

Week 06

Study Variable Tutorial

The purpose of this tutorial is to look at a set of example study designs and think through what **independent and dependent variables** are being collected as well as the impact of the study design on **external validity**.

In groups of 2-3 students, go through the study design cases. For each case try and identify the independent and dependent variables as well as the fixed aspects and their impact on external validity.

A variable is a factor that can be changed in the study design.

Independent Variables are variables that are being changed during the study. They are themselves independent of the study outcome, but they can influence the study outcome. An independent variable is also sometimes known as a “predictor variable” because it may impact (predict) the dependent variable. We measure independent variables because they help us explain or understand the outcome of the study.

Dependent Variables are the variables being tested or measured during the study. They are also sometimes known as “outcome variables” because they depend on the study being run and represent its outcome.

Fixed Aspect is a part of the study that the researcher is holding constant, or fixed. Researchers often control parts of the study as a way of reducing possible impacts on the study outcome. Having fixed aspects allows researchers to focus on what they are most interested in, but they can also impact external validity.

External Validity is how much a researcher can generalize the findings of a study to other situations, people, settings and measures. In other words, how much and in what ways can a researcher use their study outcomes to inform their understanding of situations outside the study setting.

Ecological Validity examines, specifically, whether the study findings can be generalized to real-life settings.

CASE STUDY 1

Zoe has designed a new method – scribble – for entering text on smart phones. In order to test the efficiency of Scribble she sets up a lab study to compare the scribble text entry method to a standard on-screen QWERTY keyboard.

She recruits 100 university students that own smart phones for her study. All participants fill out a questionnaire rating their experience with the QWERTY keyboard.

Participants are given a smart phone with a direct-touch screen and ask to type in sentences of varying length that are read-out loud to them.

All participants try every text entry method, but the order in which they are asked to use the text entry methods is counterbalanced to avoid learning effects.

Zoe measures the time participants take to enter the sentences and the number of errors they make while typing.

Independent Variables:

Dependent Variables:

Fixed Aspect:

External Validity:

CASE STUDY 2

Mary has built a phone app that entertains cats. Similar to the app “Fruit Ninja”, her app causes objects to move across the screen and if the cat swats the object the object will vanish and a new one appear. To test her app, she designs a study to be conducted with cats at their owners’ homes, where she sets up her app on a 12-inch tablet and installs a video camera capturing cats’ interactions with the app on the tablet.

She starts study sessions by asking the cat’s owner a few questions using a structured interview method, including the gender of the cat, if it normally lives indoors or outdoors, and how energetic the cat normally is on a scale of 1 to 10. She then gives the cats 30 minutes time to interact with the tablet.

She uses a “snowball” sampling methodology to find participants where she asks friends with cats to participate in her study and then asks them to recommend other people with cats she could test with. She was able to recruit 20 cat owners, but 4 had complex schedules, and 3 of them had 2 cats. So she ended up testing on 19 cats.

After completing all study sessions, Mary goes through the video and measures how much time the cat was looking at the tablet screen and how many times they swatted at the screen with their paw.

Independent Variables:

Dependent Variables:

Fixed Aspect:

External Validity:

CASE STUDY 3

For his student project, John decided to create a new user interface for the popular SnapChat app that would make it easier for new users to interact with it. After completing the app, he posted on a local discussion forum for SnapChat users to find people willing to beta test the app.

He was able to find 10 people who installed the app and used it for a month. After the month was over, he setup semi-structured hour-long interviews with each participant. He started each interview session by asking a set of structured questions including demographics (gender, age, occupation), the frequency they used the app, and how much they enjoyed it compared to the older version. He then asked them to describe what it was like when they first started using his new app, followed by several more questions about past experiences with using his app.

After he was done with the interviews, he used open-coding and thematic analysis to come up with a set of themes involving participants' experience with the app.

Independent Variables:

Dependent Variables:

Fixed Aspect:

External Validity:

