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Lyn Kaiser

Marie-Christine Potvin

Caitlin Beach

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Lyn Kaiser

Thomas Jefferson University - USA, lcarvell@ptd.net

Marie-Christine Potvin

Thomas Jefferson University - USA, marie-christine.potvin@jefferson.edu

Caitlin Beach

Thomas Jefferson University - USA, caitlin.beach@jefferson.edu

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Sensory-Based Interventions in the School Setting: Perspectives of Paraeducators

Abstract

Background: The purpose of this study was to explore paraeducators' perceptions of sensory-based interventions (SBIs). Paraeducators are frequently responsible for implementing SBIs to enhance a student's ability to learn in school. Previous studies have explored the perceptions of teachers and occupational therapists, but as of yet, there are no published studies exploring the perceptions of paraeducators regarding the efficacy of SBIs.

Methods: An ethnographic study was conducted with paraeducators ($n = 11$) working with students diagnosed with autism spectrum disorder or emotional disturbance in a center-based special education program. These paraeducators participated in a focus group or an interview that was transcribed and coded using a multi-step process.

Results: The paraeducators reported implementing a variety of SBIs following a specific schedule designed for each child and on an as needed basis. They expressed that benefits of SBIs included improved student engagement, emotional and behavioral control, and increased time available to learn. Finally, the paraeducators mentioned that there are barriers to implementing SBIs in schools, such as availability of supplies and space.

Conclusion: The study's findings suggest that paraeducators routinely implement SBIs, describe them as helpful for students, but acknowledge that barriers to implementation do exist.

Comments

The authors report no potential conflicts of interest.

Keywords

school-based practice, sensory-based intervention, paraeducator, qualitative research

Cover Page Footnote

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Credentials Display

Lyn K. Kaiser, OTD, MS, OTR/L; Marie-Christine Potvin, PhD, OTR/L; Caitlin Beach, OTS

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In the 1960s and 1970s, Jean Ayres (1972) developed sensory integration theory and intervention. She hypothesized that the academic performance of children who have a combination of motor dysfunction and learning disabilities would improve through interventions directed at integrating their responses to sensory stimuli. Since Ayres' pioneering work, other related theories have been developed, including Dunn's Model of Sensory Processing (Brown & Nicholson, 2011; Dunn, 1999; Nelson & Jepson-Thomas, 2003). This model is a theoretical framework designed to explain how individuals respond to sensory stimuli (Dunn, 1999). The term sensory processing disorder (SPD) was coined for individuals who experience challenges with organizing and making use of sensory stimuli (Miller et al., 2007). Adequate organization of sensory stimuli serves as a foundation for adaptive behaviors; thus, SPD is associated with challenges with participation in activities of daily life (Miller et al., 2007; Mitchell et al., 2015; Schaaf et al., 2010).

SPD has been found to impact both students with and without other disabilities. Students with autism spectrum disorder (ASD), attention-deficit hyperactivity disorder, intellectual disability, and emotional disturbance may exhibit problematic behaviors in school, such as inattention, impulsivity, and aggression toward self or others (Barnes et al., 2008; Perez-Kennedy, 2011; Smith et al., 2005). These types of problematic behaviors can be outward signs of underlying SPD (May-Benson & Koomar, 2010). It is estimated that 40% to 88% of children with these diagnoses experience some degree of SPD (Benson et al., 2019). Further, research suggests that 5% to 16% of children without a disability experience SPD (Ahn et al., 2004; Ben-Sasson et al., 2009). This condition has been shown to have a negative impact on a child's participation in daily life activities, including negatively affecting a child's academic performance and their overall ability to fulfill their role as a student (Bar-Shalita et al., 2008; Benson et al., 2019).

Sensory-based interventions (SBIs) are commonly recommended by occupational therapists working in schools with students whose behaviors are thought to be related to underlying SPD (Murray et al., 2009; Watling et al., 2011). In fact, 90% of occupational therapists report using this type of intervention with students (May-Benson & Koomar, 2010). A variety of SBI strategies have been developed and used to address SPD (Watling & Clark, 2011). These interventions include, for example, providing a child with alternative seating options, a weighted vest, or education about how to identify and meet their own sensory needs (e.g., the Alert Program). SBIs can also include changing the sensory experience of a child through adaptations of a given environment (Watling & Clark, 2011).

Studies have explored the efficacy of SBIs in helping students participate in school. To date, the evidence in support of SBIs to improve school outcomes is low (Case-Smith et al., 2015). For example, Schilling and Schwartz (2004) explored the effects of alternative seating on classroom behavior in children with ASD ($N = 4$). They found improvements in in-seat behavior, as well as strong social validity and positive teacher perceptions (Schilling & Schwartz, 2004). Bagatell and colleagues (2010), however, found mixed results regarding the efficacy of alternate seating with children with ASD ($n = 6$) and concluded that not all children experience the same level of benefits. Both studies had small samples limiting their generalizability. The Alert Program® is another commonly used SBI with a focus on teaching children to recognize and modify their level of arousal through self-regulation strategies (Williams & Shellenberger, 1996). A quasi-experimental group study explored the effects of the Alert Program® on the regulation of emotions, behaviors, and sensory processing in children who have emotional disturbances ($n = 12$) (Barnes et al., 2008). The intervention group saw more improvements than the control group; however, the difference was small (Barnes et al., 2008). Another commonly used

SBI is the weighted vest. Collins and Dworkin (2011) studied their effects on attention to tasks of general education first grade students finding no significant effect. In contrast, Lin et al. (2014) found support for the use of weighted vests to remedy attentional and on-task behavioral problems. These are just a few of the studies conducted to date. As noted by Case-Smith et al. (2015), the current evidence is limited by the studies' small sample sizes, poor methodological rigor, and inconsistencies in implementation of SBI protocols.

While researchers are studying the efficacy of SBIs empirically, clinicians are continuing to use SBIs in schools because they are perceived to be beneficial by school teams (May-Benson & Koomar, 2010). SBIs are generally recommended by an occupational therapist and then implemented throughout the school day by teachers and paraeducators, also known as teaching assistants, who work closely with the students (Brock & Carter, 2013; Perez-Kennedy, 2011). Research has begun to explore the perceptions of both occupational therapists and teachers regarding SBIs. Eighty-seven percent of occupational therapists in one study reported that SBIs contribute to helping children fulfill their roles as students (Benson et al., 2019). Occupational therapists perceived improvements in children's self-regulation, attention, learning, and an overall increase in school performance as a result of SBIs (Benson et al., 2019). Teachers have reported seeing an increase in concentration and a decrease in undesired behaviors when using SBIs with students (Lee, 2013; Mills & Chapparo, 2018). Teachers have also reported valuing learning about SBI strategies to support students and to facilitate their learning (Mills & Chapparo, 2018). However, teachers expressed concerns about implementing SBIs with fidelity citing lack of staff and resources as challenges (Bonggat & Hall, 2010; Mills & Chapparo, 2018; Mulligan, 2001). Studies exploring paraeducators' perceptions of SBIs are lacking.

It is known that the perception of those implementing SBIs impacts whether the interventions are implemented as intended (Bagatell et al., 2010). In fact, it was found that teachers do not employ strategies that they do not believe work (Bagatell et al., 2010). This is also believed to be true of paraeducators. However, as of yet, no studies have explored paraeducators' perceptions of SBIs despite the fact that they are the primary support for many students with disabilities and spend an average of 86% of their time within 3 feet of the student to whom they have been assigned (Carter et al., 2009; Giangreco & Broer, 2005; Perez-Kennedy, 2011). Thus, paraeducators are critical in the implementation of SBIs in the classroom.

SPD is prevalent among school-aged children with and without diagnosed disabilities. The symptoms of this disorder can make it difficult for a child to participate in learning and to fulfill their role as a student. Occupational therapists frequently recommend SBIs for students who experience SPD that are implemented by teachers and paraeducators. The efficacy of these programs is, in part, dependent on the teachers and paraeducators' perceptions of these programs. Paraeducators play a primary role in the classroom, especially with regard to children with disabilities. However, no study has yet explored paraeducators' perceptions of SBIs.

A qualitative study was conducted to begin to address this gap in the literature. This study aimed to:

- identify the SBI that paraeducators use in the classroom,
- discover paraeducators' perceptions of how frequently they implement SBIs,
- explore paraeducators' perceptions regarding the efficacy of SBIs, and
- discover paraeducators' perceptions regarding any perceived barriers in the use of SBIs.

Method

Design

An ethnographic study was conducted to gain a deeper understanding of paraeducators' perspectives regarding the efficacy of SBIs for students with ASD and emotional disturbance attending school in a center-based special education setting. The primary researcher conducted two focus groups and one interview to learn about the participants' experiences and perceptions about these interventions through guided, open-ended questions. Ethical approval was obtained from the Thomas Jefferson University Institutional Review Board and permission was obtained from the school administrator.

Participants

A convenience sample was recruited from a center-based special education program in suburban Pennsylvania. Potential volunteers were recruited through the use of mailers, posters, and word of mouth. Inclusion criteria included a minimum of 6 months of experience working as a paraeducator with at least one student with whom SBIs were used. Only paraeducators that were not known by the primary researcher either personally or professionally were recruited. The primary researcher had no direct personal or professional ties to the special education program. Fourteen paraeducators contacted the primary research to express their interest to participate in the study. All 14 were invited to attend one of two scheduled focus groups. Two of the 14 cancelled because of schedule conflicts and one did not attend for unknown reasons. These three paraeducators were then invited to participate in one-on-one interviews. One accepted and completed an interview that used the same question guide used with the focus groups. All of the participants were women and most were between 35 and 60 years of age (see Table 1). Most of the women were White and had completed an undergraduate degree. The participants had worked in their current position for approximately 2 years, on average.

Table 1

Participants' Characteristics (n = 11)

	Frequency	Percentage	Mean
Gender			
Male	0	0	
Female	11	100	
Age			
18-24	1	9	
25-34	1	9	
35-60	8	73	
61+	1	9	
Education			
High school	2	18	
Some college	3	27	
Associate/technical degree	2	18	
Bachelor degree	4	36	
Graduate degree	0		
Work status			
Part-time	2	18	
Full-time	9	82	
Work experience (in years)			7.591*
Years in Position			2.029**

Note. *Range 2-16 years; **Range 6 months-5 years.

Procedure

The participants provided written informed consent prior to participation in the focus group or interview. The participants then completed a socio-demographic questionnaire that included questions regarding training and job satisfaction. Focus groups and interviews were conducted by the primary researcher using an interview guide containing open-ended questions and probes. The focus groups and interviews took place in a private conference room in the education center after school hours. While others in the building may have been aware of the participants attending the focus group or interviews, all information shared was kept confidential and ideas expressed by an individual were not identified. The focus groups and interviews were audio-recorded, transcribed verbatim by the primary researcher, and de-identified. Approximately 30% of the transcripts were randomly selected to be checked for accuracy by a research assistant. No significant discrepancy in transcription was identified through this process.

Data Analysis

The primary investigator conducted content analysis using the 4-step process developed by Green and colleagues (2007). Step 1 included data immersion. During this step, the transcripts were read and re-read and initial notes were taken. Step 2 involved coding, or using words and phrases to represent the ideas in the transcripts that are used to develop a coding key. In this coding key, data were then grouped together to create categories. This step involved a back and forth between reading of the transcript and notes and analysis to draw connections as well as check and confirm relationships. Lastly, themes that emerged from the analysis were recorded and interpreted in relation to the study objectives. The credibility of this qualitative method was confirmed by three research assistants who reviewed the transcripts with specific attention to ensure inclusion of all participant comments in the development of the code key. One participant reviewed the information for validity of data analysis in capturing the information discussed during data collection. To minimize her impact on the analysis, the primary researcher identified her views regarding the efficacy of SBIs with the identified student population and the role of paraeducators through the use of reflective journaling.

Results

From the analysis of coded data, five themes emerged that described paraeducator perspectives regarding the use of SBIs. These themes include the types of SBIs used, perceptions regarding the frequency and efficacy of use, perceived barriers in the use of SBIs, and perceptions regarding training and support.

Types of SBIs Commonly Used

All of the paraeducators who participated in this study had used a variety of SBIs with the students with whom they work. SBIs designed to provide proprioceptive input were, by far, the most commonly referred to by the paraeducators. For example, a participant stated, “she liked [to use] the weighted blanket when [a student] was having a rough day” (FG1 15–16). Several of the participants referred to proprioceptive input using the word pressure, as noted by one participant, who stated, “we have some students that just want pressure, just want us to squeeze [their shoulders]” (I 17). Proprioception is not the only sense targeted by the SBIs used by these paraeducators. For example, one paraeducator worked with students “who just want fidgets, something to have in their hands” (I 18). Other paraeducators mentioned SBIs that focus on the vestibular system, such as taking a “walk to help them calm down” (FG1 21) and dynamic seating options (e.g., therapy balls or wiggle seats). Finally,

the use of music for listening and oral stimulation with “chew tubes” were identified as other examples of SBIs being implemented (FG1 115; FG2 31).

Perception Regarding Frequency of Use of SBIs

The participants described the use of SBIs as being varied and flexible depending on individual students' needs and when they were made available to students throughout the school day. On one level, SBIs were integrated into the classroom environment and included options such as dynamic seating (therapy balls, wobble seats), proprioceptive equipment (stretchy band on desk legs, weighted blankets, and vests), fidget items (stress balls, play doh), and chewy tubes. Other strategies were specifically included in the daily schedule for short periods, often less than 5 min, throughout the school day. These options were described as structured break time after a period of academic work, and in some instances included student selection of the SBI (e.g., walk or movement break, time to bounce on therapy ball, or time in the sensory room) or selection of a preferred activity, such as playing a game. Finally, SBIs were offered to students as needed as a result of a perceived need by either the student or the paraeducator. As one paraeducator described it, “there are times when we can just tell that they need a break, you can just tell that they are starting to escalate, that they are just fidgety” (FG2 64–65). Paraeducators explained that in their school, students can request a SBI verbally by using a break card or simply by getting up and seeking the strategy independently. One paraeducator explained this by stating, “they're allowed to take breaks when they feel like they need it” (FG2 24). Another provided an example stating, “he would realize when he would need his lap belt [a weighted belt], he would just walk and get it” (I 76-77). In most cases, the SBI was described as being used throughout the school day for 2 to 5 min. Although not specifically noted by the paraeducators, this use of SBIs as part of a student's routine and environment is often referred to as a sensory diet (Bonggat & Hall, 2010).

Perceptions Regarding Efficacy of SBIs

The study participants expressed positive perceptions regarding the efficacy of SBIs. They provided multiple examples of how they saw the interventions facilitating behavioral control and participation in learning activities among the students with whom they work. This is illustrated by the following excerpts from the focus group: “to help them calm down” (FG2 71), “I found the weighted vest to be helpful with the student I had” (FG2 154), and “I could just see him calm down with some pressure on his shoulders” (FG2 155). Statements that reflect paraeducator perceptions of benefits when SBIs were implemented during learning activities included, “the sensory interventions seem to help students be more on task, to calm and be able to focus” (FG2 171–172), “some of the students who have gotten fidgets will sit longer” (I 66–67), and “with the stress balls, they will actually sit and comply and listen during academics” (FG1 63–64). In fact, all the paraeducators who took part in the study expressed in one way or another having had a positive experience regarding the use of SBIs.

Another common theme that emerged is the use of SBIs to prevent and address behavioral challenges in the classroom where the SBIs were often implemented as a preventative strategy. One participant stated, “I feel that a lot of times it prevents behaviors from occurring” (FG1 59) with agreement from several other participants. When asked, most of the paraeducators expressed the opinion that the students were not specifically aware that they were using a SBI, but did know that the strategy helped them with behavioral control. One paraeducator explained that when her students participate in a SBI “they feel better and [are] able to do what's expected” (FG2 197–198).

Perceptions of Barriers to the Use of SBIs

A number of barriers were identified by the paraeducators regarding their ability to implement SBIs, some tangible, others intangible. Tangible barriers included lack of supplies, space, or staffing. For example, “maintenance of the supply” (FG1 117) was identified as a concern when discussing items that frequently need to be replaced, such as chewy tubes or stretchy bands. Obtaining adequate supplies such as therapy balls was also identified as a barrier; one paraeducator stated, “they all want . . . to bounce on them, and we don’t have enough for everyone” (I 85–86). Space was also mentioned as a concern, including situations such as storing large therapy balls in the classroom and the availability of the school’s sensory room. When “that room [the sensory room] is full . . . [it] is frustrating sometimes [for students]” (FG2 267). Staffing was described as a barrier when there were not enough personnel in the room to provide individual attention or supervision to leave the classroom for a SBI that would occur in a different location.

Intangible barriers identified included student distraction or work avoidance when SBIs were being implemented. Because the SBIs are used based on individual needs, one student using an item, such as a therapy ball, may cause a distraction to other students in the vicinity. As one of the paraeducators described, “once one person has one, then everybody wants one” (FG2 287). A second non-tangible barrier included the use of SBIs as work avoidance. Several of the paraeducators expressed this concern through statements such as, “sometimes I think it is just an escape for the student” (FG1 65) to describe that a student may request a break or time in the sensory room to avoid an academic expectation. These paraeducators described protocols to address work avoidance, such as having the student make-up any missed work at a later time.

Need for Training and Support

The paraeducators in this study shared their perceptions during the focus groups regarding their needs for training and support in relation to SBIs. Most of the participants mentioned they learned about SBIs through a process of trial and error as illustrated by two participants who stated that “we just try different things out and if we get good results, then” (FG1 132–133) and that “just from watching, from trial and error, figuring it out that way” (I 99), with several others indicating their agreement. During the focus groups, getting to know the students, experience, and formal training from the educational agency were identified as beneficial. When answering questions regarding the level of support received in their current classroom setting, one participant commented that “the support is just phenomenal” (FG2 310) with others nodding in agreement. The participants identified receiving support from teachers, behavioral technicians, supervisors, school psychologists, and occupational therapists. One paraeducator stated “just going to OTs with a student, you learn a lot” (FG2 305). These qualitative impressions about the support and training received about SBIs were supported by information shared by the participants in the sociodemographic questionnaire with most of the participants indicating being either satisfied or highly satisfied with their current position as well as with the training and support, in general, that they receive from their employer (see Table 2). None of the participants expressed any dissatisfaction with the training and support that they received in their workplace.

Table 2*Participant Satisfaction with Employment and Employer-Provided Training and Support (n = 11)*

	Frequency	Percentage
Satisfaction in current position		
1 – strongly dissatisfied	0	0
2 – dissatisfied	0	0
3 – somewhat dissatisfied	0	0
4 – neutral	0	0
5 – somewhat satisfied	2	18
6 – satisfied	5	45
7 – highly satisfied	4	36
Satisfaction with training received*		
1 – strongly dissatisfied	0	0
2 – dissatisfied	0	0
3 – somewhat dissatisfied	0	0
4 – neutral	1	10
5 – somewhat satisfied	1	10
6 – satisfied	6	60
7 – highly satisfied	2	20
Satisfaction with support received*		
1 – strongly dissatisfied	0	0
2 – dissatisfied	0	0
3 – somewhat dissatisfied	0	0
4 – neutral	1	10
5 – somewhat satisfied	1	10
6 – satisfied	4	40
7 – highly satisfied	4	40

Note: *One participant did not complete the last two questions on the questionnaire.

Discussion

This study aimed to contribute to the body of knowledge regarding the use of SBIs in public schools by adding the perspective of paraeducators who are often the frontline workers with students with disabilities in that setting. The study intended to show the types and frequency of SBIs paraeducators commonly used, the perceived efficacy of SBIs, and the barriers to SBIs implementation in the public-school setting.

Type, Frequency, and Perceived Efficacy of SBIs Used

Overall, the study found that a variety of SBIs are used throughout the school day and are perceived to be effective in the view of the paraeducators. The SBIs that the paraeducators described engage a variety of sensory systems (e.g., proprioception, touch, vestibular) and were implemented in a manner commonly referred to as a sensory diet (Bonggat & Hall, 2010). One important type of SBI that was not identified by the paraeducators in this study was changing aspects of the environment to facilitate a child's ability to participate, as described by Watling and Clark (2011). In terms of frequency, according to the paraeducators, SBIs were integrated regularly throughout the school day either during learning activities, breaks, or transitions and were implemented for short lengths of time (2 to 5 min) per occurrence. The paraeducators viewed SBIs as efficacious and described benefits such as prevention of problematic behaviors, improved behavioral control, and improved readiness to participate

in learning. Considering that the literature suggests perceived benefit is linked to implementation of a strategy (Bagatell et al., 2010), and the fact that paraeducators find SBIs beneficial, likely means they are more willing to implement such interventions. However, no assumption can be made from these findings about the actual efficacy of SBIs, since paraeducators may perceive an intervention as beneficial because they are invested in observing a positive response (Mcray, 2015).

Barriers to SBIs Used in Public Schools

The study found lack of supplies, space shortages, and inadequate staffing as barriers to the use of this intervention in schools. The paraeducators also described barriers to using SBIs in schools related to other students being distracted by a student's use of a SBI and students being perceived as requesting SBIs as part of work avoidance. Concerns about distraction and work avoidance have been described by paraeducators in a previous study related to behavioral needs (Perez-Kennedy, 2011). These barriers appear to have minimum impact on the use of SBIs by the interviewed paraeducators.

Although not identified as a barrier to using SBIs in schools by the participants, the findings about the training and support that paraeducators received related to SBIs were enlightening and concerning. The paraeducators felt that they were knowledgeable about SBIs and that their knowledge arose from training, support received, and their own experiences. In fact, the paraeducators were positive regarding the training and support that they received in the schools overall and related to the use of SBIs specifically. However, from their description during the focus group it is clear that the training they received about SBIs was informal with observation of and consultation with varied school professionals mentioned as the primary source of knowledge. This type of informal training and consultation is problematic because the depth and quality of knowledge is unclear. Further, a previous study regarding the training of paraeducators revealed limitations in the generalization of training without specific follow-up in the classroom setting (Brock & Carter, 2013).

In spite of their positive impression about the training and supports that they received, paraeducators identified using trial and error to identify interventions to use with their students. This finding suggests that paraeducators routinely implement SBIs without the benefit of a sensory-based assessment. Further, this study found that SBIs are being implemented and evaluated by paraeducators independent of an occupational therapist. These are not recommended approaches for the use of SBIs by the American Occupational Therapy Association's (AOTA) Choosing Wisely® initiative (Frauwirth et al., 2019). Rather, AOTA recommends that health and educational providers avoid the provision of SBIs without assessment and evidence to support the intervention. Paraeducators making decisions regarding intervention strategies without adequate guidance, supervision, and training is not unique to this study or SBI, and others have reported similar findings (Giangreco & Broer, 2005; Perez-Kennedy, 2011). Further, others have found teachers implemented strategies they perceived as effective without the use of data to support their claim (Bonggat & Hall, 2010). Under the guidance of AOTA, occupational therapists working in the school setting not only should complete thorough assessment to support the selection and use of SBIs but also provide ongoing guidance and training to those implementing this intervention.

Direction for Future Studies

This study began to explore paraeducators' perceptions related to the use and efficacy of SBIs in public schools and provides a platform from which future studies can expand. First, replicating this study with a larger number of paraeducators from a greater number of schools and school districts would be important. Second, exploring the perceptions of use and efficacy of SBIs from the paraeducators,

special educators, teachers, and occupational therapists point of view in parallel with a study would strengthen current understanding. With such a study, comparing perceptions of efficacy with measurable outcomes would be even more useful. Finally, it was noteworthy that sensory-based environmental adaptations were not reported as being used in this study. Further studies exploring this type of SBI in the school setting could be enlightening.

Limitations

The participants were all volunteers who may have self-selected to participate because they had positive views of SBIs (i.e., possible volunteer bias). Although researcher bias is a risk in all qualitative studies, it was minimized in this study through multiple methods (e.g., reflexivity and second coder). The study results are applicable to paraeducators working in public, center-based schools for students in emotional support and autistic support programs. Repeating the study in other and larger geographic locations with participants who have experience with more varied student populations would expand the applicability of the results.

Conclusion

Most occupational therapists working in the school setting recommend the use of SBIs (May-Benson & Koomar, 2010). It is essential that they know how this intervention is understood and used by those implementing it, including paraeducators who are at the front line of support for many students with disability. Paraeducators report using varied SBIs on a daily basis with the students they support in school. Although paraeducators in this study offered positive impressions regarding the use of SBIs, they, and the children with whom they work, could benefit from more formal supports. Based on the Choosing Wisely® recommendations, it is clear that occupational therapists have a role in continuing to improve the implementation of SBIs based on assessment and evidence and through ongoing training and collaboration with school teams.

Lyn K. Kaiser, OTD, MS, OTR/L, is an adjunct faculty member in the occupational therapy program at Thomas Jefferson University, East Falls Campus

Marie-Christine Potvin, PhD, OTR/L, is an associate professor in the occupational therapy program at Thomas Jefferson University, East Falls Campus

Caitlin Beach, OTS, is a graduate student in the occupational therapy program at Thomas Jefferson University, East Falls Campus

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