Using Research Literature to Develop a Perceptual Retraining Treatment Protocol

Maureen E. Neistadt

Key Words: brain injuries • perception

Objectives. Treatment protocols derived from research literature can help therapists provide more rigorous treatment and more systematic assessment of client progress.

Method. This study applied research findings about the influence of task, subject, and feedback parameters on adult performance with block designs to an occupational therapy treatment protocol for parquetry block assembly—an activity occupational therapists use to remediate constructional deficits. Task parameter research suggests that parquetry tasks can be graded according to the features of the design cards, with cards having all block boundaries drawn in being easier than those with some block boundaries omitted.

Results. Subject parameter findings suggest that clients' lesions and initial constructional competence can influence their approaches to parquetry tasks.

Conclusion. Feedback parameter research suggests that a combination of perceptual and planning cues is most effective for parquetry tasks. Methods to help clients transfer constructional skills from parquetry to functional tasks are also discussed.

O ccupational therapy for adults with constructional impairments secondary to brain injury often includes remedial perceptual retraining with tasks like block design assembly to provide practice in the constructional components of occupational behavior. Therapists using this approach assume that adults with brain injury learn specific constructional skills from retraining exercises and can transfer those skills across all activities (including self-care and community living activities) that require those skills (Neistadt, 1992). A recent review of outcome studies about remedial perceptual retraining for adults with brain injury suggests that those learning assumptions hold true only for clients with relatively localized lesions and preserved abstract reasoning who have been explicitly taught to transfer learning across a variety of treatment activities. That is, remedial retraining can facilitate improved occupational performance, but only for some clients, and under training conditions that include practice of perceptual skills in functional situations. Only clients who can explain how constructional skills can be used in both remedial and functional tasks, after a therapist has attempted to make that connection for them, can be expected to transfer constructional skills from remedial to functional tasks. Even these clients will transfer their constructional learning only if they have received therapist coaching about how to use constructional skills learned with a remedial task in a variety of functional activities (Neistadt, in press). The purpose of the remedial portion of treatment for these clients would be to challenge and strengthen their constructional skills with assembly tasks that are relatively novel to them (Ben-Yishay & Diller, 1983; Zoltan, Siev, & Freishtat, 1986).

If the remedial portion of treatment is to be effective for those clients who might benefit from it, however, remedial treatment activities need to be designed and graded according to principles derived from relevant research literature (Diller & Weinberg, 1977; Neistadt, 1988). Currently, specific research-based treatment protocols for constructional activities are lacking in the occupational therapy literature (Hopkins & Smith, 1993; Trombly, 1989; Zoltan et al., 1986). The purposes of this paper are to describe the task, subject, and feedback parameters discovered in block design studies and apply that information to an occupational therapy treatment protocol for a parquetry block assembly activity, an activity commonly used by occupational therapists to remediate constructional deficits (Neistadt, 1992; Zoltan et al., 1986).

Parquetry block construction is an appropriate treatment activity for constructional deficits because it requires clients to combine pieces into a whole (separate blocks are combined to make one design), that is, to use constructional skills. Performance on a parquetry block assembly task has been highly correlated with performance on the Wechsler Adult Intelligence Scale-Revised.
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Block Design Studies

Table 1 summarizes the results of studies that have examined the determinants of adult performance on block design tasks. Some of these studies have been done only with healthy adult populations (Neistadt, 1989; Royer, Gilmore, & Gruhn, 1984); the others have compared the performances of adults with and without brain injury (Ben-Yishay, Diller, Gerstman, & Gordon, 1970; Ben-Yishay, Diller, & Mandelberg, 1970; Ben-Yishay, Diller, Mandelberg, Gordon, & Gerstman, 1971, 1974). For all of their studies, Ben-Yishay and his colleagues used the same group of subjects without injuries; their subjects with brain injury all had strokes restricted to one hemisphere.

