



# Effects of Snoezelen room, Activities of Daily Living skills training, and Vocational skills training on aggression and self-injury by adults with mental retardation and mental illness

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## Abstract

Multi-sensory stimulation provided in a Snoezelen room is being used increasingly for individuals with mental retardation and mental illness to facilitate relaxation, provide enjoyment, and inhibit behavioral challenges. We observed aggressive and self-injurious behavior in three groups of 15 individuals with severe or profound mental retardation and mental illness before, during, and after being in a Snoezelen room. All participants were receiving psychotropic medication for their mental illness and function-derived behavioral interventions for aggression, self-injury, or both. Using a repeated measures counter-balanced design, each group of participants was rotated through three experimental conditions: Activities of Daily Living (ADL) skills training, Snoezelen, and Vocational skills training. All other treatment and training activities specified in each individual's person-centered plan were continued during the 10-week observational period. Both aggression and self-injury were lowest when the individuals were in a Snoezelen room,

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followed by Vocational skills training and ADL skills training. The levels in the Snoezelen room were significantly lower than in both the other conditions for aggression but only in ADL skills training for self-injury. The difference in levels before and after Snoezelen were statistically significant with self-injury but not with aggression. The order of conditions showed no significant effect on either behavior. Snoezelen may provide an effective context for reducing the occurrence of self-injury and aggression.

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## 1. Introduction

Snoezelen rooms are multi-sensory environments that are often used to improve the behavior and quality of life of individuals with mental retardation and mental illness (Hogg, Cavet, Lambe, & Smeddle, 2001; Lancioni, Cuvo, & O'Reilly, 2002; Stephenson, 2002). Typically, they provide various technical and instrumental resources that offer multiple stimulation opportunities, in separate rooms or different areas of a large room. The stimulation is believed to promote a sense of enjoyment and a relief from tension and pressure, with consequent improvement in general behavior (Haggart & Hutchinson, 1991; Lindsay, Black, Broxholme, Pitcaithly, & Hornsby, 2001; Mount & Cavet, 1995; Pagliano, 1999). Interest in and acceptance of this type of approach has increased during the last decade. It is not surprising that staff who work with individuals with severe or profound mental retardation accept this approach, given the difficulties encountered in improving the overall quality of life of these individuals and the widely-held notion that Snoezelen is a highly pleasurable and humane environment that could be very beneficial for them (Lancioni et al., 2002; Matson, Bamburg, & Smalls, 2004; Stephenson, 2002).

The growing interest and acceptance of Snoezelen rooms have been accompanied by a number of research efforts to formally assess their effects. In two recent literature reviews, 14 studies were identified that assessed the effects of Snoezelen rooms on the behavior of individuals with developmental disabilities (Hogg et al., 2001; Lancioni et al., 2002). A number of these studies reported positive effects on socially adaptive and maladaptive behavior of the participants while they were in the Snoezelen room (e.g., Cuvo, May, & Post, 2001; Fagny, 2000; Kenyon & Hong, 1998; Shapiro, Parush, Green, & Roth, 1997), but carryover of these positive effects to other settings was limited (Ashby, Lindsay, Pitcaithly, Broxholme, & Geelen, 1995; Cuvo et al., 2001; Houghton et al., 1998; Lindsay et al., 1997).

In two recent controlled studies, Cuvo et al. (2001) evaluated the effects of a Snoezelen room on stereotypy and positive engagement by three adults with profound mental retardation. In the first study, stereotypy and engagement of the individuals were observed in their living room before and after being in the Snoezelen room. Although the individuals' stereotypy decreased and engagement increased while in the Snoezelen room, these effects were not maintained in their

living room. In the second study, the same individuals and target behaviors were compared across three settings: outdoor activity, Snoezelen room, and living room. Positive effects were greatest in the outdoor condition, less in the Snoezelen room and least in the living room.

