Behav Analysis Practice (2016) 9:389–402
DOI 10.1007/s40617-015-0062-3

DISCUSSION AND REVIEW PAPER

A Review and Treatment Selection Model for Individuals with Developmental Disabilities Who Engage in Inappropriate Sexual Behavior

Tonya N. Davis[1] · **Wendy Machalicek**[2] · **Rachel Scalzo**[1] · **Alicia Kobylecky**[1] · **Vincent Campbell**[2] · **Sarah Pinkelman**[3] · **Jeffrey Michael Chan**[4] · **Jeff Sigafoos**[5]

Published online: 4 June 2015

Abstract Some individuals with developmental disabilities develop inappropriate sexual behaviors such as public masturbation, disrobing, and touching others in an unwanted sexual manner. Such acts are problematic given the taboo nature of the behaviors and the potential for significant negative consequences, such as restricted community access, injury, and legal ramifications. Therefore, it is necessary to equip caregivers and practitioners with effective treatment options. The purpose of this paper is to review studies that have evaluated behavioral treatments to reduce inappropriate sexual behavior in persons with developmental disabilities. The strengths and weaknesses of each treatment are reviewed, and a model for treatment selection is provided.

Keywords Developmental disability · Disrobing · Inappropriate sexual behavior · Masturbation · Treatment review · Treatment selection model

Jackson (1982) noted that the expression of sexuality has been observed to begin in early childhood. Specifically, young children often explore their own bodies and bodily sensations and learn appropriate and inappropriate ways of touching the bodies of same age peers (i.e., personal boundaries, asking for permission to touch, non-aggression). For typically developing children, the preschool and early elementary years provide continued opportunities to learn when and where behaviors like taking clothes off and touching one's genitals are appropriate through observation, peer interactions, and caregiver responses (Davies et al. 2000; Sandnabba et al. 2003). This is the period during which children typically restrict their sexual behaviors (e.g., masturbation) and sexual talk (e.g., genital or reproduction conversations with same age peers or siblings) to private spaces (Johnson 1993; Johnson and Aoki 1993; Sandnabba et al. 2003).

However, children with developmental disabilities (DD) often have decreased social opportunities with peers and generally require explicit instruction to acquire appropriate behavior (Walton and Ingersoll 2013), which can impede children's awareness of social rules governing sexual behavior (Volkmar and Wolf 2013). In addition, there appears to be little by way of educational and behavioral interventions to promote the healthy expression of sexuality by individuals with DD (Sullivan and Caterino 2008). This underutilization of behavioral principles to positively impact developmentally and age-appropriate sexual behaviors is no doubt at least partially due to the discomfort some stakeholders are likely to experience when discussing sexuality. The relative lack of effective interventions combined with an increased need for systematic instruction to acquire new skills contributes to the development of inappropriate sexual behaviors (ISBs) for some individuals with DD.

In particular, a child's delayed ability to discern the social norm may contribute to the development of maladaptive

✉ Tonya N. Davis
Tonya_Davis@baylor.edu

[1] Baylor University, Waco, TX, USA

[2] University of Oregon, Eugene, OR, USA

[3] George Mason University, Fairfax, VA, USA

[4] Northern Illinois University, DeKalb, IL, USA

[5] Victoria University of Wellington, Wellington, New Zealand

sexualized behaviors in educational and community settings. Without appropriate intervention, such behaviors might persist and worsen over time as the child continues to develop physically to sexual maturity. Some school age children and adults with DD have been reported to engage in ISB such as disrobing, public masturbation, inappropriately touching others, publicly discussing sexual topics, and sexual arousal to atypical objects or individuals with potentially serious consequences (e.g., Carlson et al. 2008; Early et al. 2012; Hagopian et al. 2002; Sprague et al. 1997).

Broadly, ISB is defined as a response class performed within an environment that deems the behavior as being unacceptable by societal standards (e.g., legislative rule, consequence of behavior creates harm to self or others; Ward et al. 2001). There is limited information on the prevalence of ISB exhibited by individuals with DD, which might be a result of ethical concerns regarding the measurement of private or taboo behaviors (Lund 1992). Although many ISBs are often publicly displayed, observers may feel uncomfortable observing and recording such behaviors because of the sexual content and relevant societal norms; for example, recording of public masturbation would require visually observing such behavior which may cause uneasiness for both the observer and client. However, the results of descriptive survey studies and the publication of intervention studies addressing these behaviors suggest that ISBs are evident in a significant number of children and adults with DD. Ruble and Dalrymple (1993), for example, surveyed parents of children ages 9 years and older with autism spectrum disorder (ASD) and found that 65 % of parents reported their child had touched their genitals in public. Additionally, 25 % of parents reported their child had disrobed in public, 23 % reported their child masturbated in public, and 18 % reported their child had inappropriately touched others (Ruble and Dalrymple 1993).

Over the last five decades, published research has described the assessment and behavioral treatment of ISB displayed by individuals with DD. These behaviors have included (a) exhibitionism or disrobing (e.g., Carlson et al. 2008; Hagopian et al. 2002; Lutzker 1974; Sprague and Horner 1992); (b) public masturbation or sexually stereotypical behavior (Hagopian et al. 2002; Sailor et al. 1968; Sprague et al. 1997); (c) inappropriately touching others (Magee and Ellis 2001); (d) publicly discussing sexually inappropriate topics (Early et al. 2012; Pritchard et al. 2011); (e) aggressively coercing peers into sexual interactions (Polvinale and Lutzker 1980); (f) masochism (Money and Annecillo 1991; Widermannova and Strnad 1963); (g) paraphilia (i.e., sexual arousal to atypical objects, individuals; Early et al. 2012); and (h) persistence in pursuing romantic relationships, which may be perceived as stalking (Stokes et al. 2007).

Individuals with DD who engage in ISB may experience negative outcomes including injury, limited community participation, restricted access to educational resources, social rejection (Early et al. 2012), and peer rejection (Hurley and Sovner 1983; Lund 1992). They might also have decreased instructional time and fewer opportunities to learn adaptive behavior because addressing ISB precludes practitioners from targeting educational goals (Carlson et al. 2008; Luiselli et al. 1977). Additionally, some topographies of ISB may pose a threat of injury to self, for example masturbatory behavior can result in soft tissue damage (Singh and Coffey 2012).

Many topographies of ISB also adversely affect others. Caregivers and witnesses to ISB could feel victimized or threatened. Those in the person's immediate environment (e.g., classroom or workplace) might encounter unwanted sexual contact such as inappropriate touching of their bodies (Athens and Vollmer 2010; Bloom et al. 2011), or they may inadvertently witness ISB that negatively alters their perceptions of the person with DD. Furthermore, community members may be the targets of persons with DD who sexually offend (Craig et al. 2006; Lindsay et al. 1999). Other individuals with DD may also be at a higher risk of victimization due to placement of individuals displaying ISB in treatment facilities (Lund 1992; Lundervold and Bourland 1987). Depending on the nature and severity of the behavior, as well as the culpability and age of the individual with DD, some ISB, such as sexual aggression, sexual coercion, and public disrobing, might have legal ramifications.

Though the exact prevalence of criminal justice system involvement is unknown, estimates indicate that the number of adult sexual offenders with a DD is as high or higher than rates in the general population (Lindsay et al. 1999). Furthermore, there is evidence to suggest that adult sexual offenders begin offending as adolescents (Lakey 1994). Clearly, this indicates the need for early, individualized treatment, yet limited empirical evidence regarding behavior analytic interventions is available. Treatment options have traditionally been relegated to cognitive behavioral group therapy (e.g., Lindsay et al. 1999; Yates 2013), utilization of the relapse prevention model (e.g., Yates 2013), and pharmacological treatments (e.g., Myers 1991). Recent research has described statistically significant group differences between typically developing adolescent sexual offenders and adolescent sexual offenders diagnosed with autism on survey measures, which provides further indication of the need for individualized behavior analytic treatment (Bliel Walters et al. 2013).

