



## Evidence-based practice: Quality indicator analysis of antecedent exercise in autism spectrum disorders

Melanie Kasner<sup>a</sup>, Greg Reid<sup>a,\*</sup>, Cathy MacDonald<sup>b</sup>

<sup>a</sup> McGill University, 475 Pine Avenue West, Montreal, QC H2W 1S4, Canada

<sup>b</sup> State University of New York at Cortland, P.O. Box 2000, Cortland, NY 13045-0900, United States

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### ABSTRACT

The purpose of the research was to conduct a quality indicator analysis of studies exploring the effects of antecedent exercise on self-stimulatory behaviors of individuals with autism spectrum disorders (ASD). Educational Resources Information Center (ERIC), Google Scholar, SPORTDiscus, PsychINFO, and PubMed/MedLine databases from 1980 to October 2010 and reference lists of included articles were searched. Twelve research studies employing group experimental (Gersten et al., 2005) or single-subject designs (Horner et al., 2005) met inclusion criteria. Each study was assessed for the presence and clarity of quality indicators. Group experimental and single-subject designs met 48% and 82% of quality indicators, respectively. This suggests that the effects of antecedent exercise on self-stimulatory behaviors of individuals with ASD is incomplete and claims of exercise being an evidence-based practice are premature. Several indicators were difficult to interpret or lacking clear definitions. Recommendations for clarifying and applying the quality indicators are offered.

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### 1. Introduction

The roots of evidence-based practice (EBP) can be traced to the 19th century (Bouffard & Reid, 2012). The concept has evolved from medicine to field areas such as psychology and sociology (Odom et al., 2005). Some practices may claim to be evidence-based; in particular, the effects of exercise on self-stimulatory behaviors in people with autism spectrum disorders (ASDs) have been positively evaluated in this light (Lang et al., 2010; Petrus et al., 2008).

Several definitions of EBP exist (e.g., Jin & Yun, 2010; Sackett, Rosenberg, Muir Gray, Haynes, and Richardson, 1996). Sackett et al. (1996) stated that EBP is a process that “involves the conscientious, explicit, judicious use of current best evidence in making decisions about the care of individual patients” (n.p.). In contrast, Spring (2007) argues that clinical (program) decision-making is three-pronged; the research itself is important but not the only input into decision-making. There is also a need to incorporate participant factors, such as personal values, characteristics, and preferences, as well as practitioner expertise (Spring, 2007). Despite the absence of definition consensus (Bouffard & Reid, 2012), educators are expected to update their methods of teaching based on the most recent research results outlining what works in their field (Protheroe, 2009).

Four issues posited to be important in determining evidence-based practices are research designs, quantity of research, magnitude of the effect, and methodological quality (Cook, Tankersley, & Landrum, 2009). The Council for

\* Corresponding author at: Department of Kinesiology and Physical Education, McGill University, 475 Pine Avenue West, Montreal, QC H2W 1S4, Canada.  
E-mail address: [gregory.reid@mcgill.ca](mailto:gregory.reid@mcgill.ca) (G. Reid).

Exceptional Children's Division for Research stated that different types of research questions should be used in different contexts, and a specific methodology depends on the nature of the research question (Odom et al., 2005). The four types of research methodology proposed in special education were group experimental (Gersten et al., 2005), single-subject (Horner et al., 2005), qualitative, and correlational (Thompson, Diamond, McWilliam, Snyder, & Snyder, 2005). There has been little discussion regarding quantity of research, but one study would not usually be considered adequate (Brantlinger, Jimenez, Klingner, Pugach, and Richardson, 2005; Cook et al., 2009; Reid, Bouffard, & MacDonald, 2012). The traditional method of determining quality is peer review (Seglen, 1997) but it is not the only method. Quality indicators have been proposed for each of the aforementioned methodologies to evaluate if a practice may be deemed as evidence-based (Odom et al., 2005). It is assumed that a large number of quality indicators in a study are indicative of high research quality and subsequently it may be appropriate to consider the practice as evidence-based, whereas a smaller number of indicators may suggest a lower research quality and therefore less support garnered for the practice. The current paper will focus only on quality indicators for group experimental and single-subject designs.

