



Contents lists available at ScienceDirect

## Research in Developmental Disabilities

journal homepage: [www.elsevier.com/locate/redevdis](http://www.elsevier.com/locate/redevdis)

## Appraisal of comparative single-case experimental designs for instructional interventions with non-reversible target behaviors: Introducing the CSCEDARS (“Cedars”)<sup>☆</sup>

Ralf W. Schlosser<sup>a,b,c,\*</sup>, Phillip J. Belfiore<sup>d</sup>, Jeff Sigafoos<sup>e</sup>, Amy M. Briesch<sup>a</sup>, Oliver Wendt<sup>f</sup>

<sup>a</sup> Departments of Communication Sciences and Disorders, and Applied Psychology, Northeastern University, United States

<sup>b</sup> Department of Otolaryngology and Communication Enhancement, Boston Children’s Hospital, United States

<sup>c</sup> Centre for Augmentative and Alternative Communication, University of Pretoria, South Africa

<sup>d</sup> Program of Special Education and Applied Disability Studies, Mercyhurst University, United States

<sup>e</sup> Faculty of Education, Victoria University at Wellington, New Zealand

<sup>f</sup> Department of Communication Sciences and Disorders, University of Central Florida, United States

## ARTICLE INFO

## Keywords:

Comparative effectiveness  
Evidence-based practice  
Internal validity  
Quality appraisal  
Single-case experimental designs

## ABSTRACT

Evidence-based practice as a process requires the appraisal of research as a critical step. In the field of developmental disabilities, single-case experimental designs (SCEDs) figure prominently as a means for evaluating the effectiveness of non-reversible instructional interventions. Comparative SCEDs contrast two or more instructional interventions to document their relative effectiveness and efficiency. As such, these designs have great potential to inform evidence-based decision-making. To harness this potential, however, interventionists and authors of systematic reviews need tools to appraise the evidence generated by these designs. Our literature review revealed that existing tools do not adequately address the specific methodological considerations of comparative SCEDs that aim to compare instructional interventions of non-reversible target behaviors. The purpose of this paper is to introduce the Comparative Single-Case Experimental Design Rating System (CSCEDARS, “cedars”) as a tool for appraising the internal validity of comparative SCEDs of two or more non-reversible instructional interventions. Pertinent literature will be reviewed to establish the need for this tool and to underpin the rationales for individual rating items. Initial reliability information will be provided as well. Finally, directions for instrument validation will be proposed.

### What this paper adds?

This paper introduces a new scale that permits quality appraisals of comparative single-case experimental designs aimed at comparing two or more instructional interventions on non-reversible target behaviors.

The fields of education, special education, and allied health have embraced the notion of evidence-based practice (EBP) as the preferred approach to educational and clinical practice (e.g., Law, 2002; Moran & Malott, 2004; Schlosser & Raghavendra, 2004;

<sup>☆</sup> This project was in part supported by a Field-Initiated Development Grant from the National Institute on Disability and Rehabilitation Research (NIDRR) (now the National Institute on Disability, Independent Living, & Rehabilitation, NIDILRR), U.S. Department of Education (#H133G070150-08) to Ralf W. Schlosser. The authors, however, bear sole responsibility for the content; funding by NIDRR does not imply that the content is endorsed by the agency.

\* Corresponding author at: Department of Communication Sciences and Disorders, 106 Forsyth, Northeastern University, Boston, MA 02115, United States.

E-mail address: [R.Schlosser@northeastern.edu](mailto:R.Schlosser@northeastern.edu) (R.W. Schlosser).

<https://doi.org/10.1016/j.ridd.2018.04.028>

Received 18 September 2017; Received in revised form 6 April 2018; Accepted 30 April 2018

0891-4222/ © 2018 Elsevier Ltd. All rights reserved.

Straus, 2007). EBP has been defined as “...the integration of best and current research evidence with clinical/educational expertise and relevant stakeholder perspectives to facilitate decisions for assessment and intervention that are deemed effective and efficient for a given direct stakeholder” (Schlosser, 2003, p. 256). EBP is comprised of five steps: (a) ask a well-built clinical question; (b) search for research evidence; (c) appraise the research evidence; (d) apply the research evidence; and (e) evaluate the application (Straus, 2007). This paper is concerned with the critical appraisal of research evidence, or more specifically, the critical appraisal of research evidence regarding the effectiveness or efficiency of two or more instructional interventions of non-reversible behaviors. Critical appraisal entails the process of determining the internal validity of the evidence and hence the certainty of the evidence. This bears relevance not only to interventionists who wish to implement EBP, but also to researchers who are interested in synthesizing intervention studies as part of a systematic review. Appraising the quality of each included study is a central feature of systematic reviews (e.g., Pettigrew & Roberts, 2006; Schlosser, Wendt, & Sigafoos, 2007).

A variety of design strategies can be employed to evaluate whether a treatment is efficacious or effective, including randomized control trials and non-randomized group designs. In the field of developmental disabilities, single case experimental designs (SCEDs) figure prominently as a method for generating research evidence related to the efficacy of interventions (e.g., Gast & Ledford, 2014; Kazdin, 2011; Kennedy, 2005; Logan, Hickman, Harris, & Heriza, 2008; Schlosser, 2009; Schlosser & Raghavendra, 2004; Schlosser & Sigafoos, 2006; Wendt, 2006). SCEDs are suitable for evaluating an intervention in terms of efficacy, effectiveness, and efficiency.

The appraisal of treatment studies requires considerable knowledge and skills. Also, it is important that the appraisal is implemented in a systematic, consistent, and transparent manner. Toward that end, researchers have developed appraisal checklists/tools such as the critical appraisal tool for randomized control trials by the British-based Centre for Evidence-Based Medicine (CEBM; <http://www.cebm.net/critical-appraisal/>). Wendt and Miller (2012) contrast the long history of group designs that led to the development of appraisal tools with that of SCEDs, where a discussion of appraisal considerations is a more recent phenomenon. They argue that if SCEDs are to take a more prominent role in EBP, it is crucial that appraisal tools be developed that are appropriate for this particular approach to research design.

Wendt and Miller (2012) reviewed seven appraisal scales for SCEDs in terms of their construction and use. Interestingly, none of these seven scales focused on comparative SCEDs (although they briefly make reference to an earlier version of the scale that is introduced here, it is not discussed in detail). They conclude their analysis stating that “none of the other instruments made an effort to provide separate, fine-grained criteria specific to design type. Having separate criteria for different types of SCED makes a lot of sense because some designs have specific requirements, and if those are not met the entire study can easily be flawed” (p. 258). The reviewed scales either excluded comparative designs totally or treated them like designs that evaluate a single intervention; both of these “strategies” are problematic because comparative designs have their unique internal validity constraints and considerations. By contrasting two or more instructional interventions, comparative SCEDs have the potential to illuminate their relative effectiveness and efficiency.

The main purpose of this paper is to introduce the reader to the newly developed checklist entitled, *Comparative Single-Case Experimental Design Appraisal Rating System (CSCEDARS)*; pronounced “Cedars”). Following a (a) review of current tools for appraising SCEDs, we will (b) describe the iterative process involved in developing CSCEDARS, (c) propose applications for CSCEDARS, and (d) proposed directions for future research.

## 1. Review of current tools for appraising SCEDs

Given that the review by Wendt and Miller (2012) is somewhat dated, it was deemed necessary to engage in our own review of a more up-to-date and perhaps more inclusive list of tools, including the following: (a) the Conduct Questions for Single Subject Design Studies (American Academy for Cerebral Palsy and Developmental Medicine [AACPDM], 2008); (b) the Council for Exceptional Children (CEC) Standards (Cook et al., 2015); (c) the What Works Clearinghouse (WWC) Standards (Kratohwill et al., 2010); (d) the Single Subject Research Design Scale (SSRD) (Logan et al., 2008); (e) the Protocol for Assessing Single-Subject Research Quality (PASS-RQ) (Maggin & Chafouleas, 2010); (f) the Evaluative Method (Reichow, Volkmar, & Ciccetti, 2008); (g) the EVIDAAC Single-Subject Scale (Schlosser, 2011); (h) the Certainty Framework (Simeonsson & Bailey, 1991); (i) the Adapted AACPDM Scale (Smith, Jelen, & Patterson, 2009); (j) the Single Case Experimental Design (SCED) scale (Tate et al., 2008); and (k) the National Technical Assistance Center on Transition (NTACT) Standards (National Technical Assistance Center on Transition [NTACT], 2009).

The following data were extracted from each tool: (a) number of items in total; (b) number of items focused on comparative SCEDs; (c) weighting used (?); (d) overall evidence classification used (?); (e) inter-rater agreement data provided when first introduced; (f) content validity when first introduced; and (g) later content validation.

Although detailed results are provided in Table 1, essential findings are summarized here. First, none of the reviewed scales were specifically designed to assess the internal validity of comparative SCEDs in general and comparative SCEDs of instructional interventions of non-reversible behaviors in particular. In fact, only two tools make reference to comparative SCEDs in passing. The CEC standards include 3 items (Standard 6.6., 6.7., and 7.4.) out of 29 items that tangentially address some of the challenges arising from comparative designs: Standard 6.6. stipulates that alternating treatments designs (ATDs) do not require a baseline; standard 6.7 states that ATDs, among others, may address common threats to internal validity “when properly designed and executed (Kratohwill et al., 2010)” (Cook et al., 2015, p. 225); finally, standard 7.4. states that ATDs require at least four repetitions of the alternating sequence (ABABAB) (p. 225). The WWC Standards stipulates the number of data points required per phase (2) and condition (at least 4) for ATDs along with at least five repetitions for the alternating sequence to meet standards (Kratohwill et al., 2010).

ATDs are but one of many comparative SCED options and are not suitable for the comparison of instructional interventions of non-reversible behaviors, which is the focus of this paper and the tool to be introduced. Furthermore, there are many additional internal

Download English Version:

<https://daneshyari.com/en/article/6848129>

Download Persian Version:

<https://daneshyari.com/article/6848129>

[Daneshyari.com](https://daneshyari.com)