In light of these many potential negative consequences, there would seem to be some value in interventions to educate individuals with DD about personal boundaries, modesty, the social rules governing touching others, and the socially appropriate expression of sexuality. In addition, it would seem important to identify and implement empirically supported interventions to treat ISB as a way of ensuring individuals with DD who engage in ISB have optimal opportunities for social interaction and community inclusion. Given the potential deleterious effects of ISB on individuals with DD who are school

age and older, professionals (e.g., autism specialists, behavior analysts, positive behavior support coaches, school psychologists, clinical psychologists) that provide support to caregivers, teachers, paraprofessionals, and others should be prepared to assess and treat ISB based on the legislation mandating treatment of such behaviors (Individuals with Disabilities Education Improvement Act 2004).

However, selecting an intervention for ISB can be particularly challenging due to negative public perceptions of such behaviors, the technical difficulty and ethical issues inherent in implementing direct functional behavior assessments (FBA) for sexual behavior, and the difficulty in developing an effective intervention plan for behaviors that may be primarily maintained through automatic reinforcement (e.g., masturbation, paraphilia).

Past reviews of the literature pertaining to the sexuality of individuals with DD have primarily focused on sex education curricula (see Blanchett and Wolfe 2002; Sullivan and Caterino 2008 for reviews). In regard to evaluating specific interventions, Tarnai (2006) completed a systematic review of interventions addressing socially inappropriate masturbation for persons with DD. To the authors' knowledge, there does not seem to be any current reviews evaluating interventions to prevent and decrease the broad range of ISB among individuals with DD.

The purpose of this paper was therefore to analyze peer-reviewed behavioral intervention studies aimed at reducing ISB among individuals with DD. Seven categories of interventions for ISB were identified. Based on the respective advantages and disadvantages of these interventions, a treatment selection model is provided to assist practitioners in choosing an appropriate intervention based on client, behavior, and environmental characteristics.

Method

Search Procedures

We undertook a systematic search of the following electronic databases: (a) PsycINFO, (b) Educational Resources Information Clearing House (ERIC), (c) Academic Search Complete, and (d) MEDLINE. The following free-text terms were inserted into the keyword fields in pairs utilizing Boolean operators and truncation: "cognitive disability," "intellectual disability," "mental retardation," "disability," "autism," "developmental disability," "pervasive developmental disorder, " and "PDD-NOS." These terms were paired with the following additional combinations of free-text terms: "sex," "autoerotic," "masturbation," "staring," "groping," "exposure," "autoerotic asphyxiation," "psychosexual," "paraphilia," "self-stimulation, " "exhibitionism," "sadism," "masochism," "coprophilia," "self-pleasure," "inappropriate touching," "sex education," and "disrobing." A total of 144 search combinations were created (e.g., "cognitive disability" + "sex," "autism" + "paraphilia").

The search was restricted to English language journals, although the years of publication were not restricted. The abstracts of the resulting articles were reviewed to identify studies for inclusion. An ancestry search of the references in included articles was also completed to identify additional articles.

Inclusion and Exclusion Criteria

To be included in this review, a study must have evaluated the effects of a behavioral treatment that was intended to address ISB with at least one individual of any age with DD. A target behavior was considered inappropriate if it grossly violated social norms (e.g., occurred in public locations past age-appropriate norms, violated personal space and privacy); significantly interfered with other activities, responsibilities, or instruction; or was hazardous to the individual or others (e.g., masturbation at a frequency or intensity to cause tissue damage to genitals, sexual assault of others). A treatment was deemed behavioral if it implemented treatments that utilized operant or respondent conditioning and if the treatment aligned with the seven dimensions of applied behavior analysis (ABA) as described by Baer et al. (1968). Finally, a developmental disability was defined as one that manifests in childhood (i.e., before 18 years of age) and significantly affects intellectual and/or adaptive functioning. This definition included but was not limited to intellectual disability, ASD, Down syndrome, Prader-Willi syndrome, Rett syndrome, and Fragile X syndrome; this definition excluded attention deficit hyperactivity disorder, learning disabilities, and other disabilities that typically do not affect intellectual or adaptive functioning.

Additional criteria included (a) the article was published in a peer-reviewed journal, (b) the intervention was operationally defined, and (c) the study employed an experimental or quasi-experimental design. The criterion outlined by Wheeler et al. (2006) for determining the presence of an operationally defined independent variable was implemented. Specifically, the following question must be answered "yes" for the study to be included in this review: *Can this treatment be replicated with the information provided?* Finally, studies that examined group-based interventions, such as group therapy, were excluded. The concluding search results identified 13 articles that met the aforementioned inclusion criteria.

A total of 9,936 studies were identified across the combined 144 searches. It is unclear how many studies were obtained in multiple searches. In other words, one study may have been identified across 30 of the 144 search term pairs; therefore, with this search method, it is impossible to determine the number of unique studies identified in the electronic

search. The abstracts of the 9,936 studies were reviewed against the inclusion criteria, and 97 were deemed worthy of further review. After further evaluation of the article in its entirety, 13 articles met the aforementioned inclusion criteria. An ancestry search of these 13 identified articles did not result in identification of additional articles that met inclusion criteria.

To assess reliability of our application of the inclusion criteria, three authors independently reviewed the 97 articles deemed worthy of further analysis. Agreement was 87 %; disputed studies were then reviewed by multiple authors to reach a consensus.

Data Extraction

Each study was assessed against the inclusion criteria, and data were extracted on (a) participant characteristics, (b) target behaviors, (c) intervention characteristics, and (d) study outcomes. A total of 11 items per study were summarized. To assess the reliability of data extraction, five studies (38 %) were independently summarized by two authors. In total, there were 55 items in which agreement or disagreement could be measured (i.e., 5 studies with 11 items per study). Agreement for the summarized items was 100 %.

Treatments for Inappropriate Sexual Behavior

Interventions from the included articles were divided into seven treatment categories: (a) instructional revision, (b) manipulation of motivational variables, (c) noncontingent reinforcement, (d) differential reinforcement of alternative behavior (DRA), (e) differential reinforcement of other behavior (DRO), (e) extinction, and (f) punishment procedures. A summary of the treatments and their relative strengths and weaknesses can be found in Table 1.

Instructional Revisions

Instructional revisions alter relevant aspects of the teaching environment that are associated with the occurrence of challenging behavior (Dunlap and Kern 1996). Examples of such antecedent-based interventions include manipulating (a) the degree of difficulty of the work task, (b) the number of work tasks required, (c) the schedule of activities, and/or (d) the teaching environment. Such antecedent manipulations have been used to decrease challenging behavior and increase academic engagement (Dunlap and Kern 1996).

Similar types of antecedent manipulations have been used with success to decrease challenging behavior of persons with DD (Ducharme and Rushford 2001), and there is some research to suggest that this might be a useful approach for addressing ISB in individuals with DD. For example, Cihak et al. (2007) evaluated an antecedent manipulation in the form of an instructional revision to eliminate inappropriate self-touching in a 16-year-old female with a moderate intellectual disability. In this study, results of an initial functional analysis suggested that ISB was maintained by escape from demands. Two interventions to decrease inappropriate self-touching interventions were then compared. One intervention was an antecedent-based strategy (i.e., self-operated auditory prompts), and the other was a consequence-based intervention (i.e., differential reinforcement of alternative behavior or DRA). Challenging behavior decreased equally across both interventions; however, the auditory prompting procedures were reported to be more socially acceptable and were also associated with more independent behavior.

In another relevant study, Sprague and Horner (1992) implemented an antecedent manipulation to treat the ISB of a 12-year-old female diagnosed with ASD and severe intellectual disability. Results of a functional behavior assessment suggested that lifting her shirt was maintained in part by contingent access to assistance with difficult tasks. The researchers compared several interventions, including an antecedent-based strategy, contingent assistance, and contingent assistance with blocking. The antecedent intervention consisted of an instructional revision in which an adult modeled the correct task response prior to participant completion of that same task. Instructional revision did not completely eliminate ISB, but it did reduce the inappropriate behaviors to a greater degree than the other two treatments.

In a third relevant study, Carlson et al. (2008) provided intervention to two participants diagnosed with ASD. The behavior of concern was frequent public disrobing or urination in their clothing, which seemingly occurred to gain access to more preferred apparel. Participants were given the choice to change into highly preferred clothing at specific times during the day in an effort to decrease the behavior. This choice appeared to function as an effective abolishing operation in that the ISBs were completely eliminated when choice was provided. Overall, these three studies demonstrate effective use of instructional revision strategies to decrease ISB.

