
PSYC 206: Research Methods in Education and Cognitive Development Fall 2014 (MW 1:10-2:30, Judd 113)

Prof. Anna Shusterman, ashusterman@wesleyan.edu

Office hours: Thursdays 3-4 or by appointment, Judd 410

Course Description:

This course introduces students to translational research in psychology: research that draws on psychological science to inform practice. The course is built around a central case study, the acquisition of numerical concepts in deaf children (and at-risk children more broadly). We will cover existing research on cognitive and language development, deaf education, and teaching strategies, as a means to learn about research methods and practices in these areas.

The service-learning component of the course, in which students will spend 2 hours per week in a preschool, provides a hands-on opportunity to interact with preschool children and learn first-hand about their learning environment and styles. Although the service-learning component will generally entail work in hearing preschools, opportunities will be available for observation and volunteering in schools for deaf children.

Course Goals:

- I. To learn basic research methods, particularly in *cognitive development*.
- II. To gain first-hand experience observing child development, particularly *mathematical knowledge*.
- III. To apply basic research ideas to educational practice, focusing on a special population – *deaf children*.

Success in this course requires attention to each of these three goals. You will get the most out of the course if you try to learn as much as you can about all three areas, and stretch your mind to think deeply about the relationships among basic research, child development, and education (and among cognitive development, mathematical reasoning, and deaf education).

Grading: Your grade is determined by active participation (25%), completion of ten activities (50%), and completion of a final project (25%).

| Week | Dates | Topic – NB: ROUGH SCHEDULE FOR NOW; use Moodle! | Assignment Due |
|------|-------|---|---------------------------------|
| 1 | 9/2 | Introduction to the course | |
| | 9/4 | Cognitive Development and Educational Practice <i>Heckman, JJ (2006). Skill formation and the economics of investing in disadvantaged children. Science 312, 1900-1902.</i> <i>Griffin, S. (2004). Building number sense with Number Worlds: a mathematics program for young children. Early Childhood Research Quarterly 19, 173-180.</i> | |
| 2 | 9/9 | Basic Research Principles & Translational Research <i>Textbook chapters 1 & 2; Abstract search</i> | |
| | 9/11 | Volunteering in preschools: How to be a math ambassador <i>Chap 3 & 4</i> | |
| 3 | 9/16 | Reading Scientific Articles <i>Halberda, J., Mazocco, M., & Feigenson, L. (2008). Individual differences in non-verbal number acuity correlate with maths achievement. Letters to Nature 455, 665-669.</i> | |
| | 9/18 | Research Methods: Nuts & bolts <i>QALMRI Halberda</i> | |
| 4 | 9/23 | Research Methods: Basic Design Concepts <i>Chap 5 & 6</i> | 1. Article critique |
| | 9/25 | NO CLASS – ROSH HASHANAH | |
| 5 | 9/30 | Research Methods: Experiments <i>Chap 8 & 9</i> | 2. Mystery math |
| | 10/2 | More Research Methods <i>Chap 10 & 11</i> | |
| 6 | 10/7 | Advanced Topics in Research methods <i>Chap 12 & 13</i> | 3. Lesson idea |
| | 10/9 | Qualitative and Mixed Methods | |
| 7 | 10/14 | Children's Number Concepts: The knower levels | 4. Research methods quiz |
| | 10/16 | Children's number concepts: Beyond knower levels | |

| | | | |
|----|-------|--|------------------------------|
| 8 | 10/21 | NO CLASS – FALL BREAK | |
| | 10/23 | Language and number: Foundations and issues | 5. Report on K-levels |
| 9 | 10/28 | Language and number: Development | |
| | 10/30 | Number development in deaf children | 6. Synthesis paper |
| 10 | 11/4 | Broader issues in Deaf education | |
| | 11/6 | Introduction of final projects | 7. Response paper |
| 11 | 11/11 | NO CLASS – Prof. Shusterman away | |
| | 11/13 | Lessons, curricula, & preschool math | |
| 12 | 11/18 | Conceptual change theories of learning & education | 8. Critiques of lesson plans |
| | 11/20 | Translational research revisited | |
| 13 | 11/25 | NO CLASS – Individual project meetings | 9. Final project draft |
| | 11/27 | NO CLASS – THANKSGIVING | |
| 14 | 12/2 | Presentation of final projects | |
| | 12/4 | Presentation of final projects & conclusions | 10. Journal summary |

RESOURCES

1. **Textbook (required):** Cozby, Paul. *Methods in Behavioral Research*, 10th edition. McGraw Hill. ISBN: 978-0-07-337022-4.
2. **Journal** for recording notes and reflections on service-learning activities.
3. **Moodle:** All course documents including pdfs of readings will be available on Moodle.

BASIC EXPECTATIONS AND POLICIES

Assigned readings should be completed before the lecture.

Attendance at class is required for learning the course material. If you miss a class, you are responsible for getting class notes and information from a classmate.

Ask for help when you need it. This applies to course content, assignments, and service learning placements.

Check Moodle and email frequently. All relevant announcements will be posted on Moodle.

All work is due by the start of class on the due date in Digital Dropbox on Moodle. Late work will be downgraded by one point (e.g., 10 to 9, 5 to 4) for every 24 hours late.

All work that you hand in is expected to be your own. Instances of plagiarism, including copying the work of another student, will be treated with the utmost seriousness and will be handled as an Honor Code violation.

Disability Resources: Wesleyan University is committed to ensuring that all qualified students with disabilities are afforded an equal opportunity to participate in and benefit from its programs and services. To receive accommodations, a student must have a documented disability as defined by Section 504 of the Rehabilitation Act of 1973 and the ADA Amendments Act of 2008, and provide documentation of the disability. Since accommodations may require early planning and generally are not provided retroactively, please contact Disability Resources as soon as possible. If you believe that you need accommodations for a disability, please contact Dean Patey in Disability Resources, located in North College, Room 021, or call 860-685-2332 for an appointment to discuss your needs and the process for requesting accommodations.

Student athletes: If you anticipate a game-related conflict, please communicate with me about it by Sept. 13.

FUNDAMENTALS

The purpose of this course is to create a **working laboratory** for translational research. Such research can be found in medical science, educational research, and many other fields. Translational research is at the intersection of basic or 'pure' research, which seeks to answer scientific questions (e.g., how do children acquire number concepts), and applied research, which seeks to address the pragmatic implementation of ideas in everyday environments (e.g., which math curriculum leads to most improvement on test scores?). You might think that these fields would be easy to connect: just take the best ideas from the basic science, implement them in everyday solutions, and voila.

Increasingly, both scientists and practitioners are discovering that it is not always so straightforward. Basic research is often designed to maximize scientific validity, but gives up ecological validity. Applied research takes the whole context into account, for example the school in which the curriculum is implemented, but often has to give up some scientific rigor in the research design in order to maximize the naturalness of the setting. There are two outcomes of this: one, basic and applied research communities are surprisingly disconnected from each other. There are notable exceptions, but to a large extent, people who study children's mathematical development communicate very little with people who study math education! Second, it turns out to be quite a challenge to work out how to apply the lessons of basic cognitive science to educational practice (and vice versa), so, like many difficult things, it happens a lot less than it could.

Take, for example, the difference between **efficacy** and **effectiveness** studies. Efficacy studies test to see whether an intervention works (a drug, a curriculum) using the best scientific methods (generally RCTs -- randomized controlled trials). Effectiveness studies test to see whether these effects generalize beyond that hospital or that school (when the researchers are not checking over everyone's shoulders to make sure that every protocol is adhered to). The fact that efficacy and effectiveness studies can yield different findings about what works tells us that there is a lot of work to be done in the murky middle – figuring out how to translate the best science into best practices.

This course focuses on a case study that forms part of my own current research program: numerical development in deaf children learning English. There are many reasons that this case study is interesting to me, and I hope to make it compelling to you too. It is critical that you invest yourself in learning about each piece of the puzzle, so that our classroom can really become an intellectual community with the shared goal addressing the puzzle of how to support the educational progress of children with atypical developmental histories.

