Research Methods in Developmental Psychology

Instructor Manual

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The Research Methods in Developmental Psychology module introduces students to basic definitions and concepts related to methodology and design used in the developmental psychology research. This instructor's manual module provides some information to help you craft a class lesson for your students to help keep them interested and engaged in this material. The accompanying PowerPoint presentation provides material which includes content, activities, and a video. This instructor's manual also contains other outside resources and information that may help you create a great unit of your course about culture.

Learning Objectives

Relevant APA Learning Objectives (Version 2.0)

- Engage in innovative and integrative thinking and problem solving (2.3)
- Interpret, design, and conduct basic psychological research (2.4)
- Incorporate sociocultural factors in scientific inquiry (2.5)
- Apply ethical standards to evaluate psychological science and practice (3.1)
- Apply psychological content and skills to career goals (5.1)

Content Specific Learning Objectives:

- Describe different research methods used to study infant and child development

- Discuss different research designs, as well as their strengths and limitations
- Report on the unique challenges associated with conducting developmental research

Abstract

What do infants know about the world in which they live – and how do infants grow and change with age? These are the kinds of questions answered by developmental scientists. This module describes different research techniques that are used to study psychological phenomena in infants and children, research designs that are used to examine age-related changes in development, and unique challenges and special issues associated with conducting research with infants and children. Child development is a fascinating field of study, and many interesting questions remain to be examined by future generations of developmental scientists – maybe you will be among them!

Class Design Recommendations

This material could be covered in a single 50-75-minute class period. Please refer to the Noba PowerPoint and the Lecture Framework below for specific details.

- Warm-Up Activity: Reflecting on your own development
- Research Methods
    - Measuring involuntary/obligatory responses
    - Measuring voluntary responses
    - Measuring physiological responses
    - Questionnaires and Interviews
- Research Design
    - Longitudinal
    - Cross-Sectional
    - Cross-Sequential
    - A comparison of advantages & disadvantages of each design

- Issues related to developmental research
    - Informed consent
    - Attrition
    - Recruitment
- CAT: The Muddiest Point

Module Outline

- **Introduction to research methods in developmental psychology**: Chances are, this will not be your students' first exposure to this material. Many will have covered the same or similar material in Introduction to Psychology, Research Methods, or even in other topic courses. While repetition can help to solidify learning some students may enter class rolling their eyes and with an "I know this already attitude."
- It may be equally helpful to your students to learn that the research methods presented in this module are done so specifically in the context of developmental psychology. That is, they are not simply learning (yet again!) about methods, but about how methods are uniquely adapted for developmental psychology topics. Many instructors teach methods in development as if it is merely a re-hash of basic methods. They cover correlation versus causation, experimental versus field studies and other traditional fare. It may be helpful to address any disengagement or misgivings about redundancy at the outset. This information is new, and will build on a more basic understanding of research methods and design.
- Although it is not explicitly mentioned in the module one of the most famous of all methods in psychology is the so-called visual cliff experiment. Originally, the visual cliff (a sheet of plexiglass covering a precipice) was meant to be used to assess the development of depth perception. Later, and more famously, developmental psychologists used the visual cliff paradigm to research emotion in small children. For example, it is possible to evaluate the emotional cues offered by a caregiver by placing a crawling baby at the edge of the visual cliff and instructing the care-giver to either express fear or reassurance. Researchers can then evaluate the effect of these cues on the child. The visual cliff offers a worthwhile example of a research method that is unique to developmental research with young children.

- Developmental psychology is not the psychology of children. Because so much developmental research focuses on children it is tempting to conflate the two. Development, however, extends across the entire lifespan. Researchers are interested in development among adolescents, young adults, the middle aged, and in older adults. Although this module emphasizes many methods commonly used in research with children it can be helpful to remind students that developmental psychology encompasses the entire human lifespan.
- **Thinking like a developmental researcher:** Change. Many topics in psychology can appear static. Personality, for example, is defined by a relative consistency of traits. Social contexts are expected to reliably influence human thoughts, feeling and behavior. Developmental psychology, by contrast, is a refreshing instance of psychological focus on change. Because developmental psychologists are, by definition, interested in change over time the methods associated with this branch of psychology are unique. Verbal ability. A unique feature of research with children is that they lack the verbal fluency and sophistication of adults. They have smaller vocabularies. They are less practiced at articulating their own experience. They are less reliable reporters of their own feelings and thoughts. This presents a difficulty for those wanting to study developmental phenomena with young children. Researchers are often forced to rely on observations of behavior to deduce mental states such as feelings, preferences, or memory.
- **Understanding the difference between Methods and Designs**. Lay people—to the extent that they think about research at all—have a tendency to conflate research methods and research design. This is a pedagogic opportunity to re-visit this distinction. Research methods are specific tools for collecting data such as interviews, observational paradigms, and physiological measures. Designs, by contrast, are overall strategies for data collection and analysis.
- **Research methods in developmental psychology studies**

