The Cookie Experiment Revisited: Broadened Dimensions for Teaching Nursing Research

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Abstract:

Nurse educators face the ongoing challenge of presenting increasingly complex nursing research methods to undergraduate and graduate students. The cookie experiment, a unique teaching strategy developed more than a decade ago by Thiel, has been refined and expanded to include hands-on quantitative and qualitative components while also serving as a way to lessen students' phobias about research. This creative and effective teaching strategy provides a user-friendly format that can be adapted as needed to present both basic and complex research concepts. The authors present this teaching strategy and discuss its applicability to undergraduate and graduate courses.

Article:

Various techniques have been developed to increase experiential learning activities for students involved in research courses.[1-3] More than a decade ago, Thiel[4] suggested using a "cookie experiment" in an undergraduate course as a way to lessen students' phobias about research and to encourage active participation in learning research methods. Because of the need to integrate more complex concepts into nursing research courses, we expanded and modified this cookie experiment. It is used as an icebreaker for an initial class and then provides exemplars throughout the entire course.

THE ORIGINAL COOKIE EXPERIMENT

In the original experiment, Thiel gave each student two chocolate-chip cookies, one made with egg yolk and one without: in essence, an experimental and a control group, with cholesterol being the independent variable. Students were asked to review the consent form for participation and any ethical considerations. They completed the cookie assessment tool, which included eight five-point Likert-form items and two dichotomous questions about cookie preferences. The class then discussed the strengths and limitations in the study, the existence of conflicting variables, and the cost of the research and reviewed the instrument. Descriptive statistical analyses of the data were brought back to the students for discussion. Thiel suggested that this fun approach to teaching nursing students about research could also encompass additional research concepts. We accepted Thiel's invitation to improvise and expand on his creative approach and developed several new assignments throughout our research course based on a revised cookie study.

THE REVISED COOKIE STUDY

To increase students' hands-on experience with multiple aspects of the research process and to integrate quantitative and qualitative components, we use an expanded version of the cookie study. We begin the study with the same materials used in the original study: two batches of home-baked chocolate-chip cookies that differ only in the use of eggs in one batch (cookie A) and egg substitute in the other (cookie B). Students are given a sheet of paper marked cookie A on one half and cookie B on the other half; they place their cookies on the sheet of paper, not knowing which cookie is which. They receive a cup of water to cleanse their palates between cookies.

Students are each given the study packet containing the consent form and data collection sheets (Figure 1 and Table 1). They look at the consent from two perspectives: that of a participant (what they would want to know before participating in a study) and that of the research oversight authority (what would be required by an institutional review board for the protection of human subjects). The students and professor then write a new consent form based on this discussion and compare it with the consent form from the original study. This exercise provides a wonderful opportunity to discuss the need to protect human subjects and the role of the institutional review board.

Figure 1: Subjective responses to eating a chocolate chip cookie

Choose the cookie that appeals the most to you. _____A_____B
Why did you choose that one?
Pick it up, feel its qualities, smell it, etc. Describe your experience of the cookie.
Take a bite or two. Describe the experience of eating the cookie.
How does this experience feel to you?
How do you feel about food in general, and chocolate chip cookies like this one in particular?
Rinse your mouth with water. Experience the second cookie, if you would like to.
Describe it.

Because of the unique classroom situation of students playing dual roles, that of participant and researcher, the steps of the research process were modified slightly to allow participation in both roles. Data collection follows informed consent in the classroom so that students first have the experience of being a study participant before discussing design and methodology, thus preventing them from contaminating the data. After the discussion of informed consent, students are instructed to select the cookie that appeals most to them and complete the qualitative portion of the study (Figure 1). They then answer the quantitative questions (Table 1).

With the data collected, students then move into the role of researcher and critique the steps of the research process. The first issue addressed is the purpose of the study. Students are asked, using hindsight, what questions could be answered based on the data just collected. These questions might range from a qualitative question such as, "What is it like to eat a chocolate-chip cookie?" to a quantitative correlational question such as, "Is there a relationship between weight and cookie preference?" These questions naturally move the discussion to the next step, that of research design.

The design of the study and the use of the word "experiment" serve as a good starting point for discussion regarding the characteristics of true experimental, quasiexperimental, and

nonexperimental designs. Through this exercise, students learn that this study is not a true experimental design.[5] This exercise also lends itself to a discussion of the characteristics of qualitative versus quantitative paradigms. Students frequently recognize the differences between the subjective and objective approaches of the questions asked in the study, and this can serve as the starting point for examining these two perspectives.

Table 1: Quantitative Research Questions for the Revised Cookie Experiement

State your age _____.
State your gender _____.
State your weight _____.

Put an "X" on the line that indicated your position between the two statements.

At the present time, I am:

Not at all hungry.	———	The hungriest I have ever been.

My interest or concern about the amount of cholesterol I consume:

I avoid all cholesterol.	———	I eat whatever I want, with no concern for cholesterol content in my diet

My interest or concern with healthy eating:

I avoid all unhealthy foods whenever I eat.	———	I eat whatever I want, whenever I want with no regard for the healthiness of my foods.

You will receive two cookies which will be marked in such a way as to indicate whether it is Cookie A or B. It is important NOT to remove this marker so you will not become confused about the identity of the cookies. You will be given 5 minutes to assess both cookies and to record your answers on the computer sheet. You may go back to the first cookie at any time as long as you rinse your mouth.

		Excellent "Like mom makes"	Pretty good "A good store-brand cookie"	Not Bad "Like dad makes"	Bad "A bad store-brand cookie"	Very bad "Wouldn't feed it to my dog"
A.	1. How would you rate cookie A in regard to its texture?	1._____	2._____	3._____	4._____	5._____
	2. How would you rate cookie A in regard to its moistness?	1._____	2._____	3._____	4._____	5._____
	3. How would you rate cookie A in regard to its flavor?	1._____	2._____	3._____	4._____	5._____
	4. How would you rate cookie A in regard to its appearance?	1._____	2._____	3._____	4._____	5._____
B.	5. How would you rate cookie B in regard to its texture?	1._____	2._____	3._____	4._____	5._____
	6. How would you rate cookie B in regard to its moistness?	1._____	2._____	3._____	4._____	5._____
	7. How would you rate cookie B in regard to its flavor?	1._____	2._____	3._____	4._____	5._____
	8. How would you rate cookie B in regard to its appearance?	1._____	2._____	3._____	4._____	5._____
	9. Overall, which cookie do you like better—cookie A or B? 0—cookie A; 1—cookie B					
	10. Do you like chocolate chip cookies? 0—No 1—Yes					

To prompt discussion about levels of measurement (nominal, ordinal, interval, and ratio) and various response-choice formats and to allow in-depth statistical analysis, we added items to the questionnaire (see Table 1) such as the participant's gender, weight, and age and visual analogue

scales ("I am the hungriest I have ever been" to "I am not hungry at all.") Students provide a score on "My interest or concern about the amount of cholesterol that I consume" to give them data-coding experience.

Open-ended questions about the experience and the meaning of eating a chocolate-chip cookie were added to obtain data that could be analyzed qualitatively. These additions also serve as a means for triangulation of data collection and analyses.

It is important to have items that are meaningful and culturally and gender sensitive. Response choices provided in the quantitative component of the study such as "Just like Mom makes" can serve as a catalyst for discussion about whether these would be applicable and appropriate for all participants. This exercise illustrates that terms may be value-laden or situation-specific; alternative wordings can then be developed.

Similar strategies can be used to provide different levels of research activities for undergraduate and graduate students. Undergraduates should be able to identify the level of measurement of each variable and the appropriate statistical analysis. By expanding the type and number of questions asked, the students can move beyond descriptive analysis. For example, comparing mean scores on cookie moistness by type of cookie allows students to apply their understanding of t-test analysis. Graduate students take the next steps by coding, entering, and running their statistical analyses to answer specific research questions. A statistical package such as SPSS for Windows provides a user-friendly environment. These students can apply higher-level research concepts through their direct experience with the data. To increase sample size if needed for either analysis, data may be accumulated from semester to semester, or "dummy" data may be added to build the sample size.

Because most students have not had experience with qualitative data analysis, we provide detailed guidelines. For example, when students are given the transcripts of amalgamated data, they are also given guidelines detailing how to code and develop themes for qualitative data. Suggestions should also be given to these student groups to encourage abstract thinking, such as working in a nonacademic setting and staging the environment with music, lighting, and other props. Students need direction and support during the 2 to 3 weeks that this part of the assignment often requires. This segment also provides students with experience working as a member of a research team.

DISCUSSION

As with the original cookie experiment, our expanded version is a useful and enriching teaching strategy for both teacher and students at many levels. Using this strategy, novice research students apply their basic understanding of research concepts in a hands-on study, and graduate students use it as a review before integrating these concepts into more sophisticated research experiences.

Qualitative analysis was a challenging process for many of our more concrete and objective thinkers. Developing beginning inductive reasoning related to coding and generating themes transformed their thinking about interpretive research methods. Despite their apparent simplicity, the open-ended questions about their cookie-eating experiences often yield rich contextual data.

Students' analyses reveal both physical and emotional components of the experience of eating a cookie-for instance, students wrote, "Eating this cookie is like going home to my mom's kitchen after school" and "It's comforting and reassuring."

The experience of eating a cookie, unlike many other foods, also provides an opportunity for students to relax, thus setting the emotional stage for learning. Incorporating both quantitative and qualitative components into the cookie study illustrates the differences in data collected using these two approaches.

In conclusion, the revised cookie study is a creative and effective teaching strategy that can be adapted for students at various levels. Incorporating all or some of the strategies outlined here can broaden nursing students' understanding of the research process with a user-friendly format.

REFERENCES

1. Duggleby W. Improving undergraduate nursing research education: The effectiveness of collecting and analyzing oral histories. J Nurs Education. 1998;37(6):247-252.
2. Radjenovic D, Chally PS. Research utilization by undergraduate students. Nurse Educator. 1998;23(2):26-29.
3. Shellenberger T. Dear Researcher: An alternative to the research critique. J Nurs Education. 1998;37(6):264-265
4. Thiel CA. The cookie experiment: A creative teaching strategy. Nurse Educator. 1987;12(3):8-10.
5. Burns N, Grove SR. The Practice of Nursing Research, 3rd ed. Philadelphia: Saunders; 1997.