Overall, research findings on the Snoezelen room might be considered relatively encouraging, particularly in terms of increasing enjoyment and decreasing maladaptive or challenging behaviors while in the room. However, a number of methodological questions preclude drawing firm conclusions about the extent of the impact of Snoezelen rooms. For example, the positive results reported in some studies were based largely on qualitative data, such as post-session ratings, diary cards completed retrospectively, and staff interviews (De Bunsen, 1994; Hutchinson & Hagggar, 1991). In other studies, the Snoezelen sessions differed from control sessions, not only in terms of the target stimulation, but also in terms of the staff-to-client ratio (see Lancioni et al., 2002). Several studies involved a relatively small number of Snoezelen sessions, or few participants, preventing strong conclusions being drawn from the data (e.g., De Bunsen, 1994; Fagny, 2000; Shapiro et al., 1997; Van Lankveld, 1992). In other studies, the effects of Snoezelen could not be assessed because it was used as a part of an intervention package (e.g., Withers & Ensum, 1995).

Another concern with many studies is the lack of specification of the behaviors being monitored. For example, De Bunsen (1994) reported a decrease in challenging behaviors that included undefined self-abusive behaviors and aggression. Fagny (2000) reported decreased aggression during and following Snoezelen sessions but the term “aggression” included self-injury, aggression toward people, and destruction of objects. Kenyon and Hong (1998) reported that challenging behaviors decreased by 87% during Snoezelen but did not define these behaviors. Martin, Gaffan, and Williams (1998) reported no effects of Snoezelen on undefined self-injury and aggression.

Both Hogg et al. (2001) and Lancioni et al. (2002) have noted that the dearth of well-controlled studies necessitates further research into the effects of Snoezelen on the behavior of individuals with developmental disabilities. Such research could help to both extend the knowledge of these individuals and clarify the impact of a Snoezelen room on their maladaptive behaviors. In the present study, we undertook naturalistic observations of aggression and self-injury exhibited by adults with mental retardation and mental illness in three different conditions: Snoezelen, ADL skills training, and Vocational skills training.

## 2. Method

### 2.1. Participants

The participants were residents in a facility for individuals with developmental disabilities. From a total sample of 135 adults who exhibited aggression, self-injury or both, 45 were randomly chosen for observation and assigned to one of

three groups of 15. The first group included 10 males and 5 females aged 23–54 ( $M = 39.7$ ) years. The second group included 11 males and 4 females aged 30–57 ( $M = 45.3$ ) years. The third group included 10 males and 5 females aged 22–57 ( $M = 40.5$ ) years. All participants had severe or profound mental retardation and Axis I disorders (e.g., schizophrenia, psychotic disorder, schizoaffective disorder, major depressive disorder, adjustment disorder, obsessive–compulsive disorder). Further, all participants were on psychotropic medication for their psychiatric disorder and function-derived behavioral interventions for their aggression or self-injury. Both types of intervention were held constant during the course of this study.

## 2.2. Settings

Two Snoezelen rooms, both situated in a central building on the campus of a developmental center, were used. Each room measured about 7 m  $\times$  7 m and contained an array of multi-sensory equipment that provided stimuli in several modes: olfactory (e.g., aromatherapy diffuser and assorted scents, scented magic markers), vibratory and tactile (e.g., assorted vibrators and body massagers, somatron bean bag with vibrations synchronized to music), auditory (e.g., electronic nature sounds generator, complete Bos stereo system), and visual (e.g., laser light show devices, rotating disco balls, interactive light panels with mirrors, interactive fiber optic fountain, fiber optic curtains). In addition, there were a number of rockers (vestibulator swing devices with bolster swings, net swings, and tumble form sitters), beds, and mats. The floors were carpeted, the walls were painted in various luminescent colors, and music played softly in the background.

Other rooms of about 7 m  $\times$  7 m, in the same building, were used for the Activities of Daily Living (ADL) and Vocational skills training programs.