Manipulation of Motivational Variables

Manipulating motivational variables is another approach for changing behavior. The idea is to change the current evocative or abative effects in place with respect to a potentially reinforcing stimulus and thereby temporarily alter the reinforcing value of the stimulus and the frequency, magnitude, or intensity of any behavior that has been previously reinforced by that stimulus (Laraway et al. 2003; Michael 1982; Michael 2000). For example, when there is an evocative effect (e.g., no access to a preferred stimulus), the reinforcing value of the stimulus will increase and the probability of responses that have in the past been followed by that stimulus will temporarily increase and therefore is an establishing operation. When

Table 1 Strengths and potential limitations of treatments for inappropriate sexual behavior

Treatment	Description	Strengths	Potential limitations
Instructional revisions	Modification in instructional procedures	• May prevent ISB • May result in improved learning across other adaptive skills	• Requires time and effort to implement revisions • No programmed consequence for ISB
Manipulation of motivating operations	After identifying the maintaining consequence to ISB, provide long durations of noncontingent access to that reinforcer prior to situations in which ISB is likely to occur in order to temporarily reduce value of the reinforcer	• May prevent ISB • May be used in conjunction with other treatments to mitigate the limitations of those treatments (e.g., reduce the intensity of an extinction burst) • Continued access to desired reinforcer	• Must have previously identified maintaining reinforcer • Requires expertise to identify potential stimuli that serve as motivating operations and select appropriate duration of access to those stimuli • May inadvertently create establishing operation when intended to provide abolishing operation, and vice versa • May be time consuming to provide long durations of access to the reinforcer
Noncontingent reinforcement	After identifying the maintaining consequence to ISB, that consequence is provided on a time-based schedule, irrelevant of the demonstration of ISB	• Continued access to desired reinforcer • May prevent ISB	• Must have previously identified maintaining reinforcer • Must have the ability to control access to the maintaining reinforcer • May inadvertently reinforce ISB • Requires experience to select effective reinforcement schedule and then thin this schedule • No programmed consequence for ISB
Differential reinforcement of alternative behavior	Reinforcement provided for socially appropriate behavior, while targeted ISB is placed on extinction	• Targets adaptive skills to increase • Continued access to desired reinforcer • May be used without extinction	• Requires constant monitoring of ISB • Does not provide the individual with another behavior to access maintaining reinforcer • Requires time and effort to teach alternative behavior, particularly if the alternative behavior is not already within the individual's repertoire • Current research suggests that it must be combined with additional interventions for ultimate effectiveness
Differential reinforcement of zero rates of behavior	Reinforcement is provided contingent upon the absence of ISB for a specified duration of time	• May be implemented without knowledge of or control over maintaining consequence • Maintaining consequence may be used as reinforcer, providing continued access to desired reinforcer • Non-aversive method to decrease ISB	• Requires experience to select effective reinforcement schedule and then thin this schedule • Requires constant monitoring of ISB • Does not provide the individual with another behavior to access maintaining reinforcer • Current research suggests that it must be combined with additional interventions for ultimate effectiveness
Extinction	After identifying the maintaining consequence to ISB, no longer provide that consequence contingent upon demonstration of ISB	• Frequently used in conjunction with other treatments • Provides caregiver with appropriate response to ISB	• Maintaining reinforcer must be identified • Must have the ability to control access to the maintaining reinforcer • Difficult to implement with fidelity • Frequently results in extinction burst where behavior increases in frequency, duration, and/or intensity before decreasing • Decrease in ISB may be gradual

Table 1 (continued)

Treatment	Description	Strengths	Potential limitations
Punishment	Provide undesirable consequences contingent upon displays of ISB	• Provides caregiver with appropriate response to ISB • May immediately terminate the display of ISB, thus reducing potential negative consequences of ISB	• May result in avoidance or retaliation behaviors • May negatively impact relationship between caregiver and individual displaying ISB • May be physically difficult to implement, particularly if individual is resistant • Often takes time and effort to implement with fidelity (e.g., time out must be monitored) • Some procedures may pose risk of injury to individual or caregiver (e.g., physical restraint)

there is an abative effect (e.g., long duration of access to a reinforcer), in contrast, the reinforcing value of the stimulus will decrease and the probability of responses that have in the past been followed by that stimulus will temporarily decrease and is therefore an abolishing operation.

O'Reilly et al. (2006) examined the effect of manipulating establishing and abolishing operations with a 20-year-old male diagnosed with an intellectual disability who engaged in inappropriate self-touching. Results of a functional analysis suggested that ISB was maintained by access to attention. Two conditions were then compared: (a) pre-session access to attention (i.e., abolishing operation) and (b) no prior access to attention plus extinction (i.e., establishing operation). The researchers hypothesized the first condition would act as an abolishing operation via an abative effect mechanism and therefore decrease the reinforcing value of the ISB and decrease the probability of ISB in the subsequent session. This hypothesized effect was in fact obtained. That is, the participant exhibited less ISB in sessions following pre-session access to attention compared to sessions that followed the second condition (i.e., no prior access to attention plus extinction).

Noncontingent Reinforcement

Our search identified one study that examined the effects of noncontingent reinforcement (NCR) on ISB for individuals with DD. In a NCR intervention, an individual is provided access to reinforcement independent of the performance of a target challenging behavior (Cooper et al. 2007). For maximal benefit, the reinforcer should be functionally equivalent to the consequence maintaining the challenging behavior (Cooper et al. 2007; Horner and Day 1991). Such reinforcement provided freely during NCR procedures may act as an abolishing operation, temporarily decreasing the value of the reinforcer associated with the challenging behavior and thus temporarily reducing/eliminating the motivation to engage in the challenging behavior (e.g., Vollmer and Iwata 1991). NCR procedures may also disrupt the response–stimulus relation through differential reinforcement of other behavior.

Hagopian et al. (2002) implemented NCR with a 14-year-old male diagnosed with an intellectual disability, attention deficit hyperactivity disorder, oppositional defiant disorder, and depression. The participant engaged in public masturbation, displaying his genitals, inappropriately touching others, aggression, disruption, and elopement. Results of an experimental functional analysis indicated that the behaviors were maintained by access to attention. Researchers developed an individualized treatment package using both NCR on a fixed-time schedule of 5 min (i.e., attention delivered every 5 min) and DRA (i.e., delivery of attention contingent on appropriate requests for attention). Immediately following instances of ISB, the participant was placed in non-exclusionary time out

from positive reinforcement until ISB subsided for 15 consecutive minutes. Exclusionary time out from positive reinforcement was implemented when dangerous levels of behavior occurred. The participant's ISB was almost entirely eliminated using these three procedures, but it is not clear to what extent the NCR component contribution to this positive intervention outcome as the study did not evaluate the effects of NCR only on ISB. Thus, this is an area that needs further attention in the literature.

Differential Reinforcement of Alternative Behavior

Four studies were identified that examined the effects of DRA on ISB for individuals with DD. DRA involves providing reinforcement contingent upon an alternative, socially appropriate behavior. DRA is usually also paired with extinction of the undesired behavior (Cooper et al. 2007). DRA is most effective at decreasing challenging behavior when the reinforcer delivered for alternative behavior is functionally equivalent to the reinforcer maintaining challenging behavior and extinction procedures are based on the function of the challenging behavior (Vollmer and Iwata 1992).

As previously mentioned, Cihak et al. (2007) used DRA to treat public masturbation in a 16-year-old female participant with a moderate intellectual disability. A brief functional analysis determined inappropriate self-touching was maintained by escape from demands. Reinforcement in the form of a token economy system was provided for on-task behavior on a fixed interval (FI)—30-s/limited hold (LH) 1-s schedule. The participant received a token every 30 s if she performed the appropriate response, but the token was withheld if the participant engaged in ISB within 1 s of the elapsed interval. Tokens were paired with praise and could be exchanged for access to preferred items. The effects of the token economy system were compared to self-operated auditory prompts, an antecedent intervention, using an alternating treatment design. Results demonstrated that the participant's rate of ISB was similarly decreased in both interventions. However, the researchers deemed the antecedent intervention as more socially acceptable for long-term use in the workplace.

