Fast Food Delivery: Operationalization and Research Design
Supplemental Materials
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These supplemental materials for "Fast Food Delivery: Operationalization and Research Design" provide discussion questions and sample assignments for each step. Assignments are optional and students can draw from class discussion as an anchor for more advanced work relating directly to their research project. The recommended assignments provide the instructor ideas for assessing different concepts as the semester progresses.

The fast food delivery activity allows students to develop and conduct original research, providing them the methodological skills to apply to independent research projects. The observational study can be developed in a single class following the steps below. The food should be ordered in the class following the creation of the observational study. The activity can end after the first delivery, allowing the instructor to achieve learning objectives 1-4. Orders can be placed throughout the semester to gather additional data and achieve learning objectives 5-7. **Appendix A** provides a review of when learning objectives are achieved.

Learning Objectives:

1.	Design an observational experiment
2.	Explain the role of assumptions in social science
3.	Explain the role of operationalization in social science
4.	Construct measures to operationalize concepts
5.	Test an original hypothesis
6.	Create an original dataset
7.	Analyze an original dataset

The fast food delivery activity is meant to be a conceptual anchor for students. It helps convey difficult topics in a fun and engaging way. As students move through the semester and tackle more complex research methods concepts, the instructor can refer to this activity and build assignments around the activity. It is recommended that example assignments below be used throughout the semester when the class is covering the appropriate topics.

Step 1: Research Question

Developing the research question is best done in class so the instructor can show tv, print, or online restaurant ads to students and then facilitate a discussion to determine the research question. Every campus has access to different restaurants and identifying an appropriate restaurant is up to the instructor. If no ads are available, showing the restaurant website and discussing the expectations of a speedy delivery are acceptable. Jimmy Johns' "freaky fast delivery" campaign was the original inspiration for this exercise. Students regularly saw delivery people in Jimmy Johns shirts running around campus delivering sandwiches, making them aware of how delivery people got around. The instructor can show ads to the class with no background, asking them to explain the purpose of the ad and start developing questions. Alternatively, the

instructor can assign ads in advance, have students prepare research questions based on those ads, and discuss them in class. My class watched multiple Jimmy Johns ads featuring the "freaky fast delivery" campaign which can be found on YouTube.

Step 2: Research Design

The focus of this activity is an observational study where students identify measures and collect data from a fast food restaurant delivering to the classroom. The instructor should explain what an observational design is and how it compares to some other types of research design. Instructors should shape the discussion of research design methods based on their assigned reading materials for the class. When setting up this activity, the instructor should briefly review other types of design methods. The instructor can revisit their choice later in the semester when teaching other types of design methods so students can connect new material to the fast food delivery exercise.

Research Design Methods			
Observational	**Comparative**	**Survey**	**Data and archival**
Identify and collect data based on actions taken by individuals to answer a research question.	Employ a most similar or most different systems design to detailed case studies to answer a research question.	Directly engage with individuals by asking questions pertaining to research question.	Use of open source records, documents, and statistics to answer a research question.

Step 2 assignment: When the class reaches the point in the semester when the instructor teaches design types, have student refer back to the observational design developed for the fast food delivery exercise. Provide the following prompts and chart as an assignment to assess understanding of different design types.

1. *Using the fast food delivery research question developed in class, outline a research project for each design type.*

2. *For each design type, identify two strengths and two weaknesses to applying that design type to the fast food delivery research question.*

Research Design Methods				
	Observational	**Comparative**	**Survey**	**Data and archival**
Design	Identify a local fast food restaurant to order from. Identify and define variables. Order delivery from the restaurant and collect data based on observations.			
Strengths				
Weaknesses				

Step 3: Operationalization, Theory, and Assumptions

This section provides ideas to guide the discussion for dependent and independent variables. This list is not exhaustive and the class might find additional variables or alternative measures. Most measures should be identified and discussed in class.

Delivery time: What constitutes a delivery? When will timing begin and when will it end? Does timing start when you first put the call through? Does it start when someone picks up? What happens if you are put on hold? What happens if no one answers and you have to call back? What happens if you order online? What happens if you order on an app? When does the delivery end? When the delivery person shows up? Once you pay? Once you check and make sure food is correct? What assumptions do you have to make about the delivery? The number of delivery people?