The Neistadt study (1989) had subjects work with a parquetry block task; in all of the others, subjects worked with Koh's blocks. The parquetry blocks come in six solid colors (red, blue, purple, orange, yellow, and green), and three shapes (squares, triangles, and diamonds); all designs in Neistadt's (1989) study required 32 blocks. The Koh's blocks are all square, with six different block faces on each block—two of the block faces are all red, two are all white, and two are half red and half white, with the border between the two colors being a diagonal line across the block face. Some of the designs require 4 blocks; some require 9 blocks each. Subjects in all studies were constructing three-dimensional designs from two-dimensional model cards. Some investigators measured only the speed and accuracy of subjects' performances, without the benefit of training in block design construction (Ben-Yishay, Diller, & Mandelberg, 1970; Neistadt, 1989; Royer et al., 1984); others measured the speed, accuracy, and style of subjects' performances both before and after training (Ben-Yishay, Diller, Gerstman, & Gordon, 1970; Ben-Yishay et al., 1974). Collectively, these studies found that adult performance on block design tasks was influenced by task, subject, and feedback characteristics or parameters. The findings about these parameters relate to task grading, analysis of client approaches to tasks, and therapist cuing and feedback, respectively.

Task parameters. All of the studies found that subject performance was influenced by the nature of the model design. Ben-Yishay and his colleagues found that design difficulty could be categorized by three dimensions of perceptual organization: (a) orientation of the design in the visual field; (b) articulation threshold of the figure, that is, the degree to which perceptual elements unambiguously match construction elements (block faces); and (c) the size of the figure. Designs oriented diagonally within the visual field were more difficult for subjects to construct, as judged by time and accuracy scores, than designs oriented horizontally and vertically within the visual field. Designs that required the adjacent placement of split-face blocks with contiguous color between blocks were more difficult than those in which a
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Subjects</th>
<th>Procedures</th>
<th>Results</th>
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<tbody>
<tr>
<td>Ben-Yishay, Diller, Gerstman, &amp; Gordon (1970)</td>
<td>62 with RBD, R handed About half men, half women</td>
<td>All subjects given WAIS Block Design and Similarities subtests, with graded cuing given for failed items until success on all items or complete failure to benefit from cues occurred</td>
<td>Ability to profit from cues is a linear function of initial competence levels (number of items passed)</td>
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<td>Ben-Yishay, Diller, &amp; Mandleberg (1970)</td>
<td>49 with RBD, 56 with LBD Mean age: 61.5 yr Mean ed: 12.3 yr Matched re: time since onset of stroke, socioeconomic status 40 controls—retired, no history of neurological or cardiovascular disease, normal scores on a battery of motor invariance tests; average age: 70.3 yr Mean education level: 11.9 yr Comparable socio-economic status to subjects with BD</td>
<td>All subjects given WAIS Block Design Subgroup of 26 persons without injury, 31 with RBD, 25 with LBD with competence levels ranging from 0-8 designs correct on standard administration, given training to pass Design 9 on the WAIS Block Design</td>
<td>High correlations between initial competence and number of cues required to complete Design 9 within time limits—relationship holds in both persons without injuries and persons with BD</td>
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<tr>
<td>Ben-Yishay, Diller, Mandleberg, Gordon, &amp; Gerstman (1971)</td>
<td>Same as proceeding study</td>
<td>Subgroup of 26 persons without injury, 31 with RBD, 25 with LBD with competence levels ranging from 0-8 designs correct on standard administration, given training to pass Design 9 on the WAIS Block Design</td>
<td>Subjects’ approach to the WAIS Block Design, i.e., types and numbers of maneuvers noted, during standard administration</td>
</tr>
<tr>
<td>Ben-Yishay, Diller, Mandleberg, Gordon, &amp; Gerstman (1974)</td>
<td>15 with RBD, 15 with LBD Mean age: 62.3 yr Matched re: date stroke onset, level of initial competence on WAIS Block Design 40 persons without injuries (see preceding study) All groups comparable at socioeconomic status and education levels</td>
<td>Following standard administration of WAIS Block Design, groups with BD given 10 consecutive days of training (saturational cuing) on a series of experimentally validated alternate forms of the WAIS Block Design Standard administration of WAIS Block Design given again to all subjects</td>
<td>Persons with RBD and LBD less competent than persons with injuries No significant difference between groups in partial competence (proportion correct blocks in first failed design) No differences in style (types of maneuvers) between subjects with BD and subjects without injuries All groups show equivalent increase in time and numbers of maneuvers with increasing difficulty Persons with RBD show significantly more construction deviations during failed designs than persons with LBD or persons without injuries Persons with RBD less active (numbers of maneuvers), then persons with LBD, then persons without injuries</td>
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<td>Boyer, Gilmore, &amp; Grunn (1984)</td>
<td>83 subjects without injuries aged 49 yr or older, living independently in community; 20 college students and staff members aged 30 yr or younger</td>
<td>Administered 3 four-block and 10 nine-block Koh's block designs that varied on 2 parameters: Task Uncertainty and Perceptual Cohesiveness</td>
<td>All subjects with BD initially showed decreased matching persistence (number of maneuvers to correctly match a particular block) relative to serious injuries; matching persistence linearly related to level of initial competence After training, both groups with BD more competent than group without injuries decreased matching, persistence remained despite improvements in performance Increased time/block with increasing age Age x Task Uncertainty interaction for designs with diagonals Age x Perceptual Cohesiveness interaction only for groups below 50 and over 49 years</td>
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change in color occurred between block faces. Larger designs were more difficult to construct than smaller ones (Ben-Yishay, Diller, Gerstman, & Gordon, 1970; Ben-Yishay, Diller, & Mandleberg, 1970).

Ben-Yishay and colleagues also found that block design difficulty could be judged by calculating the probable number of block face rotations needed to construct any given design. They rated the WAIS Block Designs using this method. According to the protocol for this test, in laying out the blocks for the subject, the examiner makes sure that a variety of surfaces face up, that only one out of the four blocks has a red/white side facing up for four block designs, and that only three out of nine blocks have a red/white side facing up for nine block designs (Wechsler, 1981). Some block faces would have to be turned, therefore, for most designs. Ben-Yishay and his colleagues determined that designs that were more difficult perceptually also turned out to be more difficult when assessed with this probability method; that is, the more difficult perceptual designs require more block face turns than less difficult perceptual designs. Both the perceptual and probability ratings of design difficulty correlated significantly with the actual order of difficulty as assessed by the percentage of subjects without injuries who passed given designs (Ben-Yishay, Diller, Gerstman, & Gordon, 1970).

Royer et al. (1984) categorized their designs along two parameters, task uncertainty and perceptual cohesiveness. The former counted the combined number of decisions that had to be made about the color and orientation of each block in a given design, a measure similar to Ben-Yishay’s probability measure. The latter counted the number of adjacent edges of the same color required to construct the design, like the articulation threshold mentioned above. Royer et al. (1984) found that designs with higher task uncertainty ratings and diagonal elements within them were more difficult for older subjects.

Relative to perceptual cohesiveness, the investigators found that designs with more adjacent edges of the same color were more difficult for subjects aged 49 years or older than for subjects aged 30 years or younger. Neistadt (1989) found this to be true within a younger, 18- to 35-year-old age group as well. In her study, subjects were slower and less accurate in constructing designs without clear boundary lines between like colored areas.

The task parameter findings reviewed here have implications for grading of a parquetry block treatment task. These findings suggest that the difficulty of the parquetry task could be increased by decreasing the amount of color and the number of internal block boundary lines within the design card (Neistadt, 1989). Difficulty could also be increased by increasing the number of diagonals within the design card (Royer et al., 1984), the number of like-colored contiguous areas within the design card, and the number of blocks needed for a given design (Ben-Yishay, Diller, Gerstman, & Gordon, 1970; Ben-Yishay, Diller, & Mandleberg, 1970).

Subject parameters. The block design studies have found that subjects’ performances were affected by age, gender, site of lesion, and initial competence with block design tasks. Royer et al. (1984), for example, found that motor speed decreased significantly with age. When they controlled for motor slowing in their analyses, these researchers also found, as mentioned above, that difficult designs were more difficult for older subjects than for younger ones. Neistadt (1989) found that men were significantly faster than women in constructing colored designs with some of the internal block boundary lines removed.