    - *Involuntary Responses*—Because small children are pre-verbal or have limited verbal ability researchers often study involuntary responses (also called obligatory responses). These are reflexive, natural behaviors that occur even in infants and do not require sophisticated cognition. An example of this would be a baby turning her head to track her mother's walk from one side of a room to another. From this (example), researchers might draw conclusions about infant interests, attention, and memory. This method is especially common in infant research.
    - *Voluntary Responses*—Older children are better able to engage in volitional activity. They can express preferences and, to some extent, suppress responses. Researchers study these voluntary responses among toddlers, school age children and adolescents. Many

studies that use this method employ a structured paradigm—a sequence of events or actions. In some cases, children are asked to imitate a sequence of behaviors. In other cases, children are placed in a situation such as near a distressing toy or angry adult so that researchers can evaluate their behavioral responses.

- *Physiological*-Another useful research method is the sampling of physiological data. This can be done in many ways including measures of heart rate, blood pressure, and brain activity. These biological measures offer a distinct level of analysis and help researchers understand the physiological processes that underpin many psychological phenomena.
- *Survey/Interview*—Although interviews and questionnaires are used in adult research they are also commonly used in research with children. Some of these are checklists intended for parents, teachers or other caregivers. Others are intended for child responses.

- **Research designs in developmental psychology studies**

  - *Longitudinal*— Longitudinal designs, just to use a single example, use repeated measures over time to track within-individual or within-group change on a variable of interest. For example, researchers could study the occurrence of nightmares in children by sampling a cohort of children at age 4, then again at age 6, and again at age 8. In this way, the researchers could be confident that any changes that occurred (perhaps older children experience fewer nightmares?) were true changes because extraneous influences such as parenting style, family culture, and emotional leanings would all be held constant. The downside is that it is expensive and difficult to get the same participants to continue with a study over a long period of time.
  - *Cross*-Sectional—Cross-sectional designs sample different cohorts at the same time. Using the example above, researchers might investigate nightmares by sampling a group of 4 year olds, a separate group of 6 year olds, and a group of 8 year olds. Unfortunately, any differences (perhaps older children experience fewer nightmares?) cannot be easily explained. It might be that children simply experience fewer nightmares as they mature but other explanations are possible. It could be, for instance, that the 3 groups differ on personality such that one group is, on average, more emotionally sensitive and prone to nightmares. Family variables might also explain found differences.
  - *Cross*-Sequential—Cross-sequential designs capitalize on the advantages of both cross-sectional and longitudinal approaches. In cross-sequential design, a researcher samples multiple cohorts (cross-sectional) but does so repeatedly over time (longitudinal). Using our nightmare research example, the researcher might study the occurrence of nightmares in 4 year old and then, a couple years later, follow up

with these now 6 year olds. At that same time, the researcher might begin a sample with a new cohort of 4 year olds. This helps control for the potential effect of extraneous variables as well as protect against possible cohort effects. Of course, this is the most complicated and expensive approach, and the threat of attrition is multiplied.

- **Ethics:** Although ethics may be a topic that has been covered in earlier coursework this is an opportunity to expose students to ethics in the developmental psychology context and to fill in any gaps in knowledge. Although many students are aware of informed consent, debriefing, and basic topics in ethics a surprising number of upper level students—including psychology majors—do not understand the ethics process. This is an opportunity for you to describe the IRB process: applications, review, and primary ethical concerns including harm benefit ratios and deceit. It is—time allowing-- an opportunity for you to have students try their own hand at reviewing research from an ethical point of view (see activity below).

In addition, this is an opportunity to focus on specific ethical issues related to the study of children. Chief among these, perhaps, is informed consent. Where adults can easily be informed about potential risks, how the research will be used, and the right to discontinue these issues are much more difficult for children. Children are less likely to be assertive and to discontinue participation during uncomfortable research scenarios. They are less likely to truly grasp the risks of participation. For this reason, parents or guardians consent on behalf of children participants much in the same way they would consent for medical treatment.

Research with children presents fodder for interesting discussion of research ethics. For instance, it is often the parents who are compensated for the child's participation (financial compensation, for example). This raises the possibility that the beneficiary of the research, and the consenting stakeholder is not the same individual as the participant. Might some parents be tempted to enroll their children in uncomfortable research for personal gain? Researchers can guard against any undue influence by keeping compensation modest.