Fisher et al. (2000) implemented functional communication training (FCT), a type of DRA in which the alternative behavior is specifically a communicative behavior (Carr and Durand 1985). The 19-year-old male with autism and profound intellectual disability's ISB was found to be sensitive to tangible reinforcement; therefore, FCT involved providing a picture card communication system to allow for appropriate requests for preferred items. FCT plus extinction successfully reduced a variety of challenging behavior, including public masturbation. After FCT successfully reduced target behaviors, reinforcer delay fading, punishment, and alterative activities were implemented during reinforcement delay phase. While punishment was found to be ineffective, alternative activities promoted the participant's ability to tolerate delay to reinforcement.

Hagopian et al. (2002) used DRA in combination with NCR for a 14-year-old male participant with DD who engaged in attention-maintained ISB. The DRA component of the intervention consisted of providing the participant with attention contingent on appropriate requests for attention. When combined with the NCR and time out procedures (see previous section), the participant's ISB was completely eliminated.

Najdowski et al. (2008) also implemented FCT. The participant's target ISB included public masturbation and grabbing of others' genitals; additionally, the participant reliably displayed the precursor behavior of inappropriate sexual statements about another person's genitalia prior to engaging in the target ISB. Functional analysis and FCT were implemented for this precursor behavior. Researchers taught the participant to appropriately request for attention utilizing a speech-generating device, which successfully reduced precursor behaviors and targeted ISB.

Differential reinforcement procedures are frequently used to address challenging behavior exhibited by persons with DD (see Lennox et al. 1988 for a review). The literature suggests that DRA may be most effective when combined with extinction and other procedures. Although this could potentially be costly and/or time consuming for practitioners to implement, these combinations have reduced or entirely eliminated ISB in some individuals with DD. Literature evaluating the use of DRA to treat challenging behavior of individuals with DD suggests that extinction is an essential treatment component necessary to achieve socially significant reductions in challenging behavior (e.g., Volkert et al. 2009).

However, the use of extinction procedures when treating an ISB may be difficult, undesirable, or impossible, depending on the topography of the targeted behavior. For instance, if an adolescent engages in public disrobing, attention to the act can be minimized, but not eliminated. When extinction procedures cannot be used in conjunction with DRA, practitioners should ensure that the individual with DD accesses reinforcement following appropriate behavior that is more immediate, of longer duration, and of higher quality than the reinforcer they receive following the ISB (Athens and Vollmer 2010).

Differential Reinforcement of Other Behavior

Two studies have examined the effects of DRO on ISB for individuals with DD. DRO, also described as differential reinforcement of zero rates of behavior, provides the individual with reinforcing consequences contingent upon a specific amount of time that has elapsed with no demonstration of the behavior (Vollmer and Iwata 1992). Evidence suggests that DRO is most effective when applied to challenging behavior maintained by positive reinforcement in the form of attention or access to tangibles (Hanley and Tiger 2011).

Durana and Curvo (1980) implemented DRO with a woman diagnosed with severe intellectual disability who engaged in public disrobing. Several conditions were implemented, including DRO alone, DRO plus restitution and positive practice, and DRO plus restitution and negative practice. In each condition, DRO consisted of access to social and edible rewards contingent upon remaining clothed for 5 min. Public disrobing was reduced most significantly in the DRO plus restitution and negative practice condition when compared to the other conditions.

Polvinale and Lutzker (1980) studied the effects of DRO on the ISB of a 13-year-old boy with Down syndrome. The participant engaged in public masturbation and sexual assault, which consisted of enticing or coercing other children in school into sexual interactions. A multiple baseline design across times of the day and settings within the school was used with a partial component analysis to compare the effectiveness of DRO and DRO plus social restitution. DRO consisted of verbal praise delivered on a variable interval schedule contingent upon nonoccurrence of ISB. Both public masturbation and sexual assault were eliminated after 19 days of intervention. Follow-up at 1 month, 6 months, and 1 year after treatment indicated the participant did not engage in any ISB.

In the literature, DRO is often combined with additional procedures, which could be costly and/or time consuming for practitioners to implement. However, treatment packages that include DRO procedures have been highly effective in reducing and eliminating ISB. Although the challenging behavior of individuals with DD is commonly maintained by social positive reinforcement (e.g., Love et al. 2009), to the authors' knowledge, there is currently no research to confirm that ISB follows this pattern. The nature of some common topographies of ISB such as public masturbation suggests the likelihood of an automatic function (i.e., to gain sensory stimulation). When using DRO to address ISB maintained by automatic reinforcement, the reinforcer used in the DRO procedure should be carefully considered, as it may have to compete with powerful sensory reinforcers that are obtained through ISB.

When implementing DRO, it is also important to consider what behavior will be reinforced in the absence of ISB. As stated previously, DRO is a procedure where reinforcement is contingent on the absence of the target behavior for a predetermined amount of time (Cooper et al. 2007). Throughout this predetermined amount of time, a variety of behaviors other than ISB might occur and thus be inadvertently reinforced. It is also possible that individuals with DD who engage in ISB might have few appropriate alternative behaviors in their repertoires. In such cases, it would seem important to implement reinforcement-based procedures to teach socially acceptable replacement behaviors.

The use of DRO has several potential limitations that should be considered during treatment selection. DRO has been relatively less effective than other procedures in successfully treating serious challenging behavior, such as self-injurious behavior (Matson and LoVullo 2008). To the authors' knowledge, there is no experimental research examining DRO procedures in isolation to treat ISB.

Extinction

Three studies were identified that examined the effects of extinction on ISB for individuals with DD. Extinction is the process of eliminating a behavior by withholding the particular reinforcing consequences (Cooper et al. 2007). Many times, the primary function of ISB is to obtain sensory stimulation (i.e., the behavior is automatically maintained). In these situations, an extinction procedure to ISB by withdrawing sensory stimulation may be difficult to implement.

Moreover, in instances of automatically reinforced behavior in general, identifying and teaching replacement behaviors may not be feasible. That is, it is often difficult to determine the sensations that maintain a problem behavior; identifying replacement behaviors that provide the same sensory stimulation may be equally difficult. Even in situations in which socially appropriate replacement behaviors can be identified, social norms may prevent caregivers from teaching those behaviors. For example, if an individual uses unsafe behaviors during masturbation, it might be inappropriate for a professional to teach the individual an appropriate and safe method of masturbating. Similarly, while it may be more socially acceptable for a parent to teach such behaviors, many parents may find this very uncomfortable.

Dozier et al. (2011) used a sensory extinction procedure with an adult male diagnosed with ASD who engaged in pelvic thrusting on the floor near another person's feet. The results of an experimental functional analysis indicated that the behavior was maintained by automatic reinforcement. During intervention, an athletic protector was placed on the front of the participant's pants to decrease the degree of sensory stimulation obtained from thrusting. At the onset of intervention, the rate of ISB accelerated as the participant increased the force of pelvic thrusts, which presumably resulted in the desired sensory stimulation. After five sessions, the ISB returned to baseline levels. Next, an intervention package consisting of response interruption and time out from positive reinforcement was implemented, which eliminated ISB.

O'Reilly et al. (2006) examined the effects of an extinction procedure on the occurrence of self-touching exhibited by a 20-year-old male with DD. Initial results of the functional analysis identified that self-touching was maintained by access to attention as well as automatic reinforcement. In one intervention condition, pre-session access to attention was provided continuously for 15 min and ISB was measured during subsequent sessions. In the other intervention condition, the participant was not given pre-session access to attention.

Attention was withheld following ISB in both intervention conditions. Although neither condition eliminated the ISB, ISB was notably higher in conditions in which no access to the reinforcer was provided prior to extinction sessions.

Finally, as previously mentioned, Fisher et al. implemented extinction in conjunction with FCT to reduce public masturbation and additional challenging behaviors exhibited by a 19-year-old male.

