

Department of Special Education University of Maryland
Spring, 2015

EDSP 670 IH15 The Use of Single Subject Research Designs in Education

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Time: Monday, 5:15-8:00

Text: Kennedy, C.H. (2005). *Single-case designs for educational research*. Boston, MA: Allyn and Bacon.

Course Description

The course is designed to provide the student with an extensive background in the design and analysis of single subject research. The emphasis on applications of such research designs and methodology help to prepare discipline-based practitioners to teach effectively in a pluralistic society. We will begin by addressing issues relevant to the design of empirical research in general and then proceed to issues related to single subject designs.

Course Objectives

1. Discuss in writing the advantages and disadvantages of single subject experimental designs as contrasted with group experimental designs.
2. Define in detail the terms internal and external validity and state how single-subject designs control for threats to validity.
3. Describe, recognize, and give examples of each of the four basic methods commonly used to observe behavior.
4. Be able to explain what is meant by the term reliability and state why it is important.
5. Compute reliability, given recordings of two observers.
6. Given a research study, identify the design employed and evaluate its adequacy with respect to internal and external validity.
7. Describe in writing the procedures for implementing the following single subject designs and critically evaluate them with respect to internal and external validity:
 - (a) Reversal
 - (b) Multiple baseline
 - (c) Multiple probe
 - (d) Changing criterion
 - (e) Alternating Treatments/multi-element design
 - (f) Simultaneous treatment design
8. Display data graphically, accurately, and consistent with accepted norms (as presented in class).
9. Evaluate the appropriateness of programmatic decisions on the basis of given set of data.

Academic Integrity

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. The Code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. The University Senate asks instructors to consider requiring students to write the following signed statement on each examination or assignment:

I pledge on my honor that I have not given or received any unauthorized assistance on this examination (or assignment).

Religious Observance

The University System of Maryland policy "[Assignments and Attendance on Dates of Religious Observance](#)" states that students should not be penalized in any way for participation in religious observances and that, whenever feasible, they be allowed to make up academic assignments that are missed due to such absences. However, the student must personally hand the instructor a written notification of the projected absence within two weeks of the start of the semester. The request should not include travel time.

Accommodations for Students with Disabilities

If you have a documented disability and wish to discuss academic accommodations, please contact me as soon as possible. For information on accommodations see www.counseling.umd.edu/DSS. Disability Support Services requires that students request a form for accommodations each semester. It is your responsibility to present the form for accommodations to me ASAP.

Student Responsibilities

1. Students will attend all class sections.
2. Students will hand in all assignments typed on the dates due. Late papers will not be accepted unless prior permission has been given. All projects must be turned in to obtain a grade of A or B.
3. Students will have read all assignments prior to discussion sessions and will actively engage in the class discussion.

Evaluation

Evaluation will be based on several variables measured throughout the semester.

1. Group discussion: Each week a student will be assigned an article, or a chapter or part of a chapter from the text. Each student will provide a written summary of the main points of the reading (with enough copies for the other students).
2. Review writing: Each student will be expected to write two reviews of research articles using the format supplied by the Journal of Applied Behavior Analysis. Students will be evaluated on the tone of their review (suggestive and not harsh); and on their evaluation of the methodology,

analysis, results, and discussion sections of the articles. The first review will be considered a practice/feedback session and will not be counted.

3. Exams: Exams will contain both essay and multiple choice questions on all of the material covered to that point.
4. Final project: Each of you is expected to design and write a single subject research study. The project must include replication across at least 3 subjects, settings, behaviors, and/or teachers. The final write-up must be consistent with the guidelines from the 6th edition of the publication manual for the American Psychological Association. Please make sure that you have access to a copy of this manual or use the following site:
<http://owl.english.purdue.edu/owl/resource/560/01/>

You should start thinking of topics early in the semester. As each area is covered (e.g., methodology), you should decide what is applicable to your project. **Everyone must email a proposal for their project by March 13.** Your proposal should include descriptions of:

- 1) the general area that you will be investigating and the target behavior
- 2) proposed participants and setting
- 3) observational procedure(s)
- 4) research design.
- 5) three relevant and timely (last three years) articles related to your topic. Include the names of the author(s), date of publication, title of the article, name of the journal in which it was published, volume number and page numbers.

