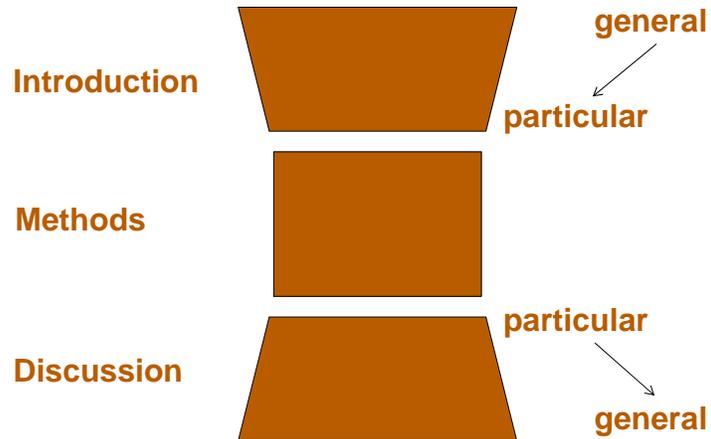


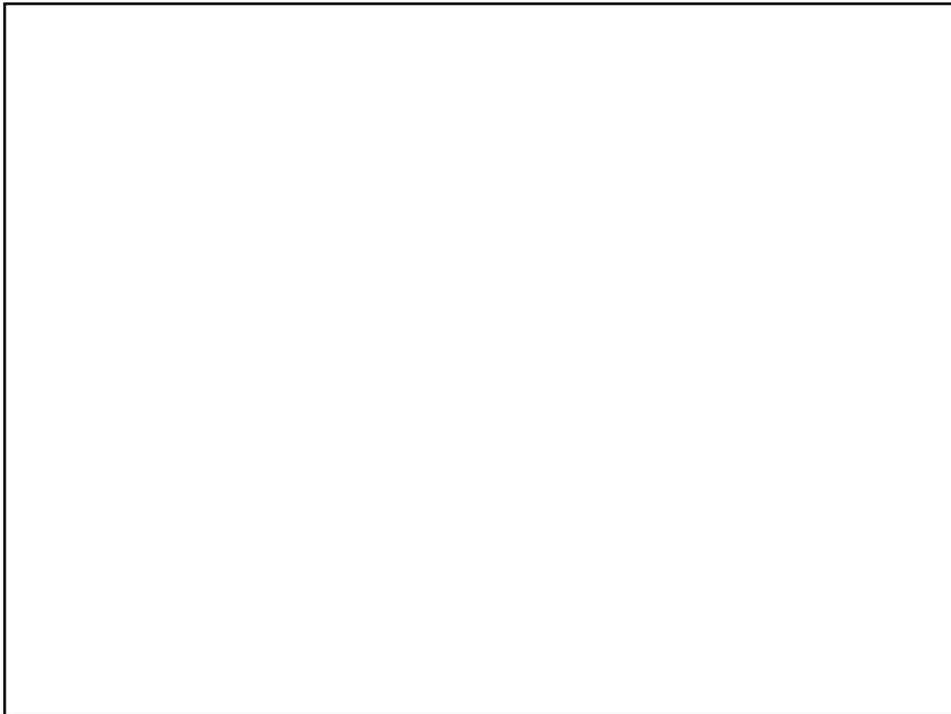
Figure. by MIT OpenCourseWare based on Figure 1. Overall organization of the research paper. Hill, Susan S., Betty F. Soppelsa, and Gregory K. West. "Teaching ESL students to read and write experimental research papers." In *TESOL Quarterly* 16 (1982): 333-347.

- The overall structure of your 9.85 proposal is similar to that of a research paper:
- Introduction provides general field or context.
 - Methods follows a particularized path, and focuses just on your project.
 - Discussion moves from specific findings to wider implications.

