The Effectiveness of Sensory Stimulation for Geropsychiatric Inpatients

(geriatrics, nursing homes, occupational therapy)

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The objectives of this study were (a) to explore the effectiveness of sensory stimulation therapy under controlled conditions, and (b) to ascertain the short-term effectiveness after treatment ceased. Thirty geropsychiatric patients were divided into three treatment condition groups: sensory stimulation, staff attention, and standard hospital treatment. Twenty-seven subjects completed the 12 weeks of treatment and 6 weeks of follow-up. Assessments were made prior to treatment, upon completion of treatment, and six weeks after treatment was completed. The results showed that those subjects who completed the sensory stimulation treatment significantly improved and maintained their improvement in the areas of personal hygiene and interest in group activities relative to the subjects in the other two treatment approaches studied. Discussion focuses on the implications of sensory stimulation for the treatment of elderly psychiatric patients.

In the past 15 years several studies have documented that sensory deprivation causes behavior changes that mimic several symptoms associated with mental illness (1). These artificially produced symptoms include hostility, disorientation, apathy, withdrawal, hallucinations, and delusions. In clinical settings, sensory deprivation has been documented as stemming from or being associated with diminished sensory acuity as a result of advancing age (2, 3); disturbed sensory perception caused by mental illness (4, 5); lowered stimulation associated with institutional life (6, 7); or by all three. These findings suggest that long-term, chronic institutionalized geropsychiatric patients are high risks for sensory deprivation.

Sensory stimulation therapy, which systematically focuses the patient’s attention on each of the senses, has been hypothesized as reducing the effects of sensory deprivation. This treatment approach has reduced psychotic behavior in hospitalized geropsychiatric patients (8, 9). With nursing home residents this treatment approach resulted in a decreased level of confusion, increased motivation, and, in certain instances, a reduction in hallucinations and delusions (10-13).

Because these were not experimentally controlled studies, it was not known whether the beneficial results were due to stimulation of the senses or to some other factors, such as increased staff attention and involvement in social activities. Additionally, it was not known whether participants continued to improve or if they regressed after the stimulation program was terminated.

The purpose of this study was to explore the effectiveness of sensory stimulation therapy under controlled conditions and to ascertain the short-term effectiveness of this treatment approach. It was hypothesized that subjects treated in a sensory stimulation program would attain a higher level of functioning in the areas of orientation, self-care skills, and interpersonal skills than would subjects receiving increased staff attention or standard hospital treatment. The second hypothesis was that subjects receiving sensory stimulation would maintain the benefits from

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such a program for six weeks after termination of the intervention.

Methods
Subjects. From the 300-bed geropsychiatric unit of a large mental hospital, the following method was used to select subjects. The treatment teams (psychiatrist, nurse, social worker, and aids) from the men's and women's wards were asked to identify their most regressed and withdrawn patients. These patients were defined as those who rarely participated in the activity therapies, who rarely socialized with peers or staff, and who required the most help with basic living skills such as dressing and grooming. Excluded were any patients who were under the age of 65; who were nonambulatory, blind, or deaf; or who had a primary diagnosis of mental retardation. Forty-five patients were identified by the teams. From this group, 15 males and 15 females volunteered to participate in a special occupational therapy program.

Using random assignment techniques, the 30 subjects were placed into one of three treatment conditions. On each of the two wards were five subjects in the sensory stimulation (SS) group, five in the staff attention (SA) group, and five in the standard hospital treatment control (C) group. Three subjects in various groups were unable to complete the study because of illness or death. The demographic data on the 27 subjects completing the study appear in Table 1.

Materials. Assessment (pre, post, and follow-up) was completed using two instruments. The Geriatric Interpersonal Evaluation Scale (GIES) (14), a patient interview scale assessing general cognitive skills including orientation, memory, and perception, was one measure used. The second measure was the Geriatric Rating Scale (GRS) (15), a nurse's observational scale assessing physical capabilities (ambulation, eyesight, hearing), self-care skills (toilet habits, eating, hygiene, grooming), and social interaction skills (helping on ward, individual response, group activities).

Materials used in the sensory stimulation groups were based on those items commonly found in the literature (16-20). Examples for each sense included but were not limited to the following items:

- Olfactory: perfume, Odors were selected that would not cause adverse effects such as depressing respiration or elevating blood pressure (17).
- Vision: a mirror, colored cardboard shapes
- Auditory: an audiotaape of familiar sounds from Development Learning Co. (DLM) rhythm instruments
- Tactile: warm and cool water, terry cloth fabric
- Kinesthetic/vestibular: beanbags, a sponge ball
- Gustatory: hot chocolate, cheese, and crackers; Diabetic subjects and those who had a history of choking received medically safe food substances.

Materials used in the staff attention activity groups included snacks and coffee, newspapers, poetry books, and a record player and musical recordings. These items generally were requested by the group members.

Procedure. During the week prior to the beginning of treat-

### Table 1

<table>
<thead>
<tr>
<th>Groups</th>
<th>Age*</th>
<th>Education*</th>
<th>Length of hospitalization*</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory stimulation</td>
<td>75 (68-87)†</td>
<td>8.5‡ (6-13)†</td>
<td>30.4 (2-50)†</td>
<td>Schizophrenia 80%</td>
</tr>
<tr>
<td>(N = 10)</td>
<td></td>
<td></td>
<td></td>
<td>Organic brain syndrome (OBS) 20%</td>