The intent of extinction is to eliminate ISB; however, there is always the risk of extinction bursts (temporary increases in the rate of a behavior at the onset of an extinction period) or the emergence of new (and/or more intense) forms of challenging behaviors such as aggression (Cooper et al. 2007; Vollmer et al. 1993). Combining extinction with intervention strategies that teach socially appropriate alternative behaviors (e.g., communication, leisure skills) and/or function-based NCR may decrease the likelihood of an extinction burst, as some reinforcement is made available. In fact, it might be considered best practice to utilize a teaching component in which the child is taught a functionally equivalent replacement behavior in any treatment package consisting of extinction. In addition, extinction procedures are unethical when used in situations where challenging behavior is harmful to self or others, given that an extinction burst is possible. In such situations, an alternative procedure such as response interruption and redirection (e.g., Ahrens et al. 2011) may be a more reasonable and acceptable treatment option. Additional research is needed to evaluate the utility of extinction procedures in treating ISB, as the small number of current studies on the topic suggests that it may not be the most effective approach.

Punishment

Seven studies were identified that examined the effects of several different types of punishment procedures on ISB for individuals with DD, including restitution, time out, facial screening, physical blocking, and restraint. First, Polvinale and Lutzker (1980) used social restitution to repair damage and bring the environment to a condition better than it was prior to the behavior. Social restitution involved prompting the participant to apologize to at least six different individuals in his classroom following each occurrence of ISB, which was paired with the DRO procedures outlined earlier. Social restitution is considered a type of overcorrection, a positive punishment procedure.

Second, Durana and Curvo (1980) also used social restitution in conjunction with DRO with a woman with severe intellectual disability who engaged in public disrobing. The intervention included her restoring her surroundings that had been disturbed by her behavior and to improve the appearance of other residents (i.e., tying undone shoe laces). There were two phases to the study, the first of which was considered positive practice where she was prompted to wear extra clothing after an incident of disrobing for 30 min. The second phase of the study included dressing and undressing repeatedly, which was referred to as negative practice. The combination of DRO, restitution, and negative practice was found to significantly reduce her ISB as compared to other conditions.

Third, Hagopian et al. (2002) used time out from positive reinforcement in combination with NCR and DRA, as previously summarized. In this study, non-exclusionary time out included removing all reinforcing materials from the environment and not providing attention to the child's behavior until all ISB had subsided for 15 min. If the behaviors escalated to assault, he was placed in exclusionary time out until he did not display any ISB for 10 min. His ISB was eliminated as a result of this treatment package.

Fourth, Barnman and Murray (1981) used a different form of positive punishment, facial screening, with a 14-year-old non-ambulatory male diagnosed with an intellectual disability who publicly masturbated and displayed his genitals. When the participant engaged in ISB, the therapist, parent, teacher, or bus aid loosely pulled a terrycloth bib over his face for 30 s and verbally reprimanded him. This procedure eliminated his ISB and gains were sustained at follow-up 6 months later.

A fifth study by Magee and Ellis (2001) demonstrated the need for extreme caution and the importance of a functional behavior assessment when utilizing punishment approaches. The researchers implemented a restraint procedure when a 13-year-old male with Down syndrome attempted to inappropriately touch female teachers. Rather than reduce ISB, the use of restraint reinforced his attention seeking behavior and increased the frequency of ISB. The authors then implemented differential reinforcement and extinction procedures to reduce his ISB. Similarly, Fisher et al. (2000) also implemented a restraint procedure contingent upon problem behavior but quickly removed the procedure when it was determined that targeted behavior increased rather than decreased.

Finally, the seventh study by Dozier et al. (2011) successfully used physical blocking with an adult male who lay prone and gyrated on the floor near a woman wearing sandals. Response interruption, in which a strap on his backpack was pulled to move him into a standing position, was used in combination with 1-min non-exclusionary time out each time he attempted to engage in ISB, which successfully eliminated the behavior. The intervention was implemented in the presence of a single woman but was observed to generalize to other settings and other women.

As these studies indicate, punishment has been used successfully in treating ISB; however, if these procedures are used, it is essential they be used along with reinforcement-based procedures for teaching socially appropriate behavior (Cooper et al. 2007). Extreme caution should be exercised in

using any punishment procedure. There are many potential negative consequences when implementing a punishment procedure that should be considered. First, the use of punishment may condition the caregiver as an aversive stimulus, leading the individual to avoid interaction with the caregiver (Jacob-Timm 1996). Second, punishment may lead to increased aggressive behavior and emotional responses from the individual (Mayhew and Harris 1978). Third, punishment may lead to injury. For example, the use of physical and mechanical restraint as a form of punishment could lead to injury to the individual or his caretaker (Jacob-Timm 1996). Finally, practitioners implementing punishment procedures should take precautions to ensure accurate identification of the consequences maintaining the ISB through ongoing data collection, as some procedures intended to serve as punishment may actually reinforce ISB (e.g., Magee and Ellis 2001). Completing a functional behavior analysis prior to the implementation of a punishment procedure may provide the practitioner with information to reduce the risk of unintentional reinforcement. For example, if ISB is determined as being maintained by escape, then the practitioner would not implement a time out from positive reinforcement procedure.

Perhaps the most important consideration before selecting punishment as an intervention is that individuals have a right to a therapeutic environment. A therapeutic environment is safe, humane, enjoyable, and instructive (Van Houten et al. 1988). Moreover, punishment only reduces a maladaptive behavior; it does not teach or strengthen adaptive behaviors, which would be critical in a comprehensive treatment plan.

A Clinical Model for Treatment

This review has identified a number of treatment options to address ISB in persons with DD. Each identified treatment is associated with strengths and weaknesses. Moreover, it is unlikely that the current literature has exhausted potential behavior analytic treatments with potential success for reducing ISB.

A notable trend among the existing literature is that ISBs are not only responsive to a broad range of ABA-based treatments but also that ISBs are in fact operant behaviors and will respond to behavior analytic treatment similar to any other topography of behavior. Therefore, a clinical model for treatment of ISB should not differ from a model to treat any challenging topography of behavior.

The first recommended step of the treatment of ISB is identification of the function(s) of ISB via a thorough functional behavior assessment. Individualized treatment often requires identification of the contingencies maintaining a problem behavior. Once an ISB function(s) is identified, several function-based interventions can be implemented, such as extinction, DRA, or NCR.

In some instances, a functional behavior assessment may not be feasible as a first step. This may be due to the severity of the behavior in that treatment cannot be delayed, the infrequency of the behavior, or contextual influences of the behavior (e.g., the behavior is only displayed at a specific public location). In instances in which a functional behavior assessment is not feasible or treatment is needed during the time in which the functional behavior assessment is being conducted, non-function-based interventions should be implemented. One such option is a DRO. However, the current literature provides evidence that ISBs are maintained by a range of reinforcers; therefore, identification of the maintaining reinforcer can only serve to better individualize a treatment plan.

The current literature provides evidence of the success of a variety of interventions for socially mediated ISB, including DRA (e.g., Cihak et al. 2007; Fisher, W. W et al. 2000; Hagopian, L. P et al. 2002; Najdowski et al. 2008), manipulation of motivating operations (e.g., O'Reilly et al. 2006), extinction (e.g., Dozier et al. 2011; O'Reilly et al. 2006), NCR (e.g., Hagopian, L. P et al. 2002), and instructional revisions (Carlson et al. 2008; Cihak et al. 2007; Sprague and Horner 1992). While some interventions have been evaluated only with specific functions maintaining ISB (e.g., the manipulation of motivating operations has not yet been studied with escape-maintained ISB), this should not preclude future clinicians from considering all of the aforementioned interventions to treat ISB as they have a history of evidence of effectiveness with reducing a variety of challenging behaviors and there is no reason to believe that ISB would not respond to such treatment in a similar fashion. Similarly, other well-documented behavior reduction or replacement techniques have yet to be studied to reduce ISB, yet it is quite likely such interventions would be successful if correctly implemented to reduce ISB.