## 2.3. Procedure

A 10-week observational study was conducted, using a repeated measures counterbalanced design. Each week-day between 9.00 a.m. and 12 noon, the three groups spent 1 hr in each of the following conditions: A = ADL skills training, B = Snoezelen room, and C = Vocational skills training. The sequence for each group varied according to a modified Latin-square design. Group 1 participants received an ABC sequence: skills training in the ADL room during the first hour, Snoezelen room during the second hour, and skills training in the Vocational room during the third hour. Participants in the second group had a BCA sequence (Snoezelen room, Vocational skills training, ADL training), and participants in the third group a CAB sequence (Vocational skills training, ADL skills training, Snoezelen room). No participant ever repeated a given activity in any one morning.

## 2.4. Dependent variables

The dependent variables were aggressive acts and self-injurious behaviors; these varied in topography across the 45 participants. Aggressive acts were

defined as kicking, punching, hitting, and slapping others. Self-injury was defined as biting or slapping oneself on any body part, and head banging.

### 2.5. Data collection and reliability

A total of 45 care staff members were trained as observers. Training continued until inter-observer reliability agreements between randomly chosen pairs of observers reached at least 80% for five consecutive observation sessions. Five primary observers collected the data during each session for each group, and an additional observer served as a reliability observer. A new group of six observers per group collected the data each hour. Each primary observer was responsible for observing three participants consecutively, once during each minute. The observer watched one participant for 15 s, recording the occurrence or non-occurrence of the target behaviors in the next 5 s, then repeated this procedure with a second participant and then with the third participant. This 1-min sequence of observations was repeated for the rest of the session. The mean inter-rater agreement among randomly selected pairs of primary and secondary observers across the study conditions was 93% (range = 85–100%) for aggression and 87% (range = 79–97%) for self-injury.

## 3. Results

Aggressive behaviors and self-injurious behaviors were analyzed separately. First, the occurrence of a behavior was compared across the three treatment conditions, using a one-way ANOVA. Fisher's LSD tests were performed following a significant  $F$  test. To determine if the Snoezelen condition had a proactive effect, the levels of the behavior in the conditions prior to and following the Snoezelen condition were compared, using a  $t$ -test. Finally, an additional one-way ANOVA was performed to assess if the order of treatment had a significant effect on the behavior.

A significant difference was found in the effects of the different treatment conditions on aggressive behavior,  $F(2, 132) = 15.01, p < .01$ . Aggression in the Snoezelen condition was significantly lower than during both ADL skills training (mean difference = 2.42,  $p < .01$ ) and Vocational skills training (mean difference = .93,  $p < .05$ ). Significantly fewer aggressive acts occurred during Vocational skills training than during ADL skills training (mean difference = 1.49,  $p < .01$ ). A comparison of aggression in the conditions before and after the Snoezelen condition yielded a non-significant effect,  $t(88) = 1.46, p = .11$ . The effect of the order of treatment on aggression was also not significant,  $F(2, 132) = .409, p = .67$ .

A significant difference was found in the effects of the different treatment conditions on self-injurious behavior,  $F(2, 132) = 8.55, p < .01$ . Self-injury in the Snoezelen condition was significantly lower than during ADL skills training (mean difference = 10.42,  $p < .01$ ) and, while less than during Vocational skills

training, this difference was not significant (mean difference = 2.07,  $p = .44$ ). Self-injurious behavior during Vocational skills training was significantly lower than during ADL skills training (mean difference = 8.36,  $p < .01$ ). A comparison of self-injurious behaviors in the conditions before and after the Snoezelen condition showed that the Snoezelen condition had a significant positive effect,  $t(88) = 2.03$ ,  $p < .05$ . The effect of the order of treatment on self-injury was not significant,  $F(2, 132) = 1.13$ ,  $p = .33$ .

#### 4. Discussion

Individuals with mental retardation and mental illness exhibited fewer aggressive acts and self-injurious behavior in the Snoezelen condition than in either the ADL or Vocational skills training conditions, although for self-injury this was only statistically significant when compared with ADL skills training. Further, aggression and self-injury were both significantly lower during Vocational skills training than during ADL skills training. The effects of the Snoezelen condition carried over to the following sessions, regardless of which training condition (ADL or Vocational) followed, but this was statistically significant only with self-injury. The order of treatment had no significant effect on either type of behavior, supporting the conclusion that it was the specific treatment, and not the order of treatment conditions, that had the important effect on the maladaptive behaviors.