Difficult Terms

Attrition
Bi-directional relationship
Cohort

Cross-sectional
Cross-sequential
Dishabituation
Elicited imitation
Event related potentials
Habituation
Informed consent
Longitudinal
Object permanence
Obligatory response
Practice effect
Recall memory
Solidity principle
Verbal report paradigm
Violation of expectation

Lecture Frameworks

Overview: This material can be presented with a combination of direct instruction, discussion, and activities. The suggested warm up activity gets students to think about development. Because this module focuses so heavily on the nuts and bolts of research—the process of thinking about ethics, recruitment, and research design, for instance—it is a good opportunity to expose the daily life of the research academic. For students interested in pursuing careers in psychology this is a chance to better understand the work of a researcher as well as the broad concepts of developmental methods and design.

- **Warm-up Activity: Studying Development-**The purpose of this slide is to facilitate an activity to get students thinking about researching developmental psychology. This is an opportunity to build on their general knowledge of research methods and to explore the everyday work context of developmental researchers. This introductory exercise encourages students to reflect on how they are currently different from when they were a child. See below in 'Activities/Demonstrations' and in the Noba PowerPoint for more details.
- **Direct Instruction of "Research Methods":**There are multiple slides associated with this portion of the lesson. Note that research methods is a "bottleneck term" and some students become stuck trying to disentangle the concept of methods from that of designs. You may choose to begin with a brief explanation of these two topics. Research methods are the specific tools used by researchers to collect information.

- Slide: Involuntary response. In this slide you can introduce the idea of involuntary responses (behaviors that require little or no conscious effort) as a means of collecting information from very young children and infants. Examples include eye tracking or turning the head to track movement or sound. Show the embedded 3 and a half minute video to introduce students to the "violation of expectation paradigm." Explore student reactions to this method.
- Slide: Voluntary response. In this slide, the instructor can introduce research with voluntary responses. As opposed to obligatory or involuntary response these responses are those that require more effortful thought and control. In developmental psychology, researchers often use imitation tasks to measure the extent to which small children can remember sequences. In the embedded 2 and a half minute video, researchers are interested in the extent to which children modify their own behavior in relation to emotional tone. The experiment shows a child who is interested in various toys, but who elects not to play with them when it appears an adult will find the play irritating. Explore students' reactions to this video and to voluntary response research more broadly.
- Slide: Psychophysiology. In this slide, the instructor can introduce psycho-physiological research methods. Because of the occasional tendency of some students to equate physiological methods with "real science" or "hard science" it may be helpful to remind them about levels of analysis. Levels of analysis assumes that psychological phenomena co-occur across different levels of analysis. At times, variables at one level cause variables at another but this is not always the case. It would be a mistake, for instance, for students to assume that "brain waves cause thinking." Rather, it is more accurate to understand that the two concepts occur simultaneously and can be measured independently (brain activity, on the one hand, and conscious though on the other). In the embedded 2 and a half minute video, a researcher interested in mapping language acquisition in the brain uses event related potential (ERP) to measure brain activity in a child. She explains her research. Explore student reactions to this research, and to physiological methods in general.
- Slide: Questionnaires and interviews. In this slide the instructor can introduce surveys and interviews as a method of collecting research data. Note that these methods rely on verbal ability to some degree and are, therefore, more commonly used with school aged children. Examples of this method include: the WPPSI-IV, a standardized test of intelligence for pre-schoolers; the Child Behavior Checklist (CBC), a list of various childhood behaviors such as nightmares, screaming, excessive fearfulness or chewing on objects; and surveys sampling experience with drugs and alcohol; used to assess base rates of use by teens and pre-teens. See below in 'Activities/Demonstrations' and in the Noba PowerPoint for more details on running a discussion related to this slide.

- **Direct Instruction "research design":**Here, instructors shift from research methods to research designs. Research designs are strategies (or "blueprints") for deciding how to collect and analyze data. In this section of the lecture, instructors will cover three distinct research designs: longitudinal, cross-sectional, and cross-sequential.