Regarding site of lesion, Ben-Yishay et al. (1971) found that subjects with right hemisphere damage made significantly more constructional deviations than subjects without injuries or those with left hemisphere damage. They also found subjects with right brain damage were the least active group, that is, made the least number of excessive maneuvers in trying to complete their constructions.

### Table 1 (Continued)

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Subjects</th>
<th>Procedures</th>
<th>Results</th>
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<tbody>
<tr>
<td>Neistadt (1989)</td>
<td>96 college students (48 men, 48 women), aged 18-35 yr, no reported history of neurological or learning problems</td>
<td>Each subject given 3 consecutive parquetry block designs to complete in one of 4 design card conditions: color with full internal detail, color with partial internal detail, black and white with full internal detail, black and white with partial internal detail. Speed and accuracy measures taken.</td>
<td>Nearly all subjects totally accurate in constructions.</td>
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<tr>
<td>Royer et al.</td>
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<td>Men faster than women.</td>
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<td>Ben-Yishay et al.</td>
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<td>Partial internal detail designs more difficult than full detail designs (required more time).</td>
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<tr>
<td>Ben-Yishay et al.</td>
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<td></td>
<td>Order of design difficulty from least to most difficult: color with full detail, black and white with full detail, color with partial detail, black and white with partial detail.</td>
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</table>

Note: R = right; RBD = right brain damage; LBD = left brain damage; BD = brain damage.

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Yishay, Diller, Gerstman, and Gordon (1970) found that, for subjects with and without brain damage, the ability to profit from cues during block design construction training was a linear function of initial competence levels on the task. Subjects who were more competent, (i.e., who got more designs correct initially) needed fewer cues to improve their performance than subjects who were less competent initially. Ben-Yishay et al. (1974) found that subjects with brain damage remained less persistent than subjects without injuries in working to match blocks correctly, even after training improved accuracy in performances.

The subject parameter findings reviewed here have implications for analysis of client approaches to a parquetry block treatment task. The above studies suggest that client approaches to block design tasks can be affected by clients' initial competence with treatment tasks (speed and accuracy measures) and by client age, gender, and locus of lesion (Ben-Yishay, Diller, Gerstman, & Gordon, 1970; Ben-Yishay, Diller, & Mandleberg, 1970; Neistadt, 1989; Royer et al., 1984). These factors could provide a framework for analyzing clients' approaches to a parquetry block task. For example, a client could make few maneuvers in completing a design because he or she was mentally rotating blocks before moving them or because he or she was perceptually confused due to right brain damage. The former client has a viable strategy for task completion; the latter does not. The former client could be encouraged to continue using his or her strategy; the latter should be helped to find a new strategy for the perceptual task.

Subject parameters can also suggest the level of cueing a client might need to successfully complete a task early in treatment, as well as clients' abilities to profit from training. For example, clients who are more competent initially with a parquetry block task are likely to need less structured cuing to construct designs and to be more able to transfer constructional learning to functional tasks than those with poor initial parquetry assembly skill.

Feedback parameters. Ben-Yishay and colleagues used saturational cuing to provide feedback during block construction training (Ben-Yishay, Diller, Gerstman, & Gordon, 1970; Ben-Yishay, Diller, & Mandleberg, 1970; Ben-Yishay et al., 1974). Saturational cuing is a process of gradually and systematically decreasing cues that are graded from most to least explicit. The more explicit directions would be withdrawn first, eventually leaving clients with only general directions that do not provide information about which steps to take in what order, or how to take those steps. An example of an explicit cue might be, “try turning that block around this way.” A general cue might be “Copy this design with these blocks.”

Two other feedback mechanisms were built into these block design training studies (Ben-Yishay, Diller, Gerstman, & Gordon, 1970; Ben-Yishay, Diller, & Mandleberg, 1970; Ben-Yishay et al., 1974): pretests and posttests, and obvious gradations in block design difficulty. These two feedback mechanisms provide subjects with knowledge of general constructional skill competence. The pretest and posttest used in these block design training studies was the WAIS Block Design test, a standardized assessment of constructional skill. The gradations of difficulty were obvious in terms of the number of blocks used for specific designs (four blocks for easier designs and nine blocks for harder ones). Also, the investigators clearly told subjects that they were being given training designs in order of difficulty from easiest to hardest.

The feedback parameter findings reviewed here have implications for therapist cuing and feedback during a treatment session using a parquetry block assembly task. Some authors have suggested that, relative to constructional tasks, clients with right hemisphere damage benefit most from spatial relationship cues, whereas clients with left hemisphere damage do best with cues to help with executive planning (Hecaen & Assal, 1970). However, subjects with left and right brain damage in the treatment studies reviewed in this section benefitted equally from a cuing system (saturational cuing) that incorporated both types of cues. Consequently, a cuing procedure that contains both perceptual and planning cues would be optimal for a parquetry block assembly task.

Saturational cuing did not change clients' style of approach to block design tasks, however, even when speed and accuracy improved. Moreover, no significant differences were found in the types of block maneuvers used by groups without injuries and groups with brain injuries at like competence levels (Ben-Yishay et al., 1974). This suggests that client style may be an individual adaptation to task demands, and may be less amenable to change than other variables of performance, like speed and accuracy. Perhaps therapists who attempt to teach their own approaches to clients are adding confusion rather than clarity to the client's problem-solving process. Perhaps, as Craig (1953) and others (Singer & Cauraugh, 1985; Schwartz, 1985) have suggested, the more efficient strategy is to help clients discover their own style via cues for information processing and planning and feedback about their performance.

Sharing the results of pretest and posttest evaluations with clients could give them information about their progress in constructional skill development and could motivate them to expend even greater effort in learning. Results from pretests and posttests could also help therapists appropriately structure treatment initially and assess the effectiveness of remedial treatment after a trial of a set length of time. By making the progression of design card difficulty obvious to clients, a therapist could provide further motivating feedback during a parquetry block task.

The following section translates the therapeutic im-
Parquetry Block Treatment Protocol

The grading of this treatment task involves sequencing the design cards from easiest to hardest according to task parameters found in the studies reviewed above. The suggestions for observations of approach to task incorporate subject parameter information, and the feedback and cueing system includes a modification of saturational cueing, a pretest and posttest, and obvious levels of difficulty in the designs used for treatment in accordance with the feedback parameters discussed above. The treatment procedures are presented in their proper sequence. The first step in using this modality should be to administer the Parquetry Block Test as a pretest, to determine whether a given client is a candidate for remedial constructional retraining.

Parquetry Block Test

This test of constructional ability involves constructing four block designs of 32 blocks each from model design cards. Figure 1 illustrates the designs and lists the average times that healthy college students, aged 18 to 35 years, took to accurately complete those designs. The designs are ordered from easiest to hardest, according to previous study (Neistadt, 1989). The materials are a parquetry set of wooden blocks, with four design cards that are all 9¼-in. square. The color design cards are manufactured by Learning Resources, Inc.; the black and white cards can be made by tracing color cards. Subjects are told that they can stop this test at any time if they become too frustrated. In a previous study of 45 men with head injury, 53% of subjects finished all four designs at both pretest and posttest (Neistadt, 1992).

An error ratio score is calculated by dividing the error score by the total number of blocks in the designs attempted. Error scores are determined by counting the number of incorrectly placed and unplaced blocks in the designs attempted. This count is made for each design attempted, after the client indicates that he or she is finished with or wants to stop working on that design. The counts for each design are then added and divided by the total number of blocks in the designs attempted. If a client attempted all four designs, then the error ratio would be the total number of incorrectly placed or unplaced blocks divided by 128 (32 blocks per design × 4 designs). If a client attempted only the first three designs, then the error ratio would be the total number of incorrectly placed or unplaced blocks divided by 96 (32 blocks per design × 3 designs). If a client attempted only the first two designs, then the error ratio would be the total number of incorrectly placed or unplaced blocks divided by 64 (32 blocks per design × 2 designs). If a client attempted only the first design, then the error ratio would be the total number of incorrectly placed or unplaced blocks divided by 32 (32 blocks per design × 1 design).