Complexity: How many alterations to the order are there? How many items are ordered? Are there different types of items ordered – food v. drinks? Should there be an index for complexity or individual measures? How will complexity affect delivery time and why? What assumptions do you have to make about the preparation of the order? The number of workers preparing the order?

Payment: What is the form of payment – cash or credit? Will it affect delivery time differently? How?

Distance: How far is the restaurant from the classroom? What ways can you measure distance? If using something like Google Maps, how do you decide on the route to use? Is the class assuming the delivery person will take the shortest distance or fastest route? Are you assuming the delivery person drives, walks, or bikes? Does it matter? What unit of distance will the class use? Miles? Are you required to round to the nearest mile? Are miles the most accurate measure or are there other measures?

Weather: What is included in this measure? Temperature? Precipitation? Cloud cover? Where does this information come from? How will you measure temperature? A thermometer? A weather website? If a website, what method is the site using to determine temperature? Is it a valid measure? How does temperature affect delivery time? Does the class assume all delivery people are equally affected by temperature? How does precipitation affect delivery time?

Peak Hours: When during the day is the order being placed? Does the class assume it will be busier at some times – during the lunch hour?

For each variable, have students develop the measure, identify any necessary assumptions, and create a theory for how it will affect delivery time.

Step 3 assignment option 1: This exercise can be assigned at the conclusion of the session where the observational study is developed. Leave one concept from class identified but undefined and assign the following prompts:

1. *The class identified concept X as being important for our study. Operationalize that concept.*

2. *Create a theory for how concept X will affect delivery time.*

3. *Identify and explain at least one assumption you made while developing your theory for concept X. Explain the implications of that assumption.*

Step 3 assignment option 2: This exercise can be assigned at the conclusion of the session where the observational study is developed. Assign one of the concepts developed in class and assign the following prompts:

1. *Develop an alternative operationalization for concept X.*

2. *Discuss the strengths and weaknesses of the change measurement.*

3. *Discuss how the change in measurement will affect delivery time.*

4. *Identify and explain at least one assumption you made when discussing how the change in measurement will affect delivery time.*

Step 4: Hypotheses

Using the discussion above and variables created, work with students to develop specific hypotheses. The instructor should provide an example hypothesis for students. For each hypothesis, students should refer to the theories developed in Step 3.

Some examples include:

H1: Increased order alterations will create a longer delivery time.
H2: Cash payments will create a longer delivery time.
H3: Rain will create a longer delivery time.
H4: Orders during peak hours will create a longer delivery time.

Step 4 assignment: When the class reaches the point in the semester that hypothesis testing is covered, have students refer back to their ***Step 3 assignment*** (either option assigned will work). Provide the following prompt:

1. *Using the variable you developed in Step 3, create a clear, testable hypothesis related to delivery time.*

2. *Provide a causal argument for your hypothesis.*

Step 5: Data collection

During this step instructors should use the information developed in Step 3 to create an excel worksheet to track the data. This step is an opportunity to explain the role of observations and data input. The instructor should discuss the difference between numerical and non-numerical values in the dataset. While this links to the operationalization discussion, constructing the data worksheet with students provides an important visual. Ask students how weather should be coded in the dataset. If it is raining during an observation, should the class use "rain" or should there be a numerical value – 1 – assigned to rain. As the semester progresses, the data can be referred to for discussing types of variables – continuous, ordinal, nominal, dummy.

The instructor should keep a master copy of the data but students can replicate worksheet and keep their own data. When collecting data, it is important to discuss intercoder reliability. It is recommended that the instructor always have three students collect the data for the day. This includes all variables the class developed – complexity, weather, delivery time…

Step 5 assignment: When the class reaches the point in the semester when the use and role of data is taught, have students refer back to the data they have been collecting for the fast food delivery activity. Provide the following prompts:

1. *What is the role of intercoder reliability and why is it important?*

2. *Define each type of variable included in the fast food delivery activity. Identify at least one strength and one weakness for each type of variable.*

If there is a variable type missing – continuous – add a question asking students to develop a continuous variable that could be included in the study. Ask students to discuss the value of this measure and if it is something that should have been included.

