The Occupational Therapy Journal of Research
Spring 1995, Volume 15, Number 2
pp. 122-141

Therapeutic Interaction and the Management of Challenge During the Beginning Minutes of Sensory Integration Treatment

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This study examines the interaction between therapists and children during treatment and finds that activities that present a "just-right" challenge for the child are marked by an interaction that is more highly playful and task-oriented than other activities.

Key words: instrument validity • therapeutic interaction • pediatrics

Abstract

In sensory integration treatment, the child and therapist manage challenging tasks in an interdependent process of action and response. This descriptive and relational study examined patterns of child-therapist action and interaction during the management of challenge in videotaped segments of the early minutes of treatment. Two dimensions emerged from these patterns: playfulness and task-orientation. Observer therapist judges perceived that a match between the task challenge and the child's ability was

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achieved when the child was working hard, showing initiative, and obviously enjoying the process. Simultaneously, the therapist was providing positive support, but not directly intervening to manipulate the child or the task. The validity of the measurement of challenge management is discussed.

Ayres (1972a) developed sensory integration treatment with the goal of enhancing the organization of the central nervous system of children with learning disorders. Treatment involves the active participation of the child in meaningful, goal-directed activities, which are selected based on the specific sensory integrative picture presented by the child. The appropriate activity varies from child to child and from moment to moment. For example, the child may balance on a moving swing while trying to reach for a toy or maneuver through a complex obstacle course and then roll into a tub of small balls. As a result of this variation, sensory integration therapy, like other treatment approaches, must be seen as embodying specific, general principles of intervention that when implemented are individualized to a very high degree (Kimball, 1988).

The effectiveness of sensory integration treatment greatly depends on the ability of the therapist to individualize interventions so that they meet the child's needs and ability level. In her discussion of the art of therapy, Ayres (1972a) outlined the specific requirements of the therapist. Because children with sensory integrative dysfunction are limited in their ability to organize meaningful responses to environmental demands, the therapist must create a special situation that consistently elicits competent, self-directed actions. Often the therapist must reduce the number or the complexity of the demands being made until a level is reached where the child can independently implement a competent action. However, the therapist must not reduce demands too much. The action of the child must represent a more mature or complex response than was previously possible if it is to ultimately benefit the child. The emphasis is on creating the just-right challenge (Ayres, 1972a; Lindquist, Mack, & Parham, 1982; Koomar & Bundy, 1991) for any given moment. The therapist vigilantly observes the responses of the child to variations in activity and environment, and fine tunes subsequent modifications to provide this just-right challenge. The result is a rich interdependent process of therapist and child action.

The ideal therapeutic interaction outlined by Ayres (1972a) is highly consistent with recent developmental theory, which emphasizes the critical effect of the social context on child behavior over a wide range of measures. Rogoff (1982, 1990) emphasized that during

almost all of the child's daily activities, a more experienced member of the culture is present who, directly or in more subtle indirect ways, articulates goals, arranges the environment to match the child's emerging capacities, and provides sensitive assistance to help the child master the desired tasks or skills. Through verbal and nonverbal transactions with the child, the adult engages in a "scaffolding process" that has been found to support subsequent independent performance (Pratt, Kerig, Cowan, & Cowan, 1988; Wood, Bruner, & Ross, 1976; Wood, Wood, & Middleton, 1978). This process involves the use of motivational strategies, such as creating a fun and playful atmosphere, as well as instructional strategies, such as directly teaching and guiding the child toward successful task completion.

The Measurement of Therapeutic Interaction and Challenge Management

Research on the efficacy of sensory integration treatment has been accumulating slowly. Quantitative and qualitative reviews of existing studies have found modest yet positive results overall, while recognizing the need for more research (Clark & Pierce, 1986; Ottenbacher, 1982, 1991; Tickle-Degnen, 1988). The outcome measures used in these studies have included improved test scores or academic performance (Ayres, 1972b) or changes on measures presumably tapping sensory integration (e.g., Kawar, 1973; Ottenbacher, Short, & Watson, 1979).

Clinical reports, however, often note significant changes in behavior during and after therapy, including improved ability to organize responses to the physical environment, more initiative in seeking challenge (Ayres & Mailloux, 1983), and more ability to attend to the task or maintain emotional control when stressed (Ayres, 1972a). These clinical reports suggest that one very important functional outcome of sensory integration therapy may be improvement in the child's ability to initiate, participate in, and manage challenging activities. The premise of our research program is that this improvement can be observed in the pattern of child-therapist interaction during treatment.

For the study reported here, we chose to examine a few minutes of treatment in great depth with the intention of applying our findings to follow-up studies of entire treatment sessions. In the tradition of a classic study in psychotherapy (Pittenger, Hockett, & Danehy, 1960) that showed the interactional complexity of the first minutes of

therapy, we examined the first therapeutic activity sequence of the sensory integration treatment session.

Our study explored patterns of (a) child action, (b) therapist action, (c) child-therapist interaction, and (d) challenge management using two types of measuring instruments. The first was a behavioral coding system, the Challenge Coding System (CCS; Coster, Tickle-Degnen, & Armenta, 1995), that identified the presence or absence of specific child and therapist actions thought to be key to the management of challenge. The second measurement method used therapist judges who rated qualities associated with the art of therapy (Ayres, 1972a) and challenge management. The Challenge Management Rating Scales (CMRS; revised from Gallo, 1991) were used to describe child and therapist action (e.g., playfulness) and task qualities (e.g., degree of challenge) that could not be coded or counted. Scales of this sort may obtain substantial reliability and validity when ratings are averaged across several judges (Ambady & Rosenthal, 1992; Rosenthal, 1982).

It was not our intention in this study to test hypotheses, but rather to describe the therapeutic action process and to note the adequacy of the two measures in capturing this process. Our primary purpose was to begin to develop a conceptual framework around challenge management that could later serve to identify key elements of the process that reflect treatment progress. This purpose was guided by a matrix procedure that enabled us to identify the types of child action that related to therapist action and the types that were not related to therapist action.

We adapted the convergent and discriminant validation procedure described by Campbell and Fiske (1959) to identify these patterns of relationship and nonrelationship. This procedure requires a close examination of correlation matrices that cross at least two different sets of variables (here different types of child action and therapist action) measured with at least two different methods (here the CCS and CMRS). Validation is established by showing that there are relationships (relatively larger correlations) and nonrelationships (relatively smaller correlations) that are interpretable in a meaningful way.

Methods

Design

This descriptive and relational study involved the analysis of clips

from 32 videotapes of therapist-child dyads during their regularly scheduled, 45-minute sensory integration treatment sessions.

Subjects

Eleven female occupational therapists from a private practice clinic specializing in sensory integration treatment volunteered to participate. The therapists had masters degrees, extensive supervised experience in providing sensory integration treatment, and at least four years of professional experience.

After parental consent and child verbal assent, 17 children (14 boys and 3 girls) participated in the study. The children were between the ages of 3 and 10 years (mean, 6 years), had sensory-motor difficulties associated with learning disability or an attention deficit disorder, and had been in treatment between 5 weeks and 2 years (mean, 9 months).

Videotape Procedure

One of three occupational therapy graduate students videotaped two regular treatment sessions, generally one week apart, for all but 2 of the 17 dyads. First-session tapes were made of the remaining two dyads, but because of problems in coordinating the videotaping, second-session videotapes were not included in the study. A short segment from each of the resulting 32 videotapes was extracted and recorded on two master tapes. The segments on the tapes varied in length from 10 seconds to 12:40 minutes (median, 2.31 minutes), and represented the first therapeutic activity sequence of each treatment session. This activity sequence consisted of the preparation and implementation of the first cycle of a gross motor activity undertaken by the therapist and child. (See Coster et al., 1995, for additional details.)

The Measurement of Action and Challenge Management

The Challenge Coding System

Using the Challenge Coding System (CCS; Coster et al., 1995), two trained graduate students viewed the master tapes and coded the presence or absence of specific child and therapist behaviors. Coded

behaviors that achieved adequate inter-rater reliability were retained for analysis.

Five of 13 child behaviors were observed with adequate frequency and reasonable inter-rater reliability: Cohen's (1960) kappa ranged from .53 through .78 (mean, .66), and *r*'s ranged from .60 through .76 (mean, .68). These behaviors were (1) child-initiated modification of the environment, (2) modification of the environment in response to the therapist, (3) use of play language, (4) making a decision, and (5) having a snag in performance (a fall, trip, fumble, or miss).

Six of eight therapist behaviors were observed with adequate frequency and reasonable inter-rater reliability: kappa's ranged from .58 through .87 (mean, .70), and *r*'s ranged from .64 through .87 (mean, .73). These behaviors were (1) manipulation of the environment, (2) manipulation of the child, (3) use of play language, (4) verbal directives or suggestions, (5) requests for clarification from the child about what to do or how to do it, and (6) giving positive feedback.

The Challenge Management Rating Scales

The Challenge Management Rating Scales (CMRS) consisted of 32 nine-point rating scales, where a "0" indicated that a quality was judged to be present to a very low degree, and an "8" to a very high degree. Five sets of qualities were represented in the scales: child action, therapist action, task challenge, match between child ability and task challenge, and therapist-child rapport. A list of the 32 rating scales can be found in Table 1.

The CMRS was used by two sets of 10 judges to view the two master tapes described in this study. Each tape was viewed by one set of 10 judges. The judges consisted of 18 occupational and 2 physical therapists who worked with pediatric populations. After viewing each activity sequence segment on the master tape, the judges completed a full set of CMRS ratings. Correlational and principal components analyses of the judgment data suggested that six components accounted for most of the variance in the 12 child-rating scales; four components in the therapist scales; and one component each for the challenge, match, and rapport scales. Composite ratings were formed by averaging the ratings, or in one case (match) transformed ratings, on each of the variables forming the composite.

Table 1 shows the final composite ratings and their reliability coefficients. These intraclass correlation coefficients represent the degree to which the judges' composite ratings covaried with one

Table 1

Composite Reliability of the Challenge Management Rating Scale

Final CMRS Score	Reliability	Scales Forming Final Score
Child Action		
Enjoyment	.82	playfulness, enthusiasm, happiness, interest in activity
Initiative	.80	initiative, self-directiveness, confidence
Success	.88	success in performing activity, behavioral organization
Anxiety	.72	anxiety
Physical Effort	.83	physical effort
Assistance Seeking	.79	assistance seeking
Therapist Action		
Directiveness	.81	directiveness, amount of verbal directions, verbal guidance, structures activity
Modification	.83	modification of the activity, modification of the environment
Playfulness	.86	playfulness, encouragement
Physical Assistance	.78	physical assistance
Task Challenge	.81	challenge, complexity, demand for focused attention, demand for physical skill
Challenge-Ability Match	.70	(-)child overly challenged by task, (-)child challenged too little by task, task challenge matched child's ability
Therapist-Child Rapport	.80	rapport, mutual warmth, mutual attentiveness, coordination with each other

Note. *Reliability is an average composed of 2 types of intraclass correlations (ICC): (1) the ICC for the judges' average child rating as it differed across children, and (2) the ICC for the judges' average rating as it differed across each child's two treatment sessions. ICC was calculated using Shrout and Fleiss (1979) equation ICC (3, k), p. 426.*

another, corrected for the fact that the final score for each therapeutic dyad was the average of 10 judges, not a single judge's rating (Rosenthal & Rosnow, 1991; Shrout & Fleiss, 1979). The average reliability was .81.

Data Analysis

Four sets of correlational analyses were done. The first examined the relationship among child actions (CCS and CMRS), the second among therapist actions (CCS and CMRS), the third between child and therapist action, and the fourth between task challenge/match

(CMRS) and the actions of the child and therapist. Separate analyses were done for the children's first and second treatment sessions and the correlations averaged (after transforming to Fisher z) across the two sessions. We were most interested in patterns of relationship, as opposed to significance testing. Therefore, we used Cohen's (1988) criteria for determining whether the magnitude of a relationship was small, moderate, or large. Under these criteria, we considered a .10 or -.10 correlation to be of a small magnitude, .30 or -.30 a moderate magnitude, and .50 or -.50 a large one.

To achieve our purpose of assessing patterns of relationship, we were guided by Campbell & Fiske's (1959) work on the multitrait-multimethod matrix. Specifically, we examined correlation matrices to look for patterns of convergence and divergence among the associations. Convergent patterns were ones in which relationships were moderate to large in magnitude and replicated among items that ostensibly were measuring similar variables. Divergent or discriminant patterns were ones in which relationships were very small and replicated among similar items. An examination of these patterns helped to provide information about the concurrent validity of the CCS and CMRS measures, and about the construct validity of the challenge management construct.

