Tactile Defensiveness and Stereotyped Behaviors

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Objectives. This study explores the constructs of stereotyped behaviors (e.g., repetitive motor patterns, object manipulations, behavioral rigidities) and tactile defensiveness as relevant to occupational therapy theory and practice and attempts to test their purported relationships in children with developmental disabilities.

Method. Twenty-eight children with developmental disabilities and autism were assessed on eight factors of stereotyped behavior via a questionnaire and by four measures of tactile defensiveness. The subjects' scores from the questionnaire were correlated with their scores on the tactile defensiveness measures to see what, if any, relationship among these behaviors exists.

Results. Significant relationships emerged from the data, indicating that subjects with higher levels of tactile defensiveness were also more likely to evidence rigid or inflexible behaviors, repetitive verbalizations, visual stereotypes, and abnormal focused affections that are often associated with autism. No significant association was found between motor and object stereotypes and tactile defensiveness. These relationships could not be explained solely by maturational factors.

Conclusion. The results suggest that clinicians should include observations of stereotyped behaviors, particularly behavioral rigidities, in conjunction with assessments of sensory defensiveness because these are related phenomena that may pose unique challenges for children with developmental disabilities and autism. Further study is needed to determine the causal mechanisms responsible for these relationships.

Occupational therapists often provide needed services to children with autism and other developmental disabilities who demonstrate a myriad of sensory, motor, and perceptual limitations and related behavioral difficulties. Clinical observations of children with developmental disabilities suggest that tactile defensiveness and stereotyped behaviors (e.g., repetitive hand movements, body rocking, unusual object manipulation, focused interests) often occur together. For example, occupational therapists who work with children with developmental disabilities often speculate about the unusual "self-stimulatory" behaviors of these children, many of whom may also have aversive responses to sensory stimulation in the environment. Is there really an association as purported by clinicians? The present study examines these behaviors and the relationships among them.
Literature Review

Tactile defensiveness is a familiar term to most occupational therapists. It is typically described as a hypersensitivity or hyperresponsivity to touch situations that most persons find nonthreatening (Ayres, 1972; Royeen & Lane, 1991). Symptoms may vary but usually are manifested as an avoidance–withdrawal response (e.g., rubbing and scratching, negative emotional reaction, avoidance of a specific texture) when confronted with specific types of tactile stimulation. These behaviors have been documented in children with developmental problems (Baranek & Berksen, 1994; Larson, 1982).

On the other hand, the term stereotyped behaviors may be less familiar to occupational therapists, especially those who do not work with persons with developmental disabilities. Related terms include stereotypies; self-stimulatory behaviors; and, less commonly, twiddles or stimming. Stereotyped behaviors are prevalent in persons with developmental disabilities and may take on many forms (Berkson, Gutermuth, & Baranek, 1995). Most typically, these behaviors involve repetitive motor patterns (e.g., body rocking, hand gazing) and unusual object manipulations (e.g., spinning objects, lining up objects). Recently, behaviors such as abnormal focused affections (e.g., an affinity for the letter s, red clothing items), rituals (e.g., turning around three times before sitting down), and other behavioral rigidities (e.g., insisting that things maintain a certain order or appearance) have broadened the construct of stereotyped behaviors, and eight orthogonal factors of stereotyped behaviors have been revealed (Berkson et al., 1995).

A few studies have reported the coexistence of tactile defensiveness and stereotyped behaviors in specific populations, for example, persons with autism (Grandin, 1992), fragile X syndrome (Hagerman, 1990), and mental retardation (Kinnealey, 1973; Larson, 1982). Both tactile defensiveness and stereotyped behaviors may be problematic because they often appear inflexible and interfere with a person's adaptive behavior and functional living skills. A child who engages in body rocking, for example, may be difficult to redirect to a more purposeful activity or may be less available for social interaction. Likewise, intolerance of tactile stimulation may interfere with self-help activities such as bathing or toothbrushing.

The literature extensively describes a range of secondary problems that may result from tactile defensiveness and other related phenomena (Ayres, 1964; Baranek & Berksen, 1994; Bauer, 1977; Royeen & Lane 1991). Both stereotyped behaviors and tactile defensiveness pose unique challenges to caregivers because children with developmental disabilities may be unable to describe experiences, communicate needs, or develop coping strategies. Occupational therapists are often called on to intervene with these behaviors and the secondary problems that may develop.

A variety of sensory-based interventions are often used in the clinical setting to reduce both defensiveness and unusual or stereotyped behaviors for persons with developmental disabilities (Bright, Bittick, & Fleeman, 1981; Grandin, 1992; Iwasaki & Holm, 1989; Larrington, 1987). These treatments are often based on sensory integrative principles and may be prescribed according to the person's inherent sensory needs (Reisman, 1993). Specifically, tactile defensive symptoms are thought to occur because of faulty sensory processing or modulation (Royeen & Lane, 1991). Likewise, sensory processing atypicalities have been implicated in the development and maintenance of stereotyped behaviors (Lovaas, Newsom, & Hickman, 1987; Reisman, 1993).

This study intended to explore the purported relationships between stereotyped behaviors and tactile defensiveness in children with developmental disabilities. We hypothesized that children with higher levels of tactile defensiveness would demonstrate more stereotyped behaviors. Additionally, we wanted to show that developmental age is not solely responsible for that relationship.

Method

Subjects

The subjects were recruited from a nonpublic day school for children with autism and related developmental disorders. From a possible total of 47, 28 children with permission to participate in the study and who were nominated by their teacher as having at least one kind of unusual or stereotyped behavior were included in this study. Ninety percent of the sample were boys. The subjects' chronological ages ranged from 7 years to 14 years (M = 10.16 years, SD = 1.92).

Procedure

Teachers completed the stereotyped behavior checklist (SBC) (see Berkson et al., 1995), a questionnaire containing 54 items about stereotyped and other unusual behaviors, on each subject in their classroom. The teachers received training on how to complete the SBC, which requires yes or no responses as well as descriptions for many of the exhibited behaviors. All SBCs were completed within a 2-week period.

The subjects were then assessed on four different measures of tactile defensiveness. The first measure was an overall teacher rating, which was later dropped because of little variance in the scores. The second measure was the Tactile Defensiveness and Discrimination Test (TDDT)—Light Touch Subtests (Baranek, 1993), which is a behavioral test designed for use with children with developmental disabilities. The examiner administers light touch
stimuli (e.g., cotton swab, small stickers) to the child’s arms, hands, and face and records the presence and degree of aversive behavioral responses (see Baranek and Berken [1994] for information about the behavioral coding). The sum scores for the two Light Touch Subtests were used.

The third measure was that of habituation to tactile stimuli applied to the face (FACE-HAB), which was being used in a concurrent study (Baranek & Berken, 1994). This assessment was completed 2 to 3 hours after the TDDT. It involved one light touch stimulus applied to subject’s face (i.e., left cheek), which was repeated for 10 15-sec trials. For each trial, a measure of the duration of any tactile-aversive behaviors as well as an intensity rating were recorded. The total for all 10 trials was used for this measure.

The Touch Inventory for Preschoolers (TIP) (Royeen, 1987) was the fourth measure. The TIP was chosen because it appeared applicable to children who were developmentally delayed and nonverbal. The teachers who knew each subject best were interviewed via this form.

The sum scores were calculated for the second, third, and fourth measures for each child. These measures, their reliabilities and validities, and the procedures used with this group of subjects are described in more detail in Baranek and Berken (1994) and are not the main concern of this study.

Developmental ages were obtained from the Vineland Adaptive Behavior Scales Classroom Edition (Sparrow, Balla, & Cicchetti, 1985). The Vinelands were completed by each subject’s primary teacher within 1 month of the start of data collection. Developmental ages ranged from 17 months to 115 months (M = 48 months, SD = 27).

Results

Table 1 summarizes the descriptive statistics for the tactile defensive measures. For each subject, we obtained a “factor score” on each of the eight factors of stereotyped behaviors that were statistically derived from the SBC data (see Table 2). The factor scores were then correlated with the total scores on each of the measures of tactile defensiveness. Because developmental factors have been suspected to be at least partially responsible for the purported relationship between tactile defensiveness and stereotyped behavior, we considered these variables in the analyses. Because both developmental age (as measured by the Vineland) and chronological age were indeed found to be correlated with some of our variables, they were partialled out in the analyses (see Table 3).

The results indicated that the TIP and FACE-HAB demonstrated a significant relationship with three of the eight factors of stereotyped behavior: Rigidity/Sameness, Auditory/Repetitive Verbalizations, and Abnormal Focused Affections. A fourth factor, Visual Orientation, was also related to the FACE-HAB.

Discussion

These findings suggest that tactile defensiveness and some stereotyped behaviors coexist in children with developmental disabilities. In this study, the subjects with higher levels of tactile defensiveness (as measured by the TIP and FACE-HAB) tended to show more stereotyped behaviors. These stereotypies included rigid behaviors, repetitive verbalizations, visual stereotypies, and abnormal focused affections (e.g., affinities for certain objects). These relationships were present beyond the influence developmental factors may have because developmental and chronological ages were partialled out in the analyses.

However, there were no significant relationships between tactile defensiveness and the motor or object stereotypies. That is, tactile defensiveness appears related more to those stereotypies commonly thought of as autistic in nature (e.g., rigid behaviors) than to those commonly associated with mental retardation in general (e.g., body rocking). The addition of a direct measure of motor stereotypies during the tests of tactile defensiveness would have been useful in making inferences about the nature of the relationship among these variables.

Specifically, three of the four stereotypy factors that demonstrated significant relationships with our measures of defensiveness contained numerous items that involve aspects of rigidity (e.g., repetition of a particular behavior or theme, intolerance of change). There may be some merit to the idea that sensory defensiveness may lead to more rigid, stereotyped behaviors. It seems logical that children who cannot tolerate tactile stimulation may become inflexible, insisting on predictable and repetitive ways of interacting with their environments. These ideas are consistent with many occupational therapy perspectives, including sensory integration theory. However, caution in the interpretation of these findings is warranted because behavioral rigidities are known to be associated with a variety of variables, including lower developmental maturity (Berkson, 1996) and stress (Kreitler, Zigler, & Kreitler, 1990; Pally, 1955), and are probably not specific to sensory processing deficits.
Table 2
Description of the Eight Factors of Stereotyped Behaviors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Key Items</th>
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<tr>
<td>I. Rigidity/Sameness</td>
<td>Prefers certain clothes, avoids certain clothing, becomes upset with change in routines, becomes upset if things do not look right</td>
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<tr>
<td>II. Auditory/Repetitive Verbalizations</td>
<td>Verbalizes repeatedly, is echolalic, talks about the same subject repeatedly, talks unusually</td>
</tr>
<tr>
<td>III. Visual Orientation</td>
<td>Gazes at hands, moves hands unusually, makes unusual noises, stares at lights</td>
</tr>
<tr>
<td>IV. (Not named)</td>
<td>Is bothered by toothbrushing or facewashing, demonstrates body prostrating, licks objects, has self-injurious behavior</td>
</tr>
<tr>
<td>V. Object Stereotypy</td>
<td>Heards objects, twiddles objects, picks objects apart, plays unusually with toys</td>
</tr>
<tr>
<td>VI. Abnormal Focused Affections</td>
<td>Has an unusual liking for an object, is interested in drawing, has a narrow range of interests, insists on carrying a particular object</td>
</tr>
<tr>
<td>VII. Music-Motor</td>
<td>Demonstrates body rocking, is interested in music, likes to listen to certain sounds</td>
</tr>
<tr>
<td>VIII. (Not named)</td>
<td>Eats only certain foods</td>
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*Loadings above 40.

One limitation of the present study is that the measures of tactile defensiveness and stereotypy used differing formats. Specifically, the TIP (which measured tactile defensiveness) and the SBC (which measured stereotyped behavior) were both questionnaires that use staff members as informants. Although these types of assessments are inherently flawed because they measure not only the behavior of interest, but also the perceptions of the informants about the behavior, at least they use comparable formats. On the other hand, the TDDT and the FACE-HAB were both behavioral measures, which is quite different from the SBC questionnaire. Thus, the results might have been more informative had a behavioral measure of stereotypy also been added.

We were surprised that the TDDT did not evidence any significant relationships with the factors of stereotyped behavior, especially given that the FACE-HAB, which has a similar format to that of the TDDT, did show significant relationships with stereotyped behaviors. Although both assessments administer light touch stimuli, the task demands and the location of the tactile stimuli were different. The FACE-HAB presents a repeating stimulus specifically to the face, which because of its sensitivity may have yielded a greater range of defensive scores. Secondly, whereas the TDDT requires attention to the stimuli presented, the FACE-HAB score is obtained while the subject is engaged in a computer task, which involves variables that are more apt to be influenced by cognitive factors (e.g., visual attention, vigilance, motivation).

Table 3
Partial Correlations of the Tactile Defensiveness Measures and Stereotyped Behavior Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>TDDT</th>
<th>TIP</th>
<th>FACE-HAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>.12</td>
<td>.39**</td>
<td>.50**</td>
</tr>
<tr>
<td>II</td>
<td>.70</td>
<td>.45*</td>
<td>.56**</td>
</tr>
<tr>
<td>III</td>
<td>-.02</td>
<td>.06</td>
<td>.48**</td>
</tr>
<tr>
<td>IV</td>
<td>-.27</td>
<td>-.22</td>
<td>.50</td>
</tr>
<tr>
<td>V</td>
<td>.23</td>
<td>.00</td>
<td>.08</td>
</tr>
<tr>
<td>VI</td>
<td>.01</td>
<td>.55**</td>
<td>.61**</td>
</tr>
<tr>
<td>VII</td>
<td>-.05</td>
<td>.17</td>
<td>.04</td>
</tr>
<tr>
<td>VIII</td>
<td>.05</td>
<td>-.28</td>
<td>.02</td>
</tr>
</tbody>
</table>

Note. FACE-HAB = habituation of tactile stimuli applied to the face; TDDT = Tactile Defensiveness and Discrimination Test; TIP = Touch Inventory for Preschoolers.

* p < .05. ** p < .01.

More specifically, stereotyped behaviors have been demonstrated to be a consequence of increased arousal (Hutt et al., 1964) as well as a modulator of arousal level (Berkson, 1967; Kinsbourne, 1980). In such cases, one might suspect that a person with developmental disabilities and tactile defensiveness may engage in stereotypies to regulate the amount of sensory input being received from the environment. Further study is warranted to investigate the mechanisms that cause these phenomena.

On the basis of our findings, clinicians need to be aware that tactile defensiveness and stereotyped behaviors are likely to co-occur in children with developmental disabilities. Including careful observations of stereotyped behaviors in conjunction with an assessment of sensory functions (i.e., modulation) is indicated and is beginning to appear in occupational therapy assessments (e.g., Reisman & Hanschu, 1992). Particular attention may need to be given to rigidities of behavior (e.g., insistence on sameness, difficulty tolerating changes) that are associated with types of sensory defensiveness and may be more problematic in children with autism specifically. It is also
important to consider what effects sensory-oriented treatments may have on both stereotyped and tactile defensive behaviors. Because tactile defensiveness and stereotyped behaviors are likely to occur together, the provision of sensory-based (e.g., inhibition) treatments to reduce both behaviors in children with developmental disabilities warrants further study.

Acknowledgments

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References