Step 6: Ordering

It is recommended that the instructor allow a student to pick the items that will be ordered and providing that student with a free lunch. Ask the class how to choose the student and provide some options – alphabetical by last name, alphabetical by first name, closest to the door first, closest to the window first, highest grade (though only as a recommendation so there are no FERPA violations). Guide students to random selection. While this does not directly address the role of populations and random sampling, it does allow students to understand the importance of randomization which allows the instructor to discuss random sampling and generalizability later in the semester. If the instructor orders throughout the semester, the class should decide on random selection with and without replacement.

Step 6 assignment: When the class reaches the point in the semester when populations and sampling are discussed, provide students the following prompts:

1. *How did the class choose what to order in the fast food delivery activity? Why did we use that method?*

2. *How should a researcher choose their sample? Why?*

3. *We ordered delivery from a single fast food restaurant; can we generalize our results? Why or why not?*

Step 7: Analysis

After collecting data from deliveries throughout the semester, the class will have multiple observations that allow for simple statistical analysis. It is important at this time that the instructor discuss discipline standards for the number of observations necessary to legitimize the study. Unless the instructor is ordering every class, it is unlikely they will reach this threshold and that should be made clear to students. Still, students can engage in simple calculations that help them understand more complex concepts. The worksheet below asks students to use and analyze data collected during the semester.

Step 7 assignment 1:

Fast Food Delivery Worksheet

Using the data collected during the semester from the fast food delivery exercise, answer the following questions.

1. Minimum time _____

2. Maximum time _____

3. Range _____

4. Mean _____

5. Median _____

6. Mode _____

7. Standard deviation _____

8. Provide a sketch for a normal distribution. Include the values for 1 and 2 standard deviations above and below the mean. Include the percentage of observations that fall within those deviations.

9. Z-score of the mean value _____

10. Z-score observation #____ _____

11. Z-score observation #____ _____

12. Z-score of the classes hypothesized value of fast delivery _____

13. The class did a good/bad job of hypothesizing the value of fast delivery? Defend your answer using data.

14. The class did a good/bad job of creating additional hypotheses? Defend your answer using the data.

Step 7 assignment 2: At the end of the semester, assign the following prompts to connect the fast food delivery activity directly to a student's research project:

1. *How did the assumptions included in the fast food delivery activity affect the results?*

2. *How did the operationalization of the concepts included in the fast food delivery activity affect the results?*

3. *Would you change/include different measures if you had to redo the project?*

4. *Using one of the peer reviewed articles from your research project, identify the assumptions made by the author and discuss why the author made those assumptions.*

5. *Using one of the peer reviewed articles from your research project, identify how two variables are measured, pose an alternative measure for that variable, and explain how it would affect the outcome.*

Final Reflection

Whether the class develops the observational design and orders once, or continues ordering throughout the semester, it is important to reflect on the research process with students. During this discussion connections should be concretely made to political science research. Specifically, the discussion should focus on the challenges associated with conducting research, the difficulty of finding measures for abstract concepts, the role of assumptions in the research process, and how early decisions can have a significant impact on outcome final outcome.

Appendix A

Achieving Fast Food Delivery Learning Objectives

Step	Learning objective
1 – Research question.	1 – Design an observational study.
2 – Research design.	1 – Design an observational study.
3 – Operationalization, theory, and assumptions.	1 – Design an observational study. 2 – Explain the role of assumptions in social science. 3 – Explain the role of operationalization in social science. 4 – Construct measures to operationalize concepts.
4 – Hypotheses.	5 – Test an original hypothesis.
5 – Data collection.	6 – Create an original dataset.
6 – Ordering.	1 – Design an observational study. 4 – Construct measure to operationalize concepts. 6 – Create an original dataset.
7 – Analysis.	2 – Explain the role of assumptions in social science. 3 – explain the role of operationalization in social science. 7 – Analyze an original dataset.