Results

Tables 2, 3, 4, and 5 report the correlations for (1) child action, (2) therapist action, (3) child-therapist interaction, and (4) challenge management. In these tables, the CCS and CMRS items are listed separately. Each matrix within each table shows one of three sets of correlations: (1) correlations among CCS items only; (2) correlations among CMRS items only; or (3) correlations between CCS and CMRS items. By comparing the results of the different matrices within a table, we could determine whether there were replicated patterns of convergence and divergence across the two measures.

A Description of Child Action

Table 2 shows the correlations among the various measures of child action. The upper left matrix (a) in Table 2 shows the intra-correlations for coded CCS actions. The correlations in this matrix were small to moderate, with the largest associations for a snag in performance (a fall, trip, fumble, or miss). The magnitude of these

Table 2

A Description of Child Action

Action	Presence/Absence of Action CCS					Quality of Action CMRS				
CCS	1	2	3	4	5	1	2	3	4	5
1. Child-initiated modification										
2. Modification in response to therapist	.24									
3. Use of play language	-.08	-.24								
4. Decision	.06	.22	-.25							
5. Snag in performance	-.12	.34	-.10	.27						
			(a)							
CMRS										
1. Enjoyment	-.05	-.08	**.53**	-.16	.13					
2. Initiative	.08	.13	.25	.06	.29	**.58**				
3. Success	-.09	-.16	.29	-.06	-.22	**.71**	.42			
4. Anxiety	.08	.05	**-.50**	.18	-.25	**-.74**	-.40	-.45		
5. Physical effort	.01	-.22	.07	.03	.24	.18	.41	.17	0	
6. Assistance seeking	.12	.13	-.27	.30	.06	-.29	.02	.05	.48	.26
			(b)					(c)		

Note: *n = 17. All correlations of* ≥ |.30| *are underlined. All correlations of* ≥ |.50| *are in bold print. Correlations are averages (after Fisher z transformation) of correlations for first and second treatment sessions. CCS = Challenge Coding System and CMRS = Challenge Management Rating System.*

Table 3

A Description of Therapist Action

Action	Presence/Absence of CCS						Quality of Action CMRS		
CCS	1	2	3	4	5	6	1	2	3
1. Manipulation of environment									
2. Manipulation of child	**.50**								
3. Use of play language	-.06	.25							
4. Verbal directive	.23	**.60**	-.04						
5. Request for clarification	-.02	.35	.08	.31					
6. Positive feedback	.05	.12	-.22	.02	.34				
			(a)						
CMRS									
1. Directiveness	.36	.43	.31	**.51**	.41	-.01			
2. Modification	.47	**.61**	.31	.30	.43	-.02	**.59**		
3. Playfulness	.13	.35	.48	.17	.43	.28	**.50**	.41	
4. Physical assistance	.43	**.76**	.26	.45	.44	.06	**.50**	**.73**	.36
			(b)					(c)	

Note: *n = 17. All correlations of* ≥ |.30 | *are underlined. All correlations of* ≥ |.50 | *are in bold print. Correlations are averages (after Fisher z transformation) of correlations for first and second treatment sessions. CCS = Challenge Coding System and CMRS = Challenge Management Rating System.*

Table 4

A Description of Child-Therapist Interaction: Correlations Between Child and Therapist Action

Therapist Action	Child Action: CCS					CMRS						
	1 Child-initiated modification	2 Modification in response to therapist	3 Use of play language	4 Decision	5 Snag in performance	1 Enjoyment	2 Initiative	3 Success	4 Anxiety	5 Physical effort	6 Assistance seeking	Rapport
CCS												
1. Manipulation of environment	.27	.27	-.51	.08	-.01	.08	.01	.07	.12	.17	-.48	-.21
2. Manipulation of child	.03	.18	-.16	.27	.14	.15	-.07	.19	.11	.18	.39	.25
3. Use of play language	.02	-.42	.60	.01	-.17	.19	-.01	.20	-.03	.05	.04	.35
4. Verbal directive	.25	.39	-.54	.20	.25	-.14	-.06	-.04	.26	.18	.30	0
5. Request for clarification	.01	.28	.13	.24	.24	.16	-.01	.17	.08	.29	.41	.45
6. Positive feedback	-.05	.11	-.01	.09	.34	.19	.25	.14	-.15	.44	.08	.16
			(a)						(b)			(c)
CMRS												
1. Directiveness	.16	.13	-.23	.13	.01	-.18	-.32	-.07	.28	.20	.31	.17
2. Modification	.15	.31	.10	.11	-.13	.07	-.09	.17	-.01	.07	.45	.37
3. Playfulness	-.24	-.20	.31	-.06	.05	.48	.02	.52	-.27	.27	.18	.78
4. Physical assistance	-.08	.36	-.06	.21	.15	-.03	.06	.01	.22	.18	.61	.24
			(d)						(e)			(f)
Rapport	-.25	-.21	.58	-.11	-.01	.69	.14	.70	-.56	.26	.04	
			(g)						(h)			