The current literature also provides support interventions for automatically maintained ISB. These include DRO (e.g., Durana and Curov 1980; Polvinale and Lutzker 1980) and sensory extinction (e.g., Dozier et al. 2011; O'Reilly et al. 2006). Likewise, clinicians should not limit themselves to these two treatment choices as it is likely any behavior analytic intervention with evidence of effectiveness to reduce other topographies of challenging behavior would likely be effective with ISB as well. Previous research supports the use of noncontingent reinforcement via reinforcement of preferred object manipulation to decrease other topographies of automatically maintained challenging behavior (Britton et al. 2002; Lindberg et al. 2003). Antecedent manipulations, specifically environmental enrichment, have demonstrated success in the reduction of automatically maintained problem behavior as well (Piazza et al. 2000; Rapp and Vollmer, 2005; Vollmer et al. 1994). The availability of preferred stimuli may indirectly compete with the reinforcement provided by automatically maintained ISB, thereby reducing the frequency of ISB. Response interruption and redirection

(RIRD) to incompatible behavior offers another potential efficacy intervention choice (see Martinez and Betz 2013 for a review). For more information on the treatment of automatically maintained behavior among individuals with developmental disabilities, see Vollmer (1994).

Though research addressing ISB through punishment procedures (e.g., Barnman, B. C and Murray 1981; Dozier et al. 2011; Durana and Curov 1980; Fisher, W. W et al. 2000; Hagopian, L. P et al. 2002; Magee and Ellis 2001; Polvinale and Lutzker 1980) was evident in this review, it is strongly recommended that function-based, reinforcement treatment approaches are attempted prior to implementing a punishment procedure. The aforementioned drawbacks of punishment procedures should be strongly considered before punishment procedures are considered a viable treatment option.

Finally, clinicians should also consider the individual needs of the client when implementing a treatment plan. Although this summary of current research and treatment model strives to take into consideration characteristics of the individual and behavior, it in no way represents an exhaustive consideration of all factors that affect treatment selection. Other considerations should be made, including the ability of the provider to implement a program with integrity, preferences of the client, and the preferences of the caregiver and practitioner. Practitioners should also take into consideration that treatment packages should consist of multiple interventions as treatment selection rarely follows a truly linear pattern. Moreover, practitioners should incorporate age-appropriate sexual education into long-term treatment plans to prevent ISB associated with knowledge and skill deficits. Sexuality Information and Education Council of the United States (SIECUS) and the National Secondary Transition Technical Assistance Center both provide a list of resources, including sex education curricula for individuals with intellectual and developmental disabilities (NSTTAC 2015; SIECUS 2015).

Conclusion

Treating ISB for individuals with DD presents many challenges, but current research provides evidence that behavioral treatment can successfully reduce or eliminate such challenging behavior. Although the number of studies conducted on this topic is relatively low, they examine several treatment options. Clearly, additional research would benefit practitioners by providing more evidence of the effectiveness of these treatments across participant characteristics, behaviors, and settings. The present paper provides a summary of current research, identifies treatments that have a modicum of evidence supporting their potential efficacy, and assists practitioners in selection of an appropriate treatment based on a number of variables. Due to the limited state of available research, it is possible that additional behavioral treatments will be successful in addressing the ISB of individuals with DD.

Because of the sensitive nature of ISB, treatment these behaviors involves unique ethical challenges. The first is a long-standing societal perception of individuals with developmental disabilities as not being capable or deserving of the right to develop a healthy sexuality, perhaps due to cognitive and social impairments or disability-related stereotypes (Sullivan and Caterino 2008). However, many individuals with developmental disabilities experience typical physical, emotional, physiological, and sexual changes during puberty and reach typical sexual maturity. Today, many practitioners and caregivers now believe that individuals with developmental disabilities have the same basic right to safe and healthy sexual experiences as other individuals (Sullivan and Caterino 2008). Nonetheless, such rights require careful preparation to ensure safe sexual practices. In fact, research demonstrates that individuals with disabilities have a disproportionally high risk for engaging in risky sexual behavior and being sexually victimized (Ballan 2012). Ensuring safe sexual health encompasses treatment beyond the scope of this review, such as sex education curriculum, contraception education, and social skills education specific to romantic and sexual relationships (Tullis and Zangrillo 2013). However, developing healthy sexual behavior includes reducing inappropriate sexual behaviors and, often, replacing those with healthy and appropriate sexual behaviors (e.g., replacing public masturbation with private masturbation). It is highly important the practitioners strive not to eliminate healthy sexual behaviors from an individual's repertoire but assist in building or maintaining healthy sexual behavior while eliminating ISB.

The second ethical challenge involves providing effective treatment. The Behavior Analysis Certification Board's (BACB) Guidelines to Responsible Conduct for Behavior Analysts includes several guidelines that are particularly relevant to the treatment of ISB. Additionally, Guideline 1.05, *Professional and Scientific Relationships*, is germane to this discussion (BACB 2013; Bailey and Burch 2011). Observing, recording, and/or discussing sexual behavior is not typical of professional relationships but may be necessary in the treatment of ISB. Therefore, treatment of ISB can be uncomfortable for all parties involved. The practitioner is challenged to ensure that all parties involved understand and abide by the rules outlined for professional relationships and in no way feel demeaned during the treatment process. Moreover, Guideline 1.05 requires that behavior analysts do not discriminate against individuals based on bias, including sexual orientation nor allow personal conflicts to interfere with effective treatment. Sexual behavior can be a controversial topic with religious and cultural factors influencing what one perceives as appropriate and healthy. Behavior analysts must be careful to analyze if his or her personal views or biases may affect the ability to provide effective treatment. While many ISBs

markedly violate societal norms that most individuals would consider them inappropriate (e.g., public disrobing would be deemed inappropriate by most individuals), alternative healthy sexual behaviors may not have such consensus.

Due to the sensitive nature of ISB, as well as the complexity in assessing behavior, selecting an appropriate treatment, and implementing procedures with fidelity, we strongly recommend that a Board-Certified Behavior Analyst (BCBA) supervise all aspects of the intervention. Additionally, the BCBA should have relevant experience working with individuals with the specific disability of interest, implementing the particular intervention for ISB, and/or changing the targeted ISB. Moreover, the BCBA should have a working knowledge of human sexuality and relevant research. In fact, such issues are addressed in the Behavior Analyst Certification Board's Guidelines for Responsible Conduct for Behavior Analysts (Bailey and Burch 2011). Seeking out multiple sources of expertise is critical to ensure the safety of all involved parties. These sources may also include professionals outside of behavior analysis, such as medical professionals who may be necessary to holistically treat all factors influencing ISB.

Future research is necessary to further explore ethical and effective treatments to reduce ISB. Reduction of ISB could result in powerful life-changing opportunities for individuals with intellectual and developmental disabilities. While practitioners may feel a sense of relief in the fact that ISBs operate as all other operant behaviors and therefore should respond similarly to all well-established behavior reduction or replacement techniques, caution should be exercised to ensure that such behaviors are addressed ethically.

References

*Identify the studies included in the review

Ahrens, E. N., Lerman, D. C., Kodak, T., Worsdell, A. S., & Keegan, C. (2011). Further evaluation of response interruption and redirection as treatment for stereotypy. *Journal of Applied Behavior Analysis, 44*, 95–108. doi:10.1901/jaba.2011.44-95.

Athens, E. S., & Vollmer, T. R. (2010). An investigation of differential reinforcement of alternative behavior without extinction. *Journal of Applied Behavior Analysis, 43*, 569–589. doi:10.1901/jaba.2010.43-569.

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1*, 91–97.

Bailey, J., & Burch, M. (2011). *Ethics for behavior analysts*. New York, NY: Routledge.

Ballan, M. S. (2012). Parental perspectives of communication about sexuality in families of children with autism spectrum disorders. *Journal of Autism Developmental Disorders, 42*, 676–684.

*Barnman, B. C. & Murray, W. J. (1981). Suppression of inappropriate behavior by facial screening. *Behavior Therapy, 12*, 730–735. doi:10.1016/S0005-7894(81)80145-1

Behavior Analysis Certification Board. (2013). Guidelines for responsible conduct for behavior analysts. Retrieved from: http://www.bacb.com/Downloadfiles/BACBguidelines/BACB_Conduct_Guidelines.pdf

Blanchett, W. J., & Wolfe, P. S. (2002). A review of sexuality education curricula: meeting the sexuality needs of individuals with moderate and severe intellectual disabilities. *Research and Practice for Persons with Severe Disabilities, 27*, 43–57.

