10.2: Overview of Single-Subject Research

Learning Objectives

1. Explain what single-subject research is, including how it differs from other types of psychological research.
2. Explain who uses single-subject research and why.

What Is Single-Subject Research?

Single-subject research is a type of quantitative research that involves studying in detail the behavior of each of a small number of participants. Note that the term single-subject does not mean that only one participant is studied; it is more typical for there to be somewhere between two and 10 participants. (This is why single-subject research designs are sometimes called small-n designs, where \( n \) is the statistical symbol for the sample size.) Single-subject research can be contrasted with group research, which typically involves studying large numbers of participants and examining their behavior primarily in terms of group means, standard deviations, and so on. The majority of this textbook is devoted to understanding group research, which is the most common approach in psychology. But single-subject research is an important alternative, and it is the primary approach in some more applied areas of psychology.

Before continuing, it is important to distinguish single-subject research from case studies and other more qualitative approaches that involve studying in detail a small number of participants. As described in Chapter 6, case studies involve an in-depth analysis and description of an individual, which is typically primarily qualitative in nature. More broadly speaking, qualitative research focuses on understanding people’s subjective experience by observing behavior and collecting relatively unstructured data (e.g., detailed interviews) and analyzing those data using narrative rather than quantitative techniques. Single-subject research, in contrast, focuses on understanding objective behavior through experimental manipulation and control, collecting highly structured data, and analyzing those data quantitatively.
Assumptions of Single-Subject Research

Again, single-subject research involves studying a small number of participants and focusing intensively on the behavior of each one. But why take this approach instead of the group approach? There are several important assumptions underlying single-subject research, and it will help to consider them now.

First and foremost is the assumption that it is important to focus intensively on the behavior of individual participants. One reason for this is that group research can hide individual differences and generate results that do not represent the behavior of any individual. For example, a treatment that has a positive effect for half the people exposed to it but a negative effect for the other half would, on average, appear to have no effect at all. Single-subject research, however, would likely reveal these individual differences. A second reason to focus intensively on individuals is that sometimes it is the behavior of a particular individual that is primarily of interest. A school psychologist, for example, might be interested in changing the behavior of a particular disruptive student. Although previous published research (both single-subject and group research) is likely to provide some guidance on how to do this, conducting a study on this student would be more direct and probably more effective.

A second assumption of single-subject research is that it is important to discover causal relationships through the manipulation of an independent variable, the careful measurement of a dependent variable, and the control of extraneous variables. For this reason, single-subject research is often considered a type of experimental research with good internal validity. Recall, for example, that Hall and his colleagues measured their dependent variable (studying) many times—first under a no-treatment control condition, then under a treatment condition (positive teacher attention), and then again under the control condition. Because there was a clear increase in studying when the treatment was introduced, a decrease when it was removed, and an increase when it was reintroduced, there is little doubt that the treatment was the cause of the improvement.

A third assumption of single-subject research is that it is important to study strong and consistent effects that have biological or social importance. Applied researchers, in particular, are interested in treatments that have substantial effects on important behaviors and that can be implemented reliably in the real-world contexts in which they occur. This is sometimes referred to as social validity (Wolf, 1976). The study by Hall and his colleagues, for example, had good social validity because it showed strong and consistent effects of positive teacher attention on a behavior that is of obvious importance to teachers, parents, and students. Furthermore, the teachers found the treatment easy to implement, even in their often-chaotic elementary school classrooms.

Who Uses Single-Subject Research?

Single-subject research has been around as long as the field of psychology itself. In the late 1800s, one of psychology’s founders, Wilhelm Wundt, studied sensation and consciousness by focusing intensively on each of a small number of research participants. Herman Ebbinghaus’s research on memory and Ivan Pavlov’s research on classical conditioning are other early examples, both of which are still described in almost every introductory psychology textbook.

In the middle of the 20th century, B. F. Skinner clarified many of the assumptions underlying single-subject research and refined many of its techniques (Skinner, 1938). He and other researchers then used it to describe how rewards, punishments, and other external factors affect behavior over time. This work was carried out primarily using nonhuman...
subjects—mostly rats and pigeons. This approach, which Skinner called the experimental analysis of behavior—remains an important subfield of psychology and continues to rely almost exclusively on single-subject research. For excellent examples of this work, look at any issue of the Journal of the Experimental Analysis of Behavior. By the 1960s, many researchers were interested in using this approach to conduct applied research primarily with humans—a subfield now called applied behavior analysis (Baer, Wolf, & Risley, 1968). Applied behavior analysis plays an especially important role in contemporary research on developmental disabilities, education, organizational behavior, and health, among many other areas. Excellent examples of this work (including the study by Hall and his colleagues) can be found in the Journal of Applied Behavior Analysis.

Although most contemporary single-subject research is conducted from the behavioral perspective, it can in principle be used to address questions framed in terms of any theoretical perspective. For example, a studying technique based on cognitive principles of learning and memory could be evaluated by testing it on individual high school students using the single-subject approach. The single-subject approach can also be used by clinicians who take any theoretical perspective—behavioral, cognitive, psychodynamic, or humanistic—to study processes of therapeutic change with individual clients and to document their clients’ improvement (Kazdin, 1982).

References