

# Attachment L: Strengths and Limitations of the Single- Subject Multiple Baseline Design

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***Research on the Efficacy and Feasibility of  
Essentials for Parenting Toddlers and Preschoolers***

Division of Violence Prevention  
National Center for Injury Prevention and Control  
Centers for Disease Control and Prevention

## Strengths

Despite their limited use, single-subject research designs have significant methodological advantages over large-sample research designs that could be used to facilitate more rapid clinical research advances. First, such designs can demonstrate clear causal relations between intervention and behavior change with much more efficiency than large-sample designs (Nock, Michel, & Photos, 2007). Indeed, large-sample studies typically require enormous amounts of time, financial resources, and staff support to implement. In contrast, any adequately trained researcher or clinician with a modest amount of resources and effort can use single-case research designs (Nock et al., 2007). Given this advantage, researchers and clinicians can use single-subject research designs in rapid succession to develop and evaluate individual or multiple versions of interventions, and thus can do in a matter of weeks what could take years (and millions of dollars) using large-group designs (Nock et al., 2007).

Second, single-case research designs offer much more flexibility in the implementation and evaluation of interventions than large-sample designs (Nock et al., 2007). Indeed, with a focus on maintenance of consistency of procedures across many subjects, group designs do not allow for a tailoring of the manipulation or intervention to the individual. The opportunity to modify interventions as needed provides greater research and clinical options and can lead to more innovative treatment development. Using variations on the single-subject experimental designs as described previously, researchers can flexibly complete efficacy or effectiveness studies, dismantling studies, parametric studies, or any other evaluations that can be addressed using large-sample designs—and can do so within or between subjects (Nock et al., 2007).

Third, the assessment methods used in single-subject research designs provide for the evaluation of individual change patterns in the data. Large sample designs most often employ only pre- and post-treatment assessment, precluding evaluations of how and why individuals change over the course of treatment (Kazdin & Nock, 2003). The use of continuous assessment and multiple experimental phases in single-subject research designs allow for detailed examinations of patterns of change and the temporal relations between manipulations and their effects over time.

Fourth, although the widespread use of large sample designs grew largely out of advances in inferential statistical methods, these very methods have come under attack due to several problems with the way they are most often used (Cohen, 1990; Krueger, 2001; Loftus, 1996; Nickerson, 2000). Most of these statistical or methodological problems are avoided or remedied through the use of single-case research designs.

## Limitations

Of course, single-subject research designs also have clear limitations that must be considered. The limitation most often cited in discussions of single-subject research designs is a lack of generality of obtained effects. Indeed, interventions shown to be effective for a single individual may not be effective with other individuals, and these effects may not even replicate when re-administered to the same individual at a later time. Although this is a clear limitation of single-subject research designs, two caveats should be kept in mind. First, the use of large-sample designs does not preclude the occurrence of such problems. Indeed, what is needed for generality is the evaluation of obtained effects using different populations, conditions, or settings. Effects obtained using a homogeneous sample of individuals (which is the rule rather than the exception in large-sample studies) also may suffer from a lack of generality.

Second, the use of multiple and heterogeneous individuals within and across studies, can be implemented to demonstrate generality. For the current project, we are aiming to recruit a heterogeneous group of 200 parents, and we will assign them to different conditions (guided or natural navigation) and order of conditions (for the guided navigation group). We are also planning to use a multiple baseline design, which will help with generality. Given that several participants will be assigned to each condition and we are using a multiple baseline design across individuals, we will be able to examine effects in a “single group” of parents. In this way, we will be able to determine that the intervention is, on average, effective (or not) for the small group of parents as well as for individual members in the “group”.

Another limitation cited for single-subject designs is related to testing. In the current study, it is likely that exposure to some of the measures can affect “scores” on other measures or repeated exposure to a measure can lead to socially desirable responding or reactive responding. Strategies to reduce or eliminate these influences have been included. For example, in single-subject research, the repeated assessment of the dependent variable(s) across phases of the design can help identify this potential threat. Replicating the effect across multiple individuals at various points in time also helps to reduce the plausibility of a claim that repeated assessment *per se* accounted for the intervention effect or that some external influence resulted in the change.

For additional information on the technical aspects of single-subject designs, please consult technical documentation compiled for the What Works Clearinghouse (Kratochwill et al., 2010):

[http://ies.ed.gov/ncee/wwc/pdf/reference\\_resources/wwc\\_scd.pdf](http://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_scd.pdf).

#### References

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