Broadly speaking, this course is divided into four segments: (1) research methods; (2) children's number development; (3) issues in deaf education/children at risk; and (4) the development of the final project. As a class, our final project will be to move forward with the mini-curriculum that has been developed by two previous iterations of this class plus an intensive follow-up by some 206 alumni. There are a few options we can take as a class and we will discuss these and cement a plan.

A brief history of Psyc 206:

- ⇒ The class was conceived as the educational component in an NSF-funded project on early number acquisition. The idea was that we needed more minds working in the black hole of translational research, and undergraduate classes might be the perfect laboratory. People agreed that the need is great.
- ⇒ The first class of 206 (in 2010) came up with lesson plans on preschool math. These lessons were designed with oral-deaf preschoolers in mind and with the goal of being firmly rooted in research findings.
- ⇒ In the second year (2011), students worked on articulating more sharply the relationship between the research literature and the lesson plan, piloting and refining the lessons, and assessing the successes and pitfalls of translating research-based concepts into practical implementation. As a class, their goal was to “find a way to systematize our assessment of the lesson drafts.”
- ⇒ The following spring (2012), 6 alumni worked through an intensive pilot of a selection of the best lessons. In addition, Andy Ribner led a student forum using these lessons, and his experience may provide some more insights.
- ⇒ These lessons have been shared with teachers and families through several forums, and met with great excitement (!).
- ⇒ Last year (2013) students divided into two class projects. One group conducted a needs assessment via teacher interviews. We don’t want to show up at schools with a package of materials and say, “Here! We made this! This is awesome! You should use it!” People often don’t take kindly to that approach. We approached the problem from the other side: What are preschool teachers already doing to support math? What’s the success of existing published curricula? Do they need to incorporate more math? Why aren’t they already doing it? What would they see as supportive measures for their work? A teach-in (we could design one!)? The second group conducted a mini-curriculum evaluation. It faced many pitfalls, which we learned from, but also yielded very promising preliminary results.
- ⇒ This is where you come in! Right now we have about 8 activities that are really finished and worth giving away. Your class will develop more activities, drawing on the first drafts that were generated in 2010/11, piloting and improving them so that they are truly teacher-ready and classroom-ready while still honoring the research.

Because it is hard to do translational research if you are entirely divorced from the relevant real-world setting, you will also observe and interact with preschoolers through the **service-learning** component of the course. You will spend 2 hours a week at your site. I have arranged with the directors that these hours will roughly be divided into 2 parts – one hour where you will host a ‘math table’ which will be one of the activities that children can wander to during ‘center time,’ and another hour where you will be there to play, support the teachers, get to know the children, and get a feel for the pulse of a preschool. This will ultimately help you to keep developmentally appropriate issues in mind as you develop your final project, and hopefully make highfalutin talk about ‘early childhood education’ a little more real.

In sum, here are the basic expectations for the class:

- 1. Classwork:** You will have something to read and think about, and frequently something to do, before each class session. You are expected to come prepared and ready to engage in thoughtful discussion about the topic for every class.
- 2. Homework:** Instead of major papers or exams, you will complete ten smaller assignments and your final project. This allows you to cement your understanding about the various sub-disciplines that you need to know in order to engage in meaningful inter-disciplinary work. Even though each assignment is small, I advise against treating it lightly; a collection of half-baked assignments will not enhance your learning, enrich your knowledge, or serve you well with a good grade at the end of the semester.
- 3. Service:** Once you have determined your schedule and your site, you will go to a preschool every week. You should be prepared to run the math activity table for one hour of your two-hour session. We will discuss things you can do, at least briefly, each week. Sometimes your activities will be dictated by the course, and sometimes you will have more freedom to be creative and experiment. You will meet with the other students at your site once a week for at least a half-hour to plan your activity for the following week. You should make a brief entry in your journal after each session.