The projects will have at least the following components:

a. Literature review

A detailed review of published research literature relevant to your topic. The articles reviewed should have been published within the last three years. A **minimum of six (6) articles** should be included in your paper, **three** of which must be **described in detail** (e.g., purpose, method, results, implications/importance).

b. Method section

This section should delineate at least the:

- i) characteristics of the participants;
- ii) characteristics of the setting;
- iii) any material(s) used to conduct the study;
- iv) type of data and the method for collecting it;
- v) baseline and intervention procedures;
- vi) research design; how it was used and why appropriate for your study (i.e., justify your selection);
- vi) how often and by what method reliability data will be collected and inter-observer agreement calculated.

c. Result section

Each of you will draw a graph reflecting what the data would look like had you actually implemented the project. The graph should be labeled correctly and represent how the data would appear given the design you have selected.

d. Reference list

Each student will have a list of references cited in their paper. The reference list must conform to APA style.

5. Presentation of final project: Each student will be required to use PowerPoint to present the results of their project in an 8-10 minute in-class presentation. Students should provide copies of their PowerPoint presentation to the other students in the class. The presentation should follow the general outline of the final paper. For example:
 - 1) Statement of problem area and why it was of interest
 - 2) Description of subjects/setting
 - 3) Detailed presentation of procedures
 - 4) Design used
 - 5) Results (present graphs, tables, etc.)
 - 6) Discussion

Approximate Points

1. Exams	100 (50 each)
2. Review writing (2 at 40 points each) (First review ungraded)	40
3. Project proposal	5
4. Final project presentation	50
5. Final project write-up	65

	260

ASSIGNMENT

DUE DATE

Final project approved

March 13

First journal review

April 9

Second journal review

April 23

Student presentations

April 27, May 4

Final project

May 6

COURSE OUTLINE

<u>Dates</u>	<u>Topic</u>	<u>Chapters</u>	<u>Readings</u>
1/26	Introduction to class Factors affecting experimental designs	1, 3	
2/2-2/09	Introduction to single subject design	4, 5	1, 2
2/16-2/23	Observational methodology	6, 7, 8, 15	
3/2-3/09	Reversal designs Multiple-baseline designs	9 11	
3/23	Midterm exam		
3/30-4/06	Multiple probe designs Changing criterion designs Brief experimental designs Journal review procedure Format of articles	11 14	3 4
4/13	Comparative designs Repeated acquisition designs Combined designs In class critique (article 1)	10 12 14	
4/20	Social validity Ethical principles	16	5
4/27	In class article critique (article 2) Student presentations		
5/4	Student presentations Review for final exam		
5/11	Final exam		

Additional Readings

1. Birnbrauer, J. (1981). External validity and experimental investigation of individual behavior. *Analysis and Intervention in Developmental Disabilities, 1*, 117-132.
2. Kazdin, A.E. (1981). External validity and single case experimentation: Issues and limitations. *Analysis and Intervention in Developmental Disabilities, 1*, 133-143.
3. Gast, D., & Ledford, J. (2009). Variations of multiple baseline designs and combination designs. In D. Gast (Ed.), *Single subject research methodology in behavioral sciences* (pp. 382-416). New York, NY: Routledge.
4. Wolery, M., & Lynne Lane, K. (2009). Writing tasks: Literature reviews, research proposals and final reports. In D. Gast (Ed.), *Single subject research methodology in behavioral sciences* (32-56). New York, NY: Routledge.
5. Mechling, L., & Gast, D. (2009). Ethical principles and practices. In D. Gast (Ed.), *Single subject research methodology in behavioral sciences* (57-90). New York, NY: Routledge.

Review Rubric

I. Overall tone of review

1 2 3 4

- a) Tone conveys respect for research.
- b) Includes suggestions for improving research.
- c) Includes detailed suggestions for areas in need of revision.
- d) Uses conditionals to help soften the tone of review (e.g., could, would, might, etc.)
- e) Avoid sarcasm
- f) Makes points in the form of statements rather than questions.