Note: *n = 17. All correlations of* ≥ |.30| *are underlined. All correlations of* ≥ |.50| *are in bold print. Correlations are averages (after Fisher z transformation) of correlations for first and second treatment sessions. CCS = Challenge Coding System and CMRS = Challenge Management Rating System.*

Table 5

A Description of the Management of Challenge: Correlations Between Action and Challenge

Child Action	Task Challenge	Challenge-Ability Match	Therapist Action	Task Challenge	Challenge-Ability Match
CCS			**CCS**		
1. Child-initiated modification	.12	-.09	1. Manipulation of environment	-.12	.04
2. Modification in response to therapist	-.18	-.19	2. Manipulation of child	.10	.19
3. Use of play language	.04	.19	3. Use of play language	.07	.22
4. Decision	.22	-.04	4. Verbal directive	.09	.09
5. Snag in performance	.30	.22	5. Request for clarification	.37	.30
			6. Positive feedback	.52	.42
CMRS			**CMRS**		
1. Enjoyment	.10	.59	1. Directiveness	.22	-.04
2. Initiative	.35	.60	2. Modification	.01	0
3. Success	.16	.62	3. Playfulness	.25	.50
4. Anxiety	.01	-.32	4. Physical assistance	.12	.15
5. Physical effort	.87	.66			
6. Assistance seeking	.39	.23	**Rapport**	.21	.47

Note: *n = 17. All correlations of* ≥ |.30| *are underlined. All correlations of* ≥ |.50| *are in bold print. Correlations are averages (after Fisher z transformation) of correlations for first and second treatment sessions. CCS = Challenge Coding System and CMRS = Challenge Management Rating System.*

associations suggest that the child CCS codes were measuring aspects of action that were somewhat independent of one another.

The lower right matrix (c) in Table 2 shows the intracorrelations for judged CMRS qualities of action. The magnitude of the associations ranged from zero to large. The largest associations were among enjoyment, success, initiative, and anxiety (negative association). Together these represent a pattern of positive response to treatment. The measures of physical effort and of assistance seeking, on average, tended to have the lowest associations, which suggests that they were measuring slightly different aspects of the child's action than the positive response measures.

The rectangular matrix (b) in Table 2 shows the intercorrelations between the CCS and CMRS measures. This matrix provides information about the concurrent validity of the two measures (Campbell & Fiske, 1959). High validity would be supported by finding the largest associations between similar items (convergence) and the smallest associations between dissimilar items (divergence). Some convergence is found between the CMRS positive response items (enjoyment, initiative, success, and (-) anxiety) and CCS use of play language. Divergence is clearly seen with the low association between CMRS physical effort and CCS use of play language. CMRS assistance seeking shows the same magnitude of negative association with CCS use of play language as it did with CMRS enjoyment. Overall, this pattern of convergent and divergent association suggests that the CCS and CMRS measures of positive response of the child to treatment are valid.

One of the most questionable patterns of association is between CMRS initiative and the CCS items that theoretically would relate to initiative: child initiates modification of the environment and making a decision. Both correlations are near zero, indicating that either the CMRS or CCS are not measuring child initiative, or are measuring different aspects of initiative.

A Description of Therapist Action

Table 3 shows the correlations among the various measures of therapist action. The upper left matrix (a) in Table 3 shows the intracorrelation matrix for coded CCS actions. The correlations in this matrix were very small to large. The action that showed the largest associations with other actions was the therapist's manipulation of the child in the performance of the action. Manipulation of the child was positively associated with manipulation of the environment, giving a verbal directive, and a request for clarification

from the child. Together these represent direct therapist intervention to support child performance. The use of play language, on average, showed the smallest relationship to the other variables, indicating that it was measuring a different aspect of therapist action than the direct therapist intervention measures.