Error ratios can range from 0 to 1.0, with an error ratio of 0 indicating that all blocks were correctly placed, and a score of 1.0 indicating that all blocks were incorrectly placed. Clients with error ratios of 0.50 or higher are not candidates for remedial perceptual training. In my treatment outcome study with men with head injury, subjects who scored 0.50 or higher on the Parquetry Block Test were not able to transfer any constructional skills from parquetry block assembly training to a functional activity (Neistadt, 1991).

A previous study established means, standard deviations, and minimal and maximal time scores for male and female college students, aged 18 to 35 years, for the designs used in this test. Error ratios for healthy male and female college students ranged from 0 to 0.10; 98% of subjects scored 0 (Neistadt, 1989).

As a test of constructional ability, the Parquetry Block Test is reliable, with a test-retest coefficient of 0.92, and valid, as demonstrated by a significant correlation between the WAIS-R Block Design test and the Parquetry Block error ratio \(r = -0.84, p = 0.0001\), (Neistadt, 1992).

If a client scores well enough on this test to be considered for a trial of remedial retraining, then a 1-week trial of retraining should be attempted with a minimum of three 30-min sessions of training with parquetry block construction. At the end of that week, the Parquetry Block Test should be given again, as a posttest. Clients who show little or no improvement on the Parquetry Block Test after 1 week of treatment are not candidates for continued remedial retraining. In my treatment outcome study with men with head injury, subjects who were ultimately able to make some transfer of constructional skills from parquetry block assembly training to a functional activity made dramatic improvements in constructional performance during the first treatment session that used parquetry block assembly (Neistadt, 1991).

Structure of Treatment Task

The levels of design card difficulty in this task, from easiest to hardest, are designs in color with all block boundaries drawn in (Level 1), black and white with all block boundaries drawn in (Level 2), color with some block

1Available from Learning Resources, Inc., 151 South Pfingsten, Unit M, PO Box 467, Deerfield, Illinois 60015.
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Derived from Neistadt, 1989

**Figure 1.** Parquetry Block Test.
boundary lines omitted (Level 3), and black and white with some block boundary lines omitted (Level 4) (Neistadt, 1989). The design cards used for the pretest and posttest should not be used for treatment. Treatment design cards can be kept in a notebook or file, with dividers clearly marking and separating the different levels of difficulty. Clients should be told that Level 1 designs are the easiest, Level 4 designs are the hardest, and Levels 2 and 3 are in between. Within each level, cards should be ordered from easiest to hardest according to the number of diagonals in the card, with more diagonals being more difficult (Royer et al., 1984). For Level 3, the greater the number of like-colored contiguous areas within the design card, the more difficult the design (Ben-Yishay, Diller, Gerstman, & Gordon, 1970; Ben-Yishay, Diller, & Mandleberg, 1970). Also, for Levels 3 and 4, designs with triangle and diamonds in the corners would be more difficult than those with squares in the corners (Neistadt, 1989). The designs should be numbered on the back, consecutively within each section (e.g., 1-1, 1-2, and so on for Level 1; 2-1, 2-2, and so on for Level 2).

The appropriate design from Figure 2 should be placed at the beginning of each level, with the times listed in Figure 2 recorded on the back of the card. These times, which come from a previous study (Neistadt, 1989), serve as feedback about performance that is considered normal and give clients a goal to strive for in their block design performance. The adult men with head injury in my treatment outcome study who engaged in remedial training with parquetry blocks were clearly energized by having this standard to work toward. Some of them expressed a competitive desire to "beat the college students" and worked hard to do so.

Task Procedures

Clients should choose the designs they want to work on. When clients choose their own designs, they are able to decide how much of a challenge they want and are more invested in the assembly task than when therapists choose designs (Neistadt, 1991).