Bliel Walters, J., Hughes, T. L., Sutton, L. R., Marshall, S. N., Crothers, L. M., Lehman, C., Paserba, D., Talkington, V., Taormina, R., & Huang, A. (2013). Maltreatment and depression in adolescent sexual offenders with an autism spectrum disorder. *Journal of Child Sexual Abuse, 22*, 72–89.

Bloom, S. E., Iwata, B. A., Fritz, J. N., Roscoe, E. M., & Carreau, A. B. (2011). Classroom application of a trial-based functional analysis. *Journal of Applied Behavior Analysis, 44*, 19–31. doi:10.1901/jaba.2011.44-19.

Britton, L. N., Carr, J. E., Landaburu, H. J., & Romick, K. S. (2002). The efficacy on noncontingent reinforcement as treatment for automatically reinforced stereotypy. *Behavioral Interventions, 17*, 93–103.

Carlson, J. I., Luiselli, J. K., Slyman, A., & Markowski, A. (2008). Choice-making as intervention for public disrobing in children with developmental disabilities. *Journal of Positive Behavior Interventions, 10*(2), 86–90. doi:10.1177/1098300707312544.

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18*, 111–126.

Cihak, D., Alberto, P. A., & Fredrick, L. D. (2007). Use of brief functional analysis and intervention evaluation in public settings. *Journal of Positive Behavior Interventions, 9*, 80–93. doi:10.1177/10983007070090020501.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Craig, L. A., Stringer, I., & Moss, T. (2006). Treating sexual offenders with learning disabilities in the community: a critical review. *International Journal of Offender Therapy and Comparative Criminology, 50*(4), 369–390. doi:10.1177/0306624X05283529.

Davies, S. L., Glasser, D., & Kossoff, R. (2000). Children's sexual play and behavior in pre-school settings: staff's perceptions, reports, and responses. *Child Abuse & Neglect, 24*, 1329–1343.

Dozier, C. L., Iwata, B. A., & Worsdell, A. S. (2011). Assessment and treatment of foot-shoe fetish displayed by a man with autism. *Journal of Applied Behavior Analysis, 44*(1), 133–137. doi:10.1901/jaba.2011.44-133.

Ducharme, J. M., & Rushford, N. (2001). Proximal and distal effects of play on child compliance with a brain-injured parent. *Journal of Applied Behavior Analysis, 34*, 221–224. doi:10.190/jaba.2001.34-221.

Dunlap, G., & Kern, L. (1996). Modifying instructional activities to promote desirable behavior: a conceptual and practical framework. *School Psychology Quarterly, 11*, 297–312.

Durana, I. L., & Curov, A. J. (1980). A comparison of procedures for decreasing public disrobing of an institutionalized profoundly mentally retarded woman. *Mental Retardation, 18*(4), 185–188.

Early, M. C., Erickson, C. A., Wink, L. K., McDougle, C. J., & Scott, E. L. (2012). Case report: 16-year-old male with autistic disorder with preoccupation with female feet. *Journal of Autism and Developmental Disabilities, 42*, 1133–1137. doi:10.1007/s10803-011-1340-8.

*Fisher, W. W., Tompson, R. H., Hagopian, L. P., Bowman, L. G., & Krug, A. (2000). Facilitating tolerance of delayed reinforcement during functional communication training. *Behavior Modification, 24*, 3–29. doi: 10.1177/0145445500241001

*Hagopian, L. P., Rush, K. S., Richman, D. M., Kurtz, P. F., Contrucci, S. A., & Crosland, K. (2002). The development and application of individualized levels systems for the treatment of problem behavior. *Behavior Therapy, 33*, 65–86. doi: 10.1016/S0005-7894(02)80006-5

Hanley, G. P., & Tiger, J. H. (2011). Differential reinforcement procedures. In W. W. Fisher, C. C. Piazza, & H. S. Roane (Eds.), *Handbook of applied behavior analysis* (pp. 229–249). New York, NY: Guilford Press.

Horner, R. H., & Day, H. M. (1991). The effects of response efficiency on functionally equivalent competing behaviors. *Journal of Applied Behavior Analysis, 24*, 719–732. doi:10.1901/jaba.1991.24-719.

Hurley, A. D., & Sovner, R. (1983). Treatment of sexual deviation in mentally retarded persons. *Psychiatric Aspects of Mental Retardation Newsletter, 2*(4), 13–16.

Individuals with Disabilities Education Improvement Act of 2004. 20 U.S.C. § 1400 et seq. (2004).

Jackson, S. (1982). *Childhood and sexuality*. Oxford: Blackwell.

Jacob-Timm, S. (1996). Ethical and legal issues associated with the use of aversives in the public schools: the SIBIS controversy. *School Psychology Review, 25*, 184–198.

Johnson, T. C. (1993). Assessment of sexual behavior problems in preschool and latency-aged children. In A. Yates (Ed.), *Child and adolescent psychiatric clinics of North America: sexual and gender disorders* (Vol. 2, pp. 431–450). Philadelphia: W. B. Saunders.

Johnson, T. C., & Aoki, W. T. (1993). Sexual behaviors of latency aged children in residential care. *Residential Treatment for Children and Youth, 11*, 1–22.

Lakey, J. (1994). The profile and treatment of male adolescent sex offenders. *Adolescence, 29*, 755–761.

Laraway, S., Snycerski, S., Michael, J., & Poling, A. (2003). Motivating operations and terms to describe them: some further refinements. *Journal of Applied Behavior Analysis, 36*, 407–414. doi:10.1901/jaba.2003.36-407.

Lennox, D. B., Miltenberger, R. G., Spengler, P., & Erfanian, N. (1988). Decelerative treatment practices with persons who have mental retardation: a review of five years of the literature. *American Journal on Mental Retardation, 92*, 492–501.

Lindberg, J. S., Iwata, B. A., Roscoe, E. M., Worsdell, A. S., & Hanley, G. P. (2003). Treatment efficacy of noncontingent reinforcement during brief and extended application. *Journal of Applied Behavior Analysis, 36*, 1–19.

Lindsay, W. R., Olley, S., Baillie, N., & Smith, A. H. W. (1999). Treatment of adolescent sex offenders with intellectual disabilities. *Mental Retardation, 37*(3), 201–211. doi:10.1352/0047-6765(1999)037<0201:TOASOW>2.0.CO;2.

Love, J. R., Carr, J. E., & LeBlanc, L. A. (2009). Functional assessment of problem behavior in children with autism spectrum disorders: a summary of 32 outpatient cases. *Journal of Autism and Developmental Disorders, 39*, 363–372. doi:10.1007/s10803-008-0633-z.

Luiselli, J. K., Helfen, C. S., Pemberton, B. W., & Reisman, J. (1977). The elimination of a child's in-class masturbation, by overcorrection and reinforcement. *Journal of Behavior Therapy and Experimental Psychiatry, 8*(2), 201–204. doi:10.1007/s11195-006-9016-6.

Lund, C. A. (1992). Long-term treatment of sexual behavior problems in adolescent and adult developmentally disabled persons. *Annals of Sex Research, 5*, 5–31. doi:10.1177/107906329200500101.

Lundervold, D., & Bourland, G. (1987). Behavioral treatment of bisexual aggression of an adult with developmental disabilities. *Sexuality and Disability, 8*(4), 216–220. doi:10.1007/BF01101968.

Lutzker, J. R. (1974). Social reinforcement control of exhibitionism in a profoundly retarded adult. *Mental Retardation, 12*(5), 46–47.

Magee, S. K., & Ellis, J. (2001). The detrimental effects of physical restraint as a consequence for inappropriate classroom behavior. *Journal of Applied Behavior Analysis, 34*, 501–504. doi:10.1901/jaba.2001.34-501.

Martinez, C. K., & Betz, A. (2013). Response interruption and redirection: current research trends and clinical application. *Journal of Applied Behavior Analysis, 46*, 1–6.

Matson, J. L., & LoVullo, S. V. (2008). A review of behavioral treatments for self-injurious behaviors of persons with autism spectrum disorders. *Behavior Modification, 32*, 61–76. doi:10.1177/0145445507304581.

Mayhew, G. L., & Harris, F. C. (1978). Some negative side effects of a punishment for stereotyped behavior. *Journal of Behavior Therapy and Experimental Psychiatry, 9*, 245–251.