Finding the smallest reduction in both behaviors during the ADL skills training condition may call into question the training methods used or the individuals' motivation to engage in ADL skills training. Typically, in most residential facilities, including this one, ADL skills are taught throughout a person's life while Vocational skills training is more circumscribed. Perhaps ADL skills training could be conducted in ways that make it more similar to the way Vocational skills training is given. One useful way could be to teach individuals ADL skills in the context in which these behaviors are to be performed rather than in sequestered sessions throughout the day.

Being in the Snoezelen room had a proactive carryover effect; the level of self-injurious behavior following the Snoezelen condition was significantly lower than the level preceding the Snoezelen condition. This is an important finding as it supports the hypothesis that the Snoezelen condition can have a longer-term effect on reducing an individual's tendency to engage in self-injurious behavior. While not statistically significant, there was also evidence of a carryover effect on the levels of aggression following Snoezelen providing some support for the idea that this condition might also benefit other maladaptive behaviors in the longer term.

Maladaptive behavior by individuals with developmental disabilities, such as aggression and self-injury, may constitute escape and avoidance behaviors because they reduce demands and escaping demands is probably the most common explanation for maladaptive behavior such as self-injury (Kahng, Iwata, & Lewin, 2002). Given this, maladaptive behavior could be expected to occur at lower levels during the Snoezelen condition, at least for some individuals, than in

the two skills training conditions where learning demands are essential. Also, these individuals would be expected to enjoy being in the Snoezelen room because of the lack of demands.

Another reason that some individuals engage in maladaptive behaviors may be to obtain sensory stimulation. As a wide variety of sensory stimulation is provided in a Snoezelen room without requiring maladaptive behaviors to produce them, maladaptive behaviors are less likely to occur during Snoezelen than in the other two conditions, where such responding may be required to produce sensory stimulation. Further research is needed to assess the correlation between the functions of the maladaptive behaviors and the impact of Snoezelen on these behaviors.

A significant limitation in our study may have lessened the potential impact of Snoezelen on aggression and self-injury. The Snoezelen environment was not specifically customized to address either the sensory needs of each individual or the way he or she modulates and processes sensory stimuli. In some individuals, aggression is a manifestation of an autonomic fight/flight response to a perceived threat. The environment might need to be adjusted so that it does not provide stimuli that might be perceived as threatening. Individuals with limited cognition and verbal communication would benefit from a sensory processing evaluation that would identify thresholds of various channels of sensory stimuli. For example, individuals with autism, often exhibit *hypersensitivity* to light, sound, and light touch, and *hyposensitivity* to vestibular stimulation. Other individuals, who appear to be hyperactive, may be placed in a “relaxing” environment such as in a Snoezelen room, when their behavior may function to provide second-order self-regulation, via sensory motor input. In these cases, an optimal Snoezelen environment might include a room for gross motor exploration, with therapeutic modalities such as suspended equipment, linear motion table, and therapy balls to provide intense vestibular and proprioceptive input. Thus, the Snoezelen environment should be designed to provide appropriate therapeutic stimulation in terms of the assessed needs of each individual. In our study, we neither undertook a full sensory evaluation of the individuals nor customized the Snoezelen room to the sensory needs of the individuals. This may be a critical feature that was lacking in both the present and previous studies on the effects of Snoezelen.

In sum, our results provide some confirmatory evidence for earlier findings that maladaptive or challenging behaviors of individuals with mental retardation are reduced in a Snoezelen room (e.g., De Bunsen, 1994; Fagny, 2000; Kenyon & Hong, 1998). Further, they provide some support for the finding of carryover effects of the Snoezelen as reported in some studies (e.g., Houghton et al., 1998; Withers & Ensum, 1995). In our study, the reduction of maladaptive behaviors in the Snoezelen carried over into the condition that followed but this but the effect was statistically significant only with self-injury. In contrast, Martin et al. (1998) reported no carryover effects for either self-injury or aggression. Clearly, these findings deserve further study both as to their replicability as well as the mechanism for any carryover effects.

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