The design card chosen by the client should be propped up vertically on a table in front of the client. The 32 wooden blocks should be laid out randomly in front of the design card. The cardboard tray, which comes with the parquetry block set and is sized correctly for 32 block designs, should be placed on the table in front of the blocks, within easy reach of the client. Therapists should keep track of clients' times, accuracy, and approach to each design (recorded by number). Approach to design notes can include observations about whether clients work in a discernable organized fashion (right to left, left to right, clockwise, counterclockwise, top to bottom, bottom to top), about any pattern of errors in particular visual fields, and about the number of maneuvers a client engages in to complete a design. These records should be kept in a file for the client, to keep track of progress. In my treatment outcome study, I found that many clients would repeat some designs from session to session, and would want to know how quickly and accurately they had done those designs before. These clients expressed great pleasure at beating their own times (Neistadt, 1991). The qualitative observations about client approach to task can be used by the therapist to reflect clients' strategies back to them. For instance, a client who is most successful when he or she fills in the perimeter of a design first can become aware of that strategy through therapist feedback.

Therapists can use a variation of saturational cuing with this task. When clients encounter difficulties in their assembly tasks, they can be led through a collaborative problem-solving process by a series of therapist questions: (a) What do you see in the block design? Does anything that you see suggest what you have to do next? (b) What steps are you going to take to complete your puzzle? This cuing method uses the general cues of saturational cuing and incorporates Singer and Gauragh's (1985) 5-part strategy: (a) "readying," or relaxing and attending; (b) "imaging," or picturing oneself performing the task at hand; (c) "focusing," or concentrating on one relevant feature of the situation to avoid distractions; (d) "executing," or performing the task; and (e) "evaluating," or using available feedback from the performance to learn better response patterns (p. 112). The question "What do you see?" directs clients' attention to the task, and to the perceptual features of the task; this is a form of readying. The idea of beginning with attention to the perceptual features of the task is supported by research suggesting that people rely heavily on visuospatial skills in the initial stages of learning psychomotor tasks (Fleishman & Rich, 1963). The question "What steps are you going to take (to complete this task)?" encourages clients to plan and possibly imagine how they will do the treatment task; this is a form of imaging. The clients' performances are the executing step, and the feedback from the therapists about accuracy and times relative to previous performances and the norms is the evaluating step. The focusing step is not recommended because one aim of treatment with adults with brain injury is to promote skill in divided attention, that is, the ability to consider more than one aspect of a situation at a time (Lezak, 1983).

Coaching in Functional Tasks

To receive maximum benefit from remedial training in constructional skills, clients should be coached in using the skills they have learned in parquetry block assembly during functional activity performance. Occupational therapists should, therefore, use functional activities in addition to remedial ones in the course of treatment. A client who has learned to take an organized approach to parquetry assembly, for instance, can be coached to use...
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Figure 2. Parquetry Block treatment designs.
that same approach with making a sandwich. The occupational therapist could say, for instance, “Okay, before you start working on a block design, you look carefully at the design and all of the pieces to help you decide what steps you want to take. Let’s try the same thing with making this sandwich.” Practicing the constructional skills in a variety of activities will facilitate transfer of those constructional skills across all activities that require those skills (Toglia, 1991).

Conclusion

Remedial retraining for constructional deficits can facilitate improved occupational function for some adults with brain injury—those with sufficient cognitive skill to explain how constructional skills can be used in both remedial and functional tasks after a therapist has attempted to make that connection for them. However, even for these adults, remedial training will not be effective if it is done in a haphazard fashion. The research literature suggests that adult performance on constructional tasks, like block designs, is influenced by the nature of the task (task parameters), the characteristics of the subject (subject parameters), and therapist feedback during task performance (feedback parameters). Therapists who pay conscious attention to these parameters during treatment for constructional deficits will be able to be more systematic in their assessment of client skill and progress and in their grading of treatment tasks. This paper has applied relevant research findings to an occupational therapy treatment protocol for a remedial activity that occupational therapists use to treat constructional deficits—parquet block assembly. The research findings summarized in this paper could be used to develop more systematic treatment protocols for other constructional tasks, like dressing. Systematic protocols for occupational therapy perceptual retraining activities could be used to study perceptual retraining outcomes (Neistadt, 1992). Ultimately, more research about treatment outcomes is necessary to help therapists develop effective and cost-effective treatment plans for their adult clients with perceptual deficits. ▲

References