    - Slide: Longitudinal. Begin with longitudinal design (research examining the same participant or participants over multiple times). For example, if a researcher counted the number of words in a child's vocabulary when she was 2 years old, in 2004, and then followed this same procedure every 2 years until the child was 8, in 2010.
    - Issues to consider:

        - the time periods do NOT need to be spaced at even internals nor do they need to occur over long periods of time (such as years). Any research that examines the same variables in the same participants at multiple times counts as longitudinal.
        - research can be "case study" (single subject) as in the example of studying one child's response to therapy, or in aggregate across dozens or even thousands of children
        - care must be taken so that each administration of the measure is consistent
        - this research can be expensive and there is the potential problem of participants dropping out over time

- Slide: Cross-sectional. Here, instructors shift from longitudinal design to cross-sectional design. Cross-sectional designs are those that sample different cohorts at the same single point in time. For example, if – in 2004-- a researcher counted the number of words in the vocabularies of 2 year olds, 6 year olds, and 8 year olds. Like the example used in the previous slide this would provide information about possible differences between age groups in language acquisition (overall vocabulary size in this instance). See below in 'Activities/Demonstrations' and in the Noba PowerPoint for more details on running a discussion related to this slide.
- Slide: Cross-sequential. Here, instructors present the third and final research design covered in this module: cross-sequential design. Cross-sequential designs are a combination of longitudinal and cross-sectional in that they collect data from distinct cohort samples (cross-sectional) and follow each of these over a period of time (longitudinal).
- This design allows for multiple analyses. First, it allows for a longitudinal analysis as illustrated by the light green horizontal bars in the figure above. For example, a researcher could look at the size of children's vocabulary when they are 2, 4 and 6-years-old. The first data collection would begin– for example purposes– in 2004 when the first cohort was two

years old. Then, at each subsequent data collection (every two years in this example) a new cohort of 2-year-olds would begin the study. This allows for between groups (between cohorts) analyses shown by the orange lines in the figure above. This design has the advantages of both longitudinal and cross-sectional designs. See below in 'Activities/ Demonstrations' and in the Noba PowerPoint for more details on running a discussion related to this slide.

- Slide: A comparison of designs (advantages and disadvantages): This slide shows the relative advantages and disadvantages of each of the three designs discussed earlier. It can be helpful to students to have the various designs presented succinctly in this way. You can use this slide as a review slide of this section, perhaps even offering a short quiz about the three design. See below in 'Activities/Demonstrations' and in the Noba PowerPoint for more details.

Activities & Demonstrations

Warm up: The purpose of this activity is to introduce the idea of psychology developing over time and to stimulate thinking about how we might study this phenomenon. This introductory exercise encourages students to reflect on how they are currently different from when they were a child. You may opt to have them share their answers in pairs or small groups before debriefing with the class as a whole, although this will add time to the activity.

- *Materials*: pen and paper for notes
- *PROMPT*: Take a moment and recall yourself at age nine or ten. If it helps, try to remember a specific day such as a family trip, a birthday, or an interaction with a sibling or best friend. Remember yourself in as much detail as possible. You may choose to take some specific notes. How did you speak? What foods did you like? How did you dress? What did you think you were going to be when you grew up? What were your hobbies? Now, take a moment and determine in what ways you were different at that time than you are now. List the ways in which you are different.
- Possible debriefing questions for the whole class:
    - -- have students share examples of how they have changed over the years. Then, ask the class to weigh in on how individual versus how universal human development is. Where do there appear to be broad similarities?

- -- ask the students to offer personal theories of how and why various types of development happen
- -- ask the students to project forward into the future. How different do they anticipate being on these same identified dimensions 10 or 20 years down the road? Then, ask them how they might go about researching their hypotheses regarding future development.

- *Note*: You may choose to tie the student answers, and the broad themes of the discussion, to the topic of research methods. For example, having students notice real world differences in development in their own lives can lead to the generation of testable hypotheses. You may also choose to point out that developmental psychology, by definition, is interested in a person at multiple points in time, and this requires special attention to methods and design.

Research Method: Questionnaires and Interviews (optional discussion): The purpose of this activity is to have students better appreciate the ways that scientists think. This activity bears some resemblance to the "flirting activity" above and you may want to skip it if you have conducted that activity.

- *Time*: 5 minutes including discussion
- *Discussion prompt*: What advantages or disadvantages do you see with interviewing children? What about questionnaires with young people?
- Possible answers might include:

  - -- limited vocabulary, difficulty articulating
  - -- lack of reliability (lying, wanting to please, etc)
  - -- lack of responding (afraid of researcher, research setting, etc)

Research Design: Cross-Sectional (optional discussion):

- *Time*: 5 minutes
- *Discussion prompt:* Have your students discuss– in pairs or small groups– the relative advantages or disadvantages of longitudinal and cross-sectional designs. Have them use the current example of the development of children's vocabulary as the target of their discussion. When they are finished, you may want to debrief as a whole class.
- Main point may include:

- -- cross-sectional designs are less likely to have attrition
- -- cross-sectional designs are less costly
- -- cross-sectional designs are less likely to be contaminated by context effects
- -- longitudinal designs are less susceptible to cohort effects (more likely to show actual within-person change rather than differences between cohorts)

Research Design" Cross-Sequential (optional discussion): This short activity is designed to get students to consider the ways that artificial environments such as laboratories can be used to conduct research.