II. Introduction Evaluation

1 2 3 4

- a) Identifies whether or not the introduction explains the relationship and importance of the study.
- b) Identifies whether or not the work is placed in the context of the previous research literature related to the current topic.
- c) Identifies whether or not a clear statement of purpose is provided at the end of the review.

III. Methodological evaluation

A. Participants and setting

1 2 3 4

- a) Identifies whether or not the participants and setting are described with sufficient detail to allow for replication.
- b) Describes in detail what additional information is needed if revision(s) are required.

B. Procedures section (x2)

1 2 3 4

- a) Identifies whether or not the procedures are described in enough detail to allow for replication.
- b) Describes in detail what additional information is needed if revision(s) are required.

C. Design section (X2)

1 2 3 4

- a) Identifies whether or not the design is appropriate for the research.
- b) Identifies whether or not the design has been implemented appropriately
- c) Describes in detail what threats to internal validity are not controlled (if any) and how the interpretation might be affected.

D. Reliability section

1 2 3 4

- a) Identifies whether or not the correct reliability formula has been used and if sufficient reliability data have been collected.
- b) Identifies whether or not the reliability figures are acceptable.

IV. Results

1 2 3 4

- a) Identifies whether or not the presentation of the results is descriptive and free from interpretation.
- b) Identifies whether or not the presentation of the results in the text corresponds to the results portrayed in the figure(s).
- c) Identifies whether or not the results reported by the author(s) are consistent with the data presented in the figure(s).

V. Discussion

1 2 3 4

- a) Identifies whether or not the discussion section integrates and interprets the results within the context of previous research.
- b) Identifies whether or not the data support the conclusions presented.
- c) Identifies whether or not future research directions are presented.

Paper Rubric

I. Introduction Evaluation

1 2 3 4 5

- a) Must reference 6 research studies related to current project with 3 described in detail (purpose, method, results, and implications) and relate them to the purpose of current project.
- b) Must have purpose statement at the end of the introduction

II. Methodological evaluation

A. Participant(s) and setting

1 2 3 4 5

- a) Participant(s) must be described with enough detail so that one could replicate the selection process and the participant(s). Must include at least age, sex, characteristics as they relate to experimental question.
- b) Setting must be described with enough detail so that one could replicate the setting in which the project occurred

B. Baseline (x2)

1 2 3 4 5

- a) Baseline procedures must be described with enough detail so that could be replicated.
- b) Must include the exact procedures that were used, number of sessions conducted on a given day, length of session.

C. Intervention (x2)

1 2 3 4 5

- a) Intervention procedures must be described with enough detail so that could be replicated.
- b) Must include the exact procedures that were used, number of sessions conducted on a given day, length of session.

D. Design section (X2)

1 2 3 4 5

- a) Must describe the design used both in terms of implementation and how it controls threats to internal validity.

E. Reliability section

1 2 3 4 5

- a) Must specify how reliability data were collected
- b) Must specify how reliability was calculated

- c) Must provide both average reliability scores as well as range.

III. Results

A. Written

1 2 3 4 5

- a) Must describe the mean and range of the data for each phase of the design
- b) Must not provide any interpretation of the data within this section.

B. Graph

1 2 3 4

- a) Must be drawn appropriately given the design selected.
- b) Headings must be based on the independent variable (baseline=absence of IV; intervention=label for IV).
- c) Horizontal axis must reflect time (e.g., sessions, trials, days, etc.). Vertical axis must reflect dependent variable.

V. APA style

A. In-text

1 2 3 4

- a) References are cited correctly (both in and out of parentheses).
- b) All references in the reference list are cited in the text.

B. Reference list

1 2 3 4

- a) Reference list is formatted correctly
- b) All references in text are cited in reference list.

VI. Quality of writing

1 2 3

- a) Very clearly written, excellent sentence structure; evidence of proofreading with no spelling, grammar or language mechanics errors