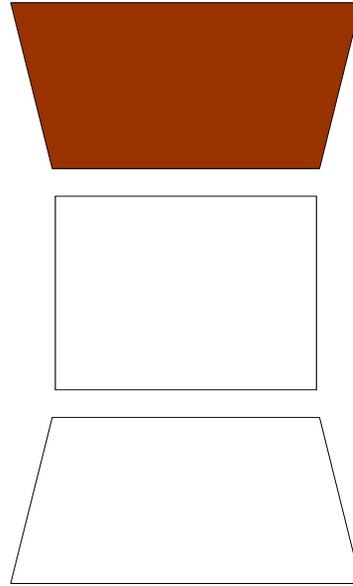
Note the differences in verb tense.

5

	Research Paper	Proposal
Introduction	Past/present	Past/present
Methods	Past	Future
Discussion	Present	Future



Introduction/ Literature Review



The function of the Introduction is to familiarize and orient your readers; for a proposal, the Introduction establishes you as an authority in the field, and demonstrates that you are not reinventing the wheel. The content of the Introduction depends on its purpose and the audience. Consider, for example, how the Introductions would differ for various grant-funding agencies (e.g., language vs. autism).

Note the funnel-like structure of the Introduction: begin broadly; end with a focus on your project.

The Introduction has three elements.

9



I arranged the three elements in the order in which you want to initially structure your Introduction:

Focus: Define your research space, or “stake out your territory”. What question are you addressing? What is your hypothesis? Although you end the Introduction with the focus or goal, it’s best to identify your goal before you write your Introduction.

Justification: How does your work fit into and extend previous work? What is the motivation for your study?

Context: Familiarizes your reader with the literature related to your study. Defining your focus and justification will help you determine what literature to cite as context.

For context, identify articles with the proper databases.

11

~~Wikipedia~~

 PsycINFO

~~Google Scholar~~

 ISI Web of Science
Cited Reference Search

Images: OpenClipArt. Public Domain.

Wikipedia is not peer-reviewed; Google Scholar does not have access to as many journals as PubMed.

PsycINFO is the database for psychology journals.

The Cited Reference Search function of Web of Knowledge allows you to obtain articles that cite a particular article.

PsycINFO: libraries.mit.edu/get/psycinfo

Web of Science: libraries.mit.edu/get/scie

MIT libraries have numerous resources for you.

13

- Vera
- RefWorks
- SFX
- ILLiad@MIT

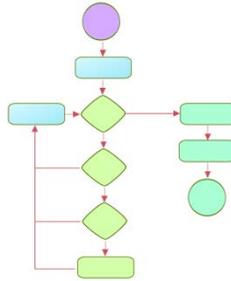
- MIT Vera for journals: <http://vera.mit.edu/> . In particular, look for the SFX symbol to get access to the full-length articles.
- RefWorks to manage citations: libguides.mit.edu/refworks
- ILLiad, MIT's interlibrary loan system: <http://libraries.mit.edu/illiad> . You can often obtain articles within a week.

Develop a research strategy.

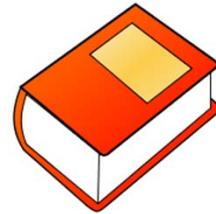
15



Pose question



Identify key concepts



List related terms

Images: OpenClipArt. Public Domain.

- Pose clear question
- Break the question into unique concepts
- List related terms, e.g. "controlled" keywords. Flexibility here will give you more results.

Question: What mutations in BCR-ABL lead to imatinib-resistance?

Key concepts: point mutation, imatinib-resistance, BCR-ABL

Related terms: Gleevec, cancer, CML, drug resistance

Your focus and justification help identify key terms.

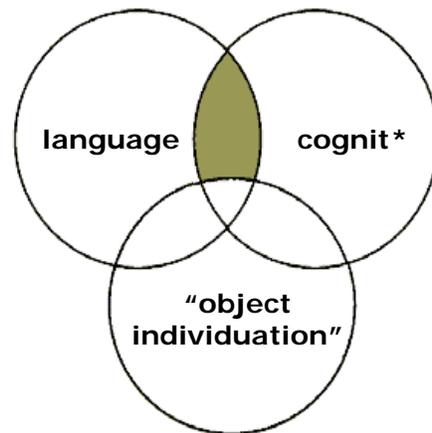
17

Though Xu, Carey and Quint (2004) have demonstrated that 12-month-old infants fail at complex object individuation tasks based on property differences, previous research indicates that adding language labels could influence their success. In the present research, I will examine the emergence of **property-based object individuation**. Specifically, what role does **language** play in early development?

9.85 model research proposal

There are many things you can do with key terms.

19



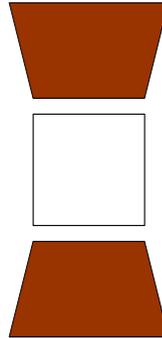
- Boolean operators: AND, OR, NOT
- Symbol for wildcard (*), e.g. cognit* for cognitive or cognition
- Quotation marks for phrases

Read strategically.

21



Summarize on notecards



Focus on Intro and Discussion



Mine bibliography

Images: OpenClipArt. Public Domain.

-Summarize articles on notecards: For example, identify IMRD of each paper. Doing so will help you state these elements in your own words. Making a table of these elements for each paper can also help you see trends across papers.

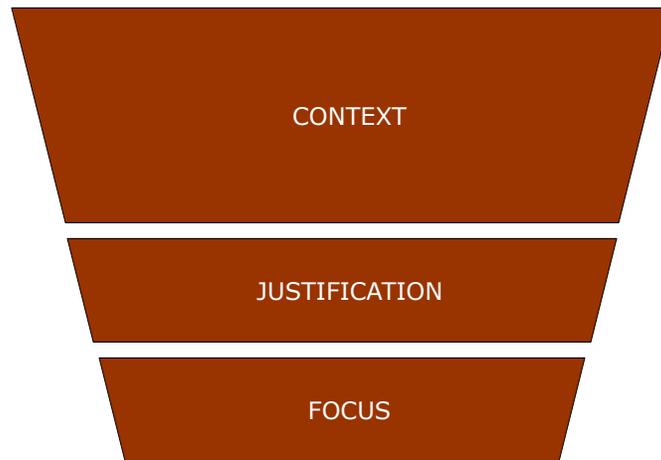
-Focus on the Introduction and Discussion sections of a paper: For a minireview, you want to convey the background and implications of a topic. These types of information are most easily found in the Introduction and Discussion sections of a paper. Therefore, you don't need to read other sections as deeply.

-Mine bibliography for more sources: Writers of research papers have also done literature searches. Take advantage of it. Remember, however, to always obtain and read the original source of information before you include the source in your own bibliography.

Mary-Lou Pardue of the Biology Department has a fantastic story illustrating the importance of tracking down original sources: For a Project Lab, she and her lab partner were responsible for isolating an enzyme from *Tetrahymena* because the literature said the enzyme was present in the organism. After much failure, Mary-Lou tracked down the original citation. This was in the days before electronic databases. She went to the library, climbed up a ladder, and blew off the dust from the journal volume. She also had her German-English dictionary handy because the article was written in German. She found the name of the enzyme and *Tetrahymena*, but the conclusion of the article was that *Tetrahymena* does *not* have the enzyme.

Organize your material to make a funnel-like structure.

23



I arranged the three elements in the order in which you want to initially structure your Introduction:

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Use grids to make claims that synthesize articles.

25

Source	Methods	Results
Spelke <i>et al.</i> , 1995	4-month old infants	object identity with continuity, but not smoothness
Xu & Carey, 1996	Compared 10-mo and 12-mo old infants	12-mo old better at object indiv. with more specific sortals
Xu <i>et al.</i> , 1999	Compared 10-mo and 12-mo old infants	12-mo, but not 10-mo, achieved object indiv. with OKI

Claim: Recent studies have investigated when children begin to represent sortal/kind concepts.



Summarize only the studies that directly motivated yours.

27

Xu (2002) showed that 9-month-old infants could use count-noun labels to facilitate individuation between two objects of different kind/sortal features (such as a duck and a ball). Again using a similar experimental model as Xu and Carey (1996), objects appeared from behind a screen one at a time. In the two-word condition, the experimenter said a different label for each object presented (e.g. "look, a duck"; or "look, a ball"). In the one-word condition, the experimenter said the same label for both objects (e.g. "look, a toy"). When two distinct labels were presented, infants were able to establish a representation of two distinct objects behind the screen.

Method

Results

Model 9.85 Research Proposal

Note the different verb tenses.

29

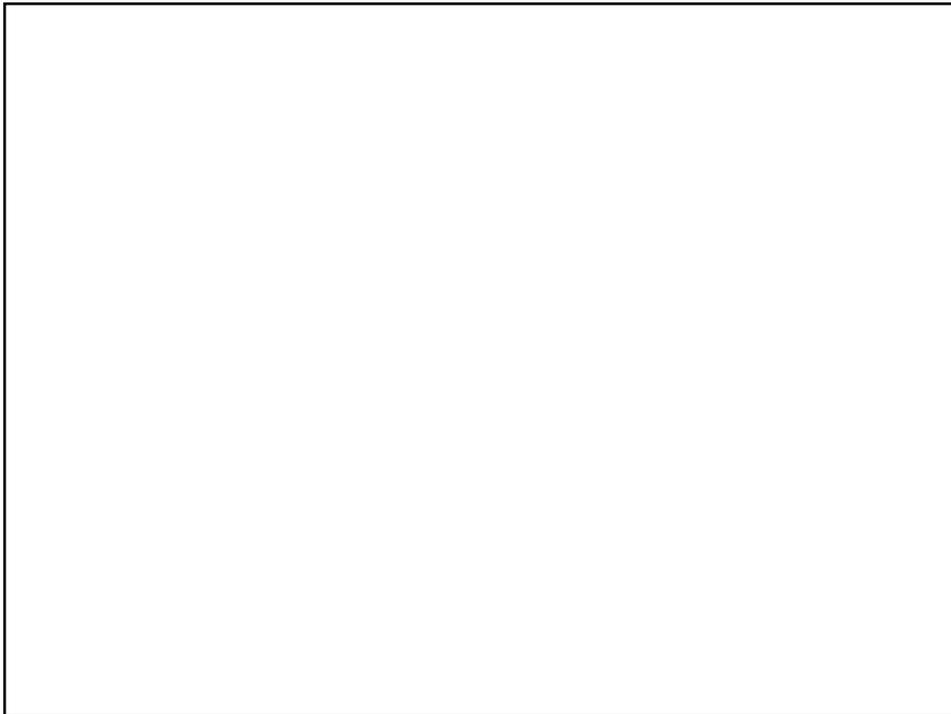
Spelke, Kestenbaum, Simons, and Wein (1995) (see also Spelke & Kestenbaum, 1986) and Xu and Carey (1996) found that at both 4 and 10 months, infants are able to use spatiotemporal criteria for object individuation, thus representing the sortal concept physical object.

Xu, F. *Cognition* 85: 223 (2002).

Scientific writing paraphrases instead of quotes.

31

Image removed due to copyright restrictions. See:
<http://www.cartoonstock.com/directory/p/paraphrase.asp>



Which is the acceptable paraphrase?

33

Original:

We do not yet understand all the ways in which brain chemicals are related to emotions and thoughts, but the salient point is that our state of mind has an immediate and direct effect on our state of body.

Source: Siegel, B. (1986). *Love, Medicine and Miracles* (p. 69). New York: Harper and Row.

#1:

Siegel (1986) writes that we still do not know all the ways in which brain chemistry is related to emotions and thoughts, but the important point is that our mental state has an immediate and direct effect on our physical state.

#2:

Siegel (1986) writes that although the relationship between brain chemistry and thoughts and feelings is not fully understood, we do know that our psychological state affects our physical state.

<http://integrity.mit.edu/academic-writing/avoiding-plagiarism-paraphrasing>

Tips on how to paraphrase can be found in the MIT Handbook of Academic Integrity (<http://integrity.mit.edu/academic-writing/avoiding-plagiarism-paraphrasing>):

- Use synonyms
- Change the structure, voice, parts of speech.
- Reduce clauses to phrases.
- Cite your source.

The handbook also has examples of good and bad paraphrasing.

Follow this format if you cite author name(s) and year.

35

Carpenter *et al.* (2006)
developed a new model for..”

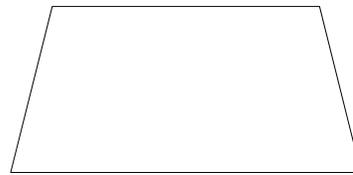
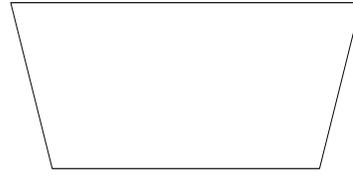
The new model gave a surprising result
(Carpenter *et al.*, 2006).”

In psychology articles, the first time you cite an article, you list all the authors. In subsequent citations of the same article, you use “et al.” for articles with three or more authors.

If citing by author name(s) and publication year, observe the following for papers with more than 3 authors:

- “et al.” is italicized
- “et” needs no period
- “al” needs a period and sometimes a comma

Methods



The Methods section demonstrates to a funding agency that you are using appropriate procedures to address your experimental question.

The Methods section describes and justifies the experiment.

39

Participant

Image removed due to copyright restrictions. See:
<http://liberalarts.tamu.edu/images/spot/spot-infant-cognition-lab1.jpg>

Materials

Design

Procedure

Participants: describes the experimental subjects. For example, number, age, how they were obtained.

Materials: describes the testers, apparatus.

Design: describes the experimental design, e.g. within- or between- subject; experimental manipulations (e.g., Eng. vs. French actress); order of presentation, intervals, timing, etc.

Procedures: describes all steps taken to get the responses from the babies; familiarization vs. test phases.

The Design and Procedure differ in level of detail.

41

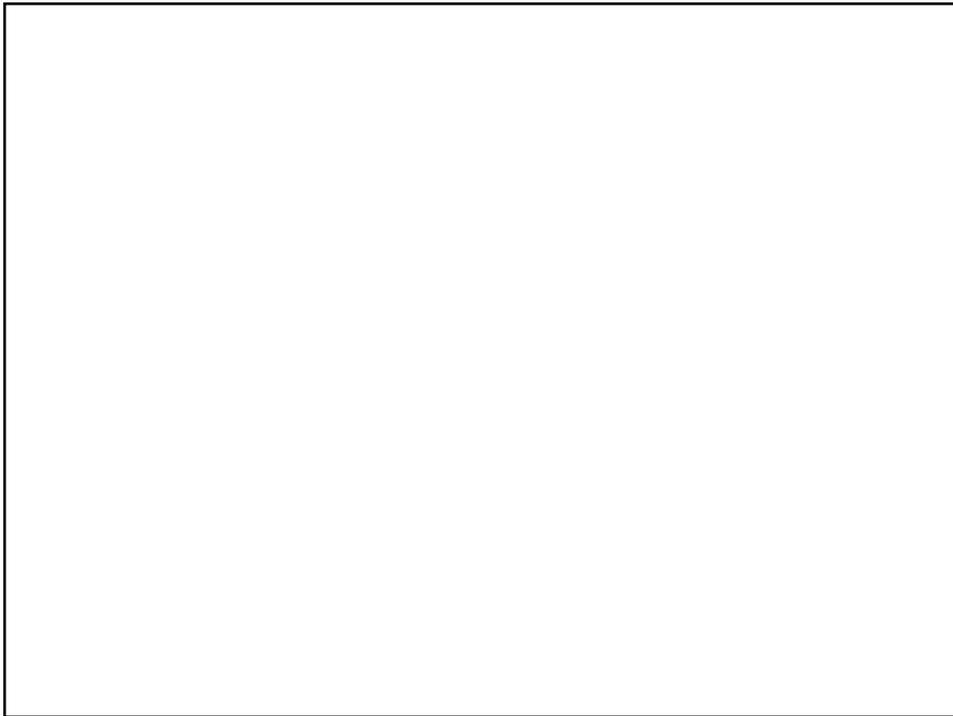
Design—All infants [will be] presented with one familiarization trial with each actress and food in succession, followed by a test trial in which both actresses and foods appeared side-by-side. For any given infant, the lateral positions of each actress and food [will be] fixed...

Procedure—...Infants next [will see] two familiarization trials (positive English and negative French). At the start of each familiarization trial, an occluding screen [will be] raised to reveal the video screen. Near the end of each familiarization movie, a replica of the food featured in the movie [will be] moved out of the foam core box and pushed toward the infant. Infants [will be] given 30 s to reach for the container and sample the food, if they desired. A static image of the actress pointing [will remain] onscreen during this time.

At the start of the subsequent test trial, the screen [will be] raised to reveal both actresses silent and smiling side-by-side onscreen...

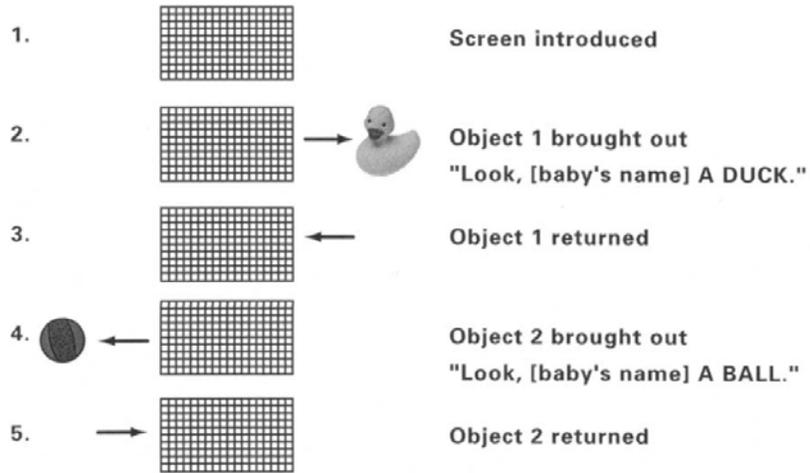
Shutts *et al.* *J Cogn Dev.* 10: 1 (2009).

Note that the future tense should be used in the Methods section.



Consider adding figures to clarify text

45



Courtesy of Elsevier, Inc., <http://www.sciencedirect.com>. Xu, F. *Cognition* 85: 223 (2002).
Used with permission.

Tables differ from other illustrations.

47

Table 1. Results.

	Psychological Outcome	Physical Outcome	Audience	Epistemic Status
Total # of toddlers who participated in each condition	16	22	22	18
Did toddlers learn the predictive relationship?				
Learned predictive relationship...	15/16 (93.75%)	18/22 (81.82%)	17/22 (77.27%)	17/18 (94.44%)

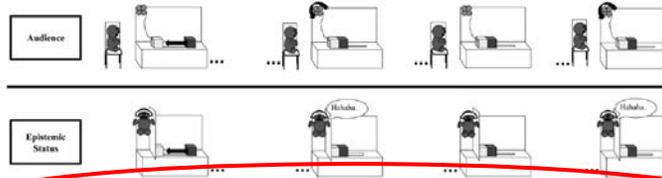
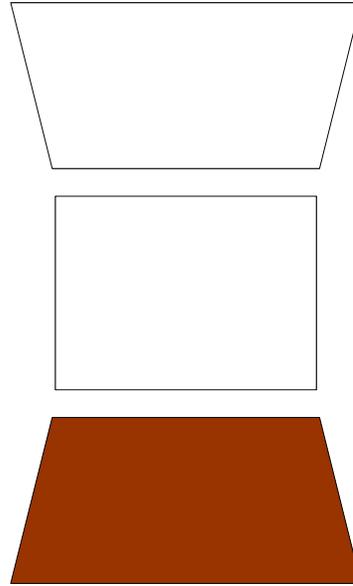


Figure 1. Experimental procedures for the Psychological outcome, Physical outcome, Audience, and Epistemic Status conditions. Toddlers viewed four On familiarization trials, an Off familiarization trial, and a final On familiarization trial. If toddlers failed to look towards the effect in the Off familiarization trial, then they viewed two additional trials (On, Off) before the final On trial. In the Audience condition, the puppet was audience member to the physical outcome event; during prior trials, the audience member was the epistemic status condition, there was a wall between the puppet and the blocks, and a blindfold was placed over the puppet's eyes at the start of the experiment. doi:10.1371/journal.pone.0042495.g001

Source: Muentener, Paul, Daniel Friel, and Laura Schulz. "Giving the Giggles: Prediction, Intervention, and Young Children's Representation of Psychological Events." *PLoS One* 7, no. 8 (2012). doi:10.1371/journal.pone.0042495. License CC BY.

The main difference between a table and all other illustrations is the placement of the figure number and title. For a table, these elements belong above a table; for all other illustrations, the elements belong below the illustration.

Discussion



In your 9.85 proposal, you demonstrate how your expected results will contribute to the field.

According to Jan Pechenik's *A Short Guide to Writing About Biology, 2nd ed*, the Discussion section could be said to deal with expectations:

- What did you expect to find, and why?
- How did your results compare with those expected?
- How might you explain any unexpected results?
- How might you test these potential explanations?

The Discussion is an argument about your data.

51



A discussion section is an argument, and should demonstrate sound scientific logic. In making an argumentative claim about one's findings, one needs to start with the soundness of the findings themselves.

-Claims: propositions, conclusions, judgments.

-Evidence: data to support the claim

-Assumptions: logical links between evidence and the claim.

The Discussion section has a particular paragraph structure.

53

This finding is consistent with the ideas presented in Wilcox and Chapa (2004). They found that infants succeeded in property-based object individuation tasks when the objects were associated with distinct functions, suggesting that the infants used the function information to map objects to kind-categories. The present research shows an analogous effect with language labels. Thus, object individuation based on property differences would be shown to be dependent upon an infant's ability to hold object kind-concepts. This idea is also argued in Waxman and Markow (1998).

Claim

Evidence

Analysis

Model 9.85 Research Proposal

Start and end your Discussion like an argument.

55

In each of the three experiments, [we expect that] 9-month-old and 12-month-old infants [will succeed] in using property information...to complete a complex object individuation task when...given distinct labels for each of the objects...Furthermore, the infants [will] not succeed when a single label [is] provided for the objects, indicating that the effect is not due to a simple increase in attention due to the presence of language.

...

In sum, the findings of this study [will] suggest that language [plays] an important role in the development of object concepts. The presence of language labels does influence an infant's ability to discern whether an object seen on occasion A is the same as an object seen on occasion B by contributing to a mapping of object information to kind-categories. There is still much to determine about the precise role of language in object concept development, and more broadly how closely language and conceptual thought may be entwined.

Model 9.85 Research Proposal

From Day, Robert. *How to Write and Publish a Scientific Paper*. 5th ed.

- Summarize findings presented in the Results section.
- End with a short summary or conclusion about the work's importance.

The introductory paragraph could remind the reader of the focus and justification of the project. The conclusion paragraph should summarize the main finding and implications of the work.

Note that for the Proposal, the proper verb tense is the future because you are discussing your expected results.

Compare to literature and draw implications.

57

This finding is consistent with the ideas presented in Wilcox and Chapa (2004). They found that infants succeeded in property-based object individuation tasks when the objects were associated with distinct functions, suggesting that the infants used the function information to map objects to kind-categories. The present research shows an analogous effect with language labels. Thus, object individuation based on property differences would be shown to be dependent upon an infant's ability to hold object kind-concepts. This idea is also argued in Waxman and Markow (1998).

Model 9.85 Research Proposal

Source: Day, Robert. *How to Write and Publish a Scientific Paper*, 5th ed.

- Cite supporting literature.
- Explain discrepancies between your findings and previous reports.
- Point out shortcomings of your work and define unsettled points.
- Discuss theoretical and practical implications of your work.

Point out shortcomings and define unsettled points.

59

Further research would be necessary to determine the precise role of language in complex object individuation tasks. In [my proposed] study, labels [will be] presented singularly, and without context. It is possible that word type may influence the role of language in object individuation tasks. Would infants respond differently to words presented as adjectives versus nouns? Property information is mapped to adjective labels in language, while kind/sortal information is mapped to noun labels. Would an infant respond differently in object individuation tasks if a novel word label were presented as an adjective (e.g. "This looks like a dax one") or a noun (e.g. "This is a dax")?

Model 9.85 Research Proposal

If you do not point out the unsettled points, your reviewer will.

Use only one hedge word per sentence.

61

"The cause of the degenerative changes is unknown but *possibly* one cause *may* be infection by a *presumed* parasite."

Common hedge words from Matthews et al. *Successful Scientific Writing*:
-Nouns: supposition, idea, speculation, conjecture, possibility, inference
-Adverbs: presumably, probably, possibly, apparently, not unlikely, seemingly
-Verbs: appear, postulate, suggest, seem, may be, speculate

Abstract concisely summarizes purpose, results, and impact.

63

[Adults conceptualize the world in terms of enduring physical objects.] [I propose three experiments to investigate] the emergence of property-based object individuation. Nine- and 12-month-old infants [are expected to be] able to use novel word labels to help establish a representation of two distinct objects in a complex object individuation task replicated from Xu (2002). There [is] one important difference between the present study and that of Xu: rather than belonging to different kind/sortal categories, the objects differed along property features such as color, size, and pattern. The results [will] support the thought that language [plays] an important role in conceptual development by helping to map objects to kind-categories.

Model 9.85 Research Proposal

- Aim for ≤150 words, and use the future tense.
- Source for 1st sentence: Xu and Carey. *Cognitive Psychology*, 30: 111 (1996).

In sum, remember the parts of your Research Proposal.

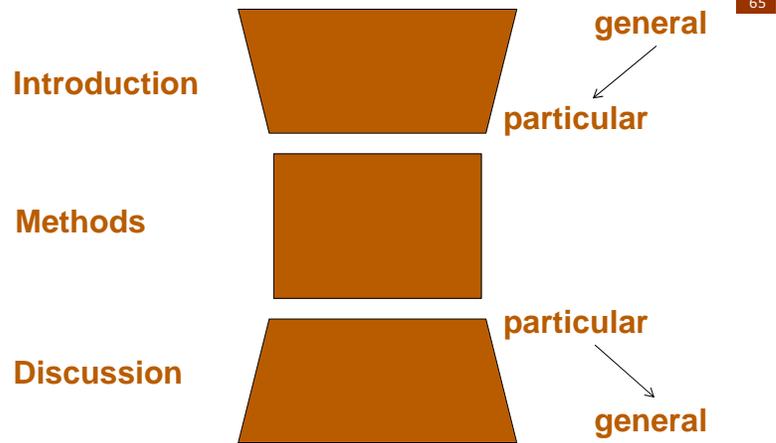


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9.85 Infant and Early Childhood Cognition
Fall 2012

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