- *Time:*5 minutes
- *Discussion prompt:* If cross-sequential designs are so strong (have so many advantages) why don't researchers always use them?
- Possible answers include:
  - -- they are expensive
  - -- they are complicated
  - -- they are not appropriate to every research question
  - --there is a risk of attrition

A comparison of designs (optional activity): The purpose of this activity is to allow students to apply their knowledge to real world, albeit hypothetical, research scenarios. Divide the class into small groups and have them consider which design they would choose if they wanted to study any of the following topics. You may elect to have each group focus on only a single topic. This would allow them to more carefully evaluate the relative benefits of each design. Alternately, you may choose to direct groups to choose two topics. This would allow them to make comparisons regarding how some topics might be better served by some designs than others.

- *Time:* 10-15 minutes
- *Prompt*: Which design would you employ (and why) if you were interested in studying:
- The development of the ability to manage of fear
- The development of hand eye coordination

- How children's answer to the question "what do you want to be when you grow up?" changes from pre-school through high school

Debrief: If you elect to have students focus on a single research topic then you can use the whole class debriefing to compare design strategies of different groups who chose the same topic. Have the groups talk with one another about their respective rationales. Use the debrief as an opportunity to highlight the various merits and perils of each of the three designs.

Wrap-up: One minute paper: This activity is an opportunity for students to engage in meta-cognitive learning. Using the 1 minute paper format they can reflect on what they have learned and what may, as yet, remain confusing or unanswered. Further, the paper encourages them to look for opportunities to apply the learning in their own lives. The three main points prompted in the slide are:

- What is the most important lesson you learned today's class?
- What will you do with this information?
- What important question remains unanswered?

Discussion Points

1. Developmental Psychology is a science. As such, it is important that people interested in this corner of psychology understand science. This begins by understanding the difference between methods (data collection techniques) and design (strategies for using methods and for analyzing data). Because developmental psychology focuses especially heavily on A) children and B) change over time it is necessary for researchers to create and use methods specific to these needs.
2. Research with children requires special attention. Because the lion's share of developmental research employs children as participants extra care must be taken to ensure that studies are ethical, that they run to completion, and that children are adequately sampled.

Additional Activities

Outside Resources

Video: A 3 and a half minute video depicting the violation of expectation paradigm.
https://www.youtube.com/watch?v=l1VK2iawS34

Video: A popular TED talk by Dr. Laura Schulz on the topic of how babies make decisions.
https://www.youtube.com/watch?v=y1KlVZw7Jxk

Video: A popular TED talk by Dr. Patricia Kuhl on the topic of how babies learn language.
https://www.youtube.com/watch?v=M-ymanHajN8

Video: A two and a half minute video showing how ERP (brain activity) can be measured with children in the laboratory.
https://www.youtube.com/watch?v=gMBYs-pP-9o

Web: A link to Angela Lukowski's research laboratory. The site includes descriptions of the research and researchers as well as a list of publications.
http://memorydevelopment.soceco.uci.edu/

Web: The International Congress on Infant Studies - a professional society focused on infant research
http://www.infantstudies.org/

Web: The Society for Research on Adolescence - a professional society focused on research on adolescence
http://www.s-r-a.org/

Web: The Society for Research on Child Development - a professional society focused on child development research
http://www.srcd.org/

PowerPoint Presentation

This module has an associated PowerPoint presentation. Download it at

https://nobaproject.com//images/shared/supplement_editions/000/000/294/Research%20Methods%20in%20Developmental%20Psychology.pptx?1482785915.

About Noba

The Diener Education Fund (DEF) is a non-profit organization founded with the mission of re-inventing higher education to serve the changing needs of students and professors. The initial focus of the DEF is on making information, especially of the type found in textbooks, widely available to people of all backgrounds. This mission is embodied in the Noba project.

Noba is an open and free online platform that provides high-quality, flexibly structured textbooks and educational materials. The goals of Noba are three-fold:

- To reduce financial burden on students by providing access to free educational content
- To provide instructors with a platform to customize educational content to better suit their curriculum
- To present material written by a collection of experts and authorities in the field

The Diener Education Fund is co-founded by Drs. Ed and Carol Diener. Ed is the Joseph Smiley Distinguished Professor of Psychology (Emeritus) at the University of Illinois. Carol Diener is the former director of the Mental Health Worker and the Juvenile Justice Programs at the University of Illinois. Both Ed and Carol are award- winning university teachers.

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