Gersten et al. (2005) outlined quality indicators for group experimental and quasi-experimental research. They divided the quality indicators into two groups: *essential* and *desirable*. For a research study to be considered "acceptable" it must: (a) meet all but one of the essential quality indicators and (b) at least one of the desirable quality indicators. For the research to be considered "high quality" it must: (a) meet all but one of the essential quality indicators and (b) at least four of the desirable quality indicators. Notably, the authors provided no clear rationale of those criteria. Essential quality indicators were arranged into four groups, coinciding with four areas of a group experimental research report. The quality indicators referred to: (a) describing participants, (b) implementation of the intervention and description of comparison conditions, (c) outcome measures, and (d) data analysis (Gersten et al., 2005). For example, one of the quality indicators for describing participants considers if sufficient information was provided to determine whether the participants demonstrated the disability or difficulties presented.

Horner et al. (2005) did not organize the single-subject research design quality indicators into essential and desirable categories as Gersten and colleagues. The quality indicators for single-subject designs were, however, presented similarly to the essential indicators as described for group experimental research. Seven broad categories of quality indicators were proposed for single subject research: (a) description of participants and settings, (b) dependent variable, (c) independent variable, (d) baseline, (e) experimental control/internal validity, (f) external validity, and (g) social validity.

### 1.1. ASD and repetitive self-stimulatory behaviors

ASDs fall under the umbrella term of pervasive developmental disorders (American Psychiatric Association, 2000) and are characterized by impairments in social interactions, verbal and non-verbal communication, as well as demonstrations of a restricted repertoire of activities and interests. The latter includes self-stimulatory behaviors. Autistic Disorder, Asperger's Syndrome and PDD-NOS are often referred to as ASDs (Newschaffer et al., 2007). Given the prevalence of ASD is increasing (Newschaffer et al., 2007) and self-stimulatory behaviors have been shown to increase stigma that may inhibit social interactions (Durand & Cart, 1987), identifying practices that reduce self-stimulatory behaviors may be particularly important.

Researchers have explored several ways to decrease self-stimulatory behaviors including shock therapy (Risley, 1968), overcorrection (Harris & Wolchik, 1979), the use of self-stimulation as positive reinforcement (Hung, 1978), and altering the physical environment (Duker and Rasing, 1989). Physical activity has also been used to reduce stereotypical behaviors among individuals with ASD (e.g., Levinson & Reid, 1993; Pan, 2010; Rosenthal-Malek & Mitchell, 1997). Lang et al. (2010) conducted a systematic review of research on the impact of exercise on a variety of behaviors of individuals with ASD while Petrus et al. (2008) restricted their review to the exercise effect on stereotypic behaviors. While each review generally supported the use of exercise as an effective practice in ASD, neither performed a quality indicator analysis of the specific studies included.

The purpose of the study was to conduct a quality indicator analysis of individual studies evaluating the effects of antecedent exercise on self-stimulatory behaviors of individuals with ASD. A secondary aim was to assess the clarity of the quality indicators to enhance their usability.

## 2. Method

### 2.1. Criteria for inclusion

There were several inclusion criteria. First, the authors had to specifically state that the participants had Autistic Disorder, Asperger's Syndrome, or PDD-NOS (Newschaffer et al., 2007). The term "autism-like behaviors" was acceptable. All studies in which participants had only "mental retardation" were excluded. Second, the primary purpose of the study was to investigate self-stimulatory behaviors of individuals with ASD. Third, the study employed antecedent physical activity or exercise. Fourth, the study adopted a single-subject or group experimental design. Finally, all articles were published in peer-reviewed English language journals between 1980 and October 2010.

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