The lower right matrix (c) in Table 3 shows the intracorrelations for judged CMRS qualities of action. The magnitude of the associations ranged from moderate to large. There was high convergence among the therapist qualities of action, particularly directiveness, modification, and physical assistance. A more moderate relationship was found between these direct intervention measures and the judged playfulness of the therapist. This pattern of associations, although of larger magnitude, is very similar to the one found among the CCS measures of therapist action.

The rectangular matrix (b) in Table 3 shows the intercorrelations between the CCS and CMRS measures. The magnitude of the associations ranged from near zero to large, but generally consisted of moderate associations. The pattern of associations supports the concurrent validity of the measures of therapist action, because, in general, the largest association in each row or column was between similar measures. Specifically, the largest correlations were found between the following sets of items: CCS manipulation of environment/child and CMRS modification; CCS manipulation of child and CMRS physical assistance; CCS use of play language and CMRS playfulness; and CCS verbal directive and CMRS directiveness. CCS request for clarification appeared to be equally related to each CMRS measure, whereas CCS positive feedback had only a small association with CMRS playfulness.

A Description of Child-Therapist Interaction

Table 4 shows the correlations between the child and therapist actions. Two dimensions to child-therapist interaction emerged from the pattern of associations: playfulness and task-orientation.

The more the therapist used playful language and action, the more the child tended to use playful language and to show enjoyment and success. Associations among these playfulness items, with some exception, were in the moderate to large range, and, without exception, of larger positive magnitude than associations of playfulness items with task-oriented items. Therapeutic rapport was rated highest when the therapist and child obviously were enjoying themselves.

The task-orientation of the therapist and child interaction was

reflected by the degree to which the therapist and child were responding to one another directly to complete tasks successfully. The more the child sought assistance from the therapist, the more the therapist assisted the child, modified the environment and task, sought clarification from the child, and directed the child. Children became more involved in modifying the environment in response to the therapist when the therapist used more directives and was more involved in modifying the task and assisting the child. The therapists increased their positive feedback when children had more snags in performance, such as a fall or a trip, and produced more physical effort. Therapist involvement in direct intervention with the child was associated with less use of play language by the child.

Not unexpectedly, child initiative was related inversely to the rated directiveness of the therapist. It was unrelated to the therapist's playfulness.

A Description of the Management of Challenge

Table 5 shows how child and therapist actions were related to judged task challenge and the match of task challenge to the child's ability. With increased task challenge, the therapist and child were more task-oriented. The child showed increased physical effort, assistance seeking, initiative, and snags in performance. The therapist gave more positive feedback to the child and sought clarification from the child more often. Child-therapist playfulness tended to be unrelated to the degree of task challenge.

The match between task challenge and child ability, or the just-right challenge, was judged to be highest when the child simultaneously was task-oriented, playful, and showing initiative. Increased match also was associated with more therapist playfulness, positive feedback, and requests for clarification from the child.

Discussion

In this study, two dimensions of action described the management of challenge during the early minutes of sensory integration treatment: a playfulness dimension and a task-orientation dimension. More playfulness involved more symbolic play language and a more positive socioemotional atmosphere. This playfulness may have been the motivational scaffolding (Pratt, Kerig, Cowan, & Cowan, 1988; Wood, Bruner, & Ross, 1976; Wood, Wood, & Middleton, 1978) that directed the child's attention and sustained the child's

involvement in the therapeutic activity. Task-orientation, on the other hand, formed the instructional scaffolding for the child's successful completion of the therapeutic tasks. More task-orientation involved the child seeking assistance and responding more to therapist guidance, and the therapist providing more direct intervention to help the child or to modify the task environment.

It appeared that the child and therapist together created the scaffolding for meeting challenges effectively. The actions of the child and therapist were cooperative and interdependent (Benjamin, 1974, 1977). They tended to be playful together, or to be task-oriented together. Of course, the interactions described in this study occurred in only the first few minutes of treatment. It is highly possible that an examination of later or more extended portions of treatment may reveal more transactions of less cooperative and complementary responding, such as when a child resists a therapists' suggestion by doing something unintended by the therapist. Ayres (1972a) suggested that a child who is growing and developing self-direction will not necessarily be uniformly compliant.

The achievement of the just-right challenge for children appeared to be a condition that occurred when both playfulness and task-orientation were high. Specifically, when the children simultaneously thoroughly enjoyed themselves and worked hard, they were judged as challenged at a level that matched their ability. During these just-right tasks, child initiative was high, therapist intervention was supportive and playful, and the rapport between the therapist and child was high. In future studies, multiple measurements of challenge and match, not only observer judgments, must be made. It is possible, for example, that the judges' perceptions would be different from those of the treating therapists. Through a process of "triangulation" (zeroing in on) from multiple perspectives (Campbell & Fiske, 1959), we can refine and elaborate the description of the challenge management process.

The findings generally support the construct validity of a management of challenge process by therapist and child. That any patterns exist at all suggests that treatment does follow general principles related to the management of challenge, despite its individualization. In so much as the patterns make sense from a practical and theoretical standpoint, construct validity has begun to be supported.

Analysis of the associations within and between the CCS and CMRS measures also provides some support for validity. The measures of therapist action, in particular, showed clear patterns of convergence and divergence. Items on the CCS that measured one aspect of therapist action (e.g., use of play language) had larger relationships with items on the CMRS that measured similar thera-

pist action (e.g., playfulness) than with CMRS items measuring a different aspect of action (e.g., physical assistance to the child). Patterns of convergence and divergence were not as clear for child action. Although many explanations are possible, one seems most probable. The CCS, with its dichotomous present/absent scoring of behaviors, may not have been sensitive enough to detect nuances in child behavior. Child actions measured on the CCS tended to be relatively infrequent (Coster et al., 1995). In the future, the CCS could be used in a way that counts the total number of actions during a segment (or assesses their duration), as opposed to noting whether or not an action occurred at least once.

It will be important to continue to include both coding and rating systems in future studies, because they provide different information about interaction. Judgment ratings tap into gestalt impressions that amass complex patterns of actions, whereas coded action clarifies the meaning of those impressions. Also, as shown in the high intracorrelations among the CMRS items, ratings on separate items tend to reflect overlapping judgments. For example, a judge's rating of a child's enthusiasm is not separate from that judge's rating of the child's success or initiative. Because of the objectively defined parameters for CCS items, the CCS has less overlapping measurement among items. When codes note the presence or absence of an action, the coders are trained to distinguish it from other types of codable action.

The findings of the current study can be generalized to the first minutes of sensory integration treatment, but not beyond them. We have begun case studies that use the coding and rating measurement systems across entire 45-minute treatment sessions. Preliminary findings suggest that there is tremendous variability and complexity in the sequencing of action. In these studies, we can ask questions about sequences of therapist and child action. For example, does therapist directiveness peak before or after child assistance seeking? What does the therapist do after a peak of child success or a dip in that success? What adjustments to task and environment are made before and after peaks of the just-right challenge? Can child initiative be predicted from previous child or therapist actions?

Once we have found a method for identifying valid sequences of interaction related to the management of challenge, we will be able to apply it to studying treatment longitudinally. Of primary concern is whether objective parameters of therapeutic interaction can be identified that validly relate to the child's development of competence and self-direction. Over time, we would expect to see a shift in the management of challenge from the therapist to the child. Presently, our focus is to establish measurement and construct validity. Clearly, longitudinal studies are the next necessary step.

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Acknowledgments

Support for the project was provided by a grant from the American Occupational Therapy Foundation. Additional support was provided by the American Occupational Therapy Association, Inc., the American Occupational Therapy Foundation, and Boston University through the Neurobehavioral Rehabilitation Research Center for Scholarship and Research. The project reflects the careful work of many research assistants and students: Lisa Bazzano, Laurie Clemens, Ashish Gulati, Gina Gallo, Alexis Henry, Jenny Hsu, Sandra Klein, Stacy Kramer, Alissa LaPenna, Sandra Longtin, Sharon Ray, Cay Reilly, Nancy Smith, and Jamie Sullivan. Twenty therapist judges in the Boston area also donated their invaluable time and expertise to this work. The authors express their deep appreciation to the therapists and children at Occupational Therapy Associates (OTA) in Watertown, Mass., for their participation in the study, and to Jane Koomar, MS, OTR/L, for supporting and facilitating their work at OTA.