Michael, J. (1982). Distinguishing between discriminative and motivational functions of stimuli. *Journal of Experimental Analysis of Behavior, 37*, 149–155. doi:10.1901/jeab.1982.37-149.

Michael, J. (2000). Implications and refinements of the establishing operation concept. *Journal of Applied Behavior Analysis, 33*, 401–410. doi:10.1901/jaba.2000.33-401.

Money, J., & Annecillo, C. (1991). Paraphilia as a sexual disability: outcome study in a female with a history of the Kaspar Hauser dwarfism syndrome. *Sexuality and Disability, 9*(4), 297–309. doi:10.1007/BF01102018.

Myers, B. (1991). Treatment of sexual offenses by persons with developmental disabilities. *American Journal of Mental Retardation, 95*, 563–569.

Najdowski, A. C., Wallace, M. D., Ellsworth, C., MacAleese, A. N., & Cleveland, J. M. (2008). Functional analyses and treatment of precursor behavior. *Journal of Applied Behavior Analysis, 41*, 97–105. doi:10.1901/jaba.2008.41-97.

National Secondary Transition Technical Assistance Center. (2015). Sexuality and individuals with disabilities annotated bibliography. Retrieved from: http://nsttac.org/content/sexuality-and-individuals-disabilities-annotated-bibliography.

O'Reilly, M. F., Sigafoos, J., Edrisinha, C., Lancioni, G., Cannella, H., Choi, H. Y., & Barretto, A. (2006). A preliminary examination of the evocative effects of the establishing operation. *Journal of Applied Behavior Analysis, 39*(2), 239–242. doi:10.1901/jaba.2006.160-04.

Piazza, C. C., Adelinis, J. D., Hanley, G. P., Goh, H. L., & Delia, M. D. (2000). An evaluation of the effects of matched stimuli on behaviors maintained by automatic reinforcement. *Journal of Applied Behavior Analysis, 33*, 13–27.

Polvinale, R. A., & Lutzker, J. R. (1980). Elimination of assaultive and inappropriate sexual behavior by reinforcement and social-restitution. *Mental Retardation, 18*(1), 27–30.

Pritchard, D., Graham, N., Ikin, A., Penney, H., Kovacs, L., Mercer, D., Edwards, R., Jones, D., & Mace, F. C. (2011). Managing sexually harmful behaviour in a residential special school. *British Journal of Learning Disabilities, 40*, 302–309. doi:10.1111/j.1468-3156.2011.00712.x.

Rapp, J. T., & Vollmer, T. R. (2005). Stereotypy I: A review of behavioral assessment and treatment. *Research in Developmental Disabilities*, 527–547.

Ruble, L. A., & Dalrymple, N. J. (1993). Social/sexual awareness of persons with autism: a parental perspective. *Archives of Sexual Behavior, 22*, 229–40. doi:10.1007/BF01541768.

Sailor, W., Guess, D., Rutherford, G., & Baer, D. M. (1968). Control of tantrum behavior by operant techniques during experimental verbal training. *Journal of Applied Behavior Analysis, 1*, 237–243. doi:10.1901/jaba.1968.1-237.

Sandnabba, N. K., Santtila, P., Wannas, M., & Krook, K. (2003). Age and gender specific sexual behavior in children. *Child Abuse & Neglect, 27*, 579–605.

Sexuality Information and Education Council of the United States. (2015). Educator resources: curriculum bibliography. Retrieved from: http://www.sexedlibrary.net/index.cfm?pageId=778

Singh, G., & Coffey, B. J. (2012). Sexual obsessions, compulsions, suicidality and homicidality in an adolescent diagnosed with bipolar disorder not otherwise specified, obsessive-

compulsive disorder, pervasive developmental disorder not otherwise specified, and mild mental retardation. *Journal of Child and Adolescent Psychopharmacology, 22*(3), 250–253. doi:10.1089/cap.2012.2234.

*Sprague, J. R., Holland, K., & Thomas, K. (1997). The effect of noncontingent sensory reinforcement, contingent sensory reinforcement, and response interruption on stereotypical and self-injurious behavior. *Research in Developmental Disabilities, 18*, 61–77. doi:10.1016/S0891-4222(96)00038-8

Sprague, J. R., & Horner, R. H. (1992). Covariation within functional response classes: implications for the treatment of severe problem behavior. *Journal of Applied Behavior Analysis, 25*, 735–745. doi:10.1901/jaba.1992.25-735.

Stokes, M., Newton, N., & Kaur, A. (2007). Stalking, and social and romantic functioning among adolescents and adults with autism spectrum disorder. *Journal of Autism and Developmental Disabilities, 37*, 1969–1986. doi:10.1007/s10803-006-0344-2.

Sullivan, A., & Caterino, L. C. (2008). Addressing the sexuality and sex education of individuals with autism spectrum disorders. *Education and Treatment of Children, 31*(3), 381–394.

Tarnai, B. (2006). Review of effective interventions for socially inappropriate masturbation in persons with cognitive disabilities. *Sexuality and Disability, 24*, 151–168. doi:10.1007/s11195-006-9016-6.

Tullis, C. A., & Zangrillo, A. N. (2013). Sexuality education for adolescents and adults with autism spectrum disorders. *Psychology in the Schools, 50*, 866–875. doi:10.1002/pits.21713.

Van Houten, R., Axelrod, S., Bailey, J. S., Favell, J. E., Foxx, R. N., Iwata, B. A., et al. (1988). The right to effective behavioral treatment. *The Behavior Analyst, 11*, 111–114.

Volkert, V. M., Lerman, D. C., Call, N. A., & Trosclair-Lasserre, N. (2009). An evaluation of resurgence during treatment with functional communication training. *Journal of Applied Behavior Analysis, 42*, 145–160. doi:10.1901/jaba.2009.42-145.

Volkmar, F. R., & Wolf, J. M. (2013). When children with autism become adults. *World Psychology, 12*, 79–80.

Vollmer, T. R. (1994). The concept of automatic reinforcement: implications for behavioral research in developmental disabilities. *Research in Developmental Disabilities, 15*, 187–207.

Vollmer, T. R., & Iwata, B. A. (1991). Establishing operations and reinforcement effects. *Journal of Applied Behavior Analysis, 24*, 279–291. doi:10.1901/jaba.1991.24-279.

Vollmer, T. R., & Iwata, B. A. (1992). Differential reinforcement as treatment for behavior disorders: procedural and functional variations. *Research in Developmental Disabilities, 13*, 393–417. doi:10.1016/0891-4222(92)90013-V.

Vollmer, T. R., Iwata, B. A., Zarcone, J. R., Smith, R. G., & Mazaleski, J. L. (1993). The role of attention in the treatment of attention-maintained self-injurious behavior: noncontingent reinforcement and differential reinforcement of other behavior. *Journal of Applied Behavior Analysis, 26*, 9–21.

Vollmer, T. R., Marcus, B. A., & LeBlanc, L. (1994). Treatment of self-injury and hand mouthing following inconclusive functional analyses. *Journal of Applied Behavior Analysis, 27*, 331–344.

Walton, K., & Ingersoll, B. (2013). Improving social skills in adolescents and adults with autism and severe to profound intellectual disability: a review of the literature. *Journal of Autism & Developmental Disorders, 43*(3), 594–615. doi:10.1007/s10803-012-1601-1.

Ward, K. M., Trigler, J. S., & Pfeiffer, K. T. (2001). Community services, issues, and service gaps for individuals with developmental disabilities who exhibit inappropriate sexual behaviors. *Mental Retardation, 39*(1), 11–19. doi:10.1352/0047-6765(2001)039<0011:CSIASG>2.0.CO;2.

Wheeler, J. J., Baggett, B. A., Fox, J., & Blevins, L. (2006). Treatment integrity: a review of the intervention studies conducted with children with autism. *Focus on Autism and Other Developmental Disabilities, 21*, 45–54.

Widermannova, L., & Strnad, M. (1963). An interesting case of sexual deviation in a mental defective. *Ceskoslovenská Psychiatrie, 59*, 176–181.

Yates, P. M. (2013). Treatment of sexual offenders: research, best practices, and emerging models. *International Journal of Behavioral Consultation and Therapy, 8*, 89–95.