Methods and Analysis Worksheet
Example 2

Guidelines: The research proposal must be **related to theory of mind**, **experimental (or pseudo-experimental)**, **developmental,** and **feasible**.

a. "Related to theory of mind" means that you should either manipulate or measure some aspect of theory of mind (How does [some aspect of theory of mind] influence Y? How does X influence [some aspect of theory of mind]? Are X and [some aspect of theory of mind] the same? etc. etc.). Other proposal topics indirectly related to theory of mind (e.g., social attention, symbolic representation, moral judgment) will be considered but should be brought to my attention as soon as possible.
b. "Experimental" here means at least one of the independent variables (IVs) is being manipulated. Age of course can't be manipulated, but is acceptable as a pseudo-IV.
c. "Developmental" here means comparing two age groups, examining a single age group to test a developmental hypothesis, or comparing typical and atypical development.
d. "Feasible" here means a research idea that can be completed in a reasonable amount of time and with a reasonable amount of resources (money, equipment, participants, etc.). This is intentionally imprecise, and should be understood as mostly unrestrictive. As long as you can justify why you might need a significant amount of time or resources, the proposal is more likely to be deemed feasible and therefore acceptable. Furthermore, the methods must be plausible. If you plan to use a method that requires overcoming limitations from previous studies, you must explain how you're going to overcome those limitations. If you have questions about whether your proposal is feasible, you should see me as soon as possible.

1. The present study

This sub-section comes at the end of your Introduction section and is not included in the Method. This is included in the worksheet only to help you further clarify these points as a basis for constructing your Method and Data Analysis Plan ("Results") sections.

a. ***Research question***: Does motor development, specifically the ability to physically interact with objects (reach, grasp, and manipulate them), influence when infants acquire an object concept?

b. ***Independent variable(s), conceptually***: motor development

c. ***Dependent variable, conceptually***: object concept

Aside: How do you begin to address your research question? Start by posing the question to a theory. A theory is like a machine that takes research questions as input and generates hypothetical answers as outputs. These proposed answers are also known as hypotheses. Your goal is to consider theories that set up competing hypotheses so that any outcome must provide support for one hypothesis and against the other.

d. ***Hypothesis A (state how your variables should relate according to theory A)***: According to core knowledge theories (Baillargeon, 1994; Spelke et al., 1992), motor development does not influence when children acquire the object concept.

e. ***Hypothesis B (state how your variables should relate according to theory B)***:
According to Piaget's theory of cognitive development (Piaget, 1952), motor development influences when children acquire the object concept.

f. ***Task (brief description only; provide details in section 4)***:
I will use the drawbridge study, which is a "violation of expectation" paradigm in which the infant will see expected and unexpected events involving objects.

g. ***Independent variable(s), operationally***: age (3-month-olds vs. 9-month-olds) and object event (unexpected vs. expected)

(Note: this is a funky example - age is being used as an index of motor development because 3-month-olds do not reach reliably or accurately for objects, whereas 9-month-olds do.)

h. ***Dependent variable, operationally***: looking time to the object events in seconds

i. ***Specific predictions A (includes direction of effect and effects for different developmental groups if applicable)***:
The unexpected event will cause an increase in looking time compared to the expected event in both 3 and 9 month olds.

j. ***Specific predictions B (includes direction of effect and effects for different developmental groups if applicable)***:
The unexpected event will cause an increase in looking time compared to the expected event in 9 but not 3 month olds.

2. Study design

a. ***Experimental or quasi-experimental?***
The study uses a quasi-experimental design since age is a quasi-IV.

b. ***How many IVs and how many levels for each IV (write out in m x n x p … format)?***
There are two IVs – age has two levels (3-month-olds vs. 9-month-olds) and object event have two levels (unexpected vs. expected).
2(age: 3 month-olds vs 9-month-olds) x 2(object event: unexpected vs expected)

c. ***How many conditions, and how many trials per condition will there be?***
There are 2 x 2 = 4 conditions. There will be 3 trials per condition.

d. ***Between-subjects, within-subjects, or mixed (if mixed, which variables are between- and which are within-subjects)?***
The study uses a mixed design since age is between-subjects and object event is within-subjects.

3. Participants

a. ***How many? If you have different developmental groups, how many per group?***
I will recruit 60 infants, including 30 3-month-olds and 30 9-month-olds.

b. ***How and where will they be recruited?***
I will recruit infants using the Developmental Participant Pool maintained by the Department of Psychology at the University of Western Ontario (Note: if you plan to recruit infants or toddlers, I would recommend saying you will use this pool).

c. **Age range**:
I will recruit 3-month-olds (range: 2.5-3.5 months) and 9-month-olds (range: 8.5-9.5 months). Recall 3-month-olds do not reach reliably or accurately for objects, whereas 9-month-olds do.

d. **Gender breakdown**:
I will recruit an equal number of boys and girls.

4. Materials/Measures

a. ***Describe the materials (e.g., vignettes, pictures) you will use and, if applicable, how you plan to manipulate the stimuli to create different levels of the IVs. Include citations for any materials you will either use or adapt***.
[See articles from class for examples]

b. ***How will you measure the DV (if applicable, include name of scale, number of items, rating scale with anchors, example item)***?
[See articles from class for examples]

c. ***If you are including control variables, how will you measure them (if using a survey/scale, including name of scale, number of items, rating scale with anchors, example item; if using a task, describe it in sufficient detail)***?
[See articles from class for examples]

d. ***Demographic items (should at minimum include age, gender, ethnicity, SES)***:
[See articles from class for examples]

5. Procedure

a. ***Explain what participants will actually do in your study step by step (including informed consent, study participation, and debriefing). You should provide enough detail that another person could replicate your study.***
[See articles from class for examples]

b. ***Participant compensation***:
[See articles from class for examples]

6. Data analysis plan

In your paper, you will include a Data Analysis Plan section instead of Results since you will not actually be collecting data.

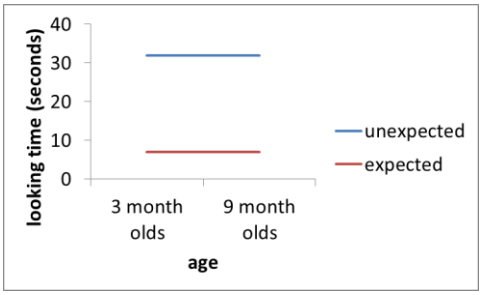
a. ***What statistical test(s) will you use***?
I will run 2-way mixed design ANOVA followed by planned two-sample t-tests (some will be paired/dependent, some will be unpaired/independent).

b. ***Why is the test appropriate to use for your variables***?
A 2-way mixed design ANOVA is appropriate because I have 2 IVs, a continuous (interval/ratio) DV, more than 2 samples ("samples" means groups of participants), and the samples are independent on age but dependent on object event ("dependent" and "independent" refers to whether samples are the same or different people, respectively). Following the omnibus ANOVA, I will explore main effects and interactions with independent samples t-tests to examine differences between age groups at each object event level and with dependent samples t-tests to examine differences between object events at each age level.

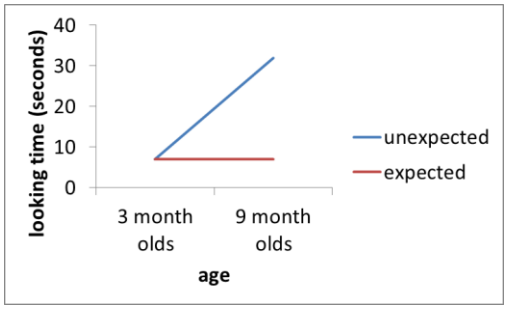
c. ***What will the results be if prediction A is supported? Describe significant differences or main effects and interactions (if you have multiple IVs) under each prediction. Include a figure or table to visualize the results***.
On prediction A, there will be a main effect of object event, but no other main effects or interactions. Planned t-tests will show a difference between unexpected and expected events for both 3-month-olds and 9-month olds.

d. ***What will the results be if prediction B is supported? Describe significant differences or main effects and interactions (if you have multiple IVs) under each prediction. Include a figure or table to visualize the results***.
On prediction B, there will be a main effect of age, a main effect of object event, and an interaction between age and object event. Planned t-tests will show no difference in looking times between expected and unexpected events for 3-month-olds but will show a significant difference in 9-month-olds.

Prediction A



Prediction B



7. References

Include a list of references for all materials and measures that you will use from published sources. (These are separate from and do not count towards the 5 main intro/discussion references that are required for the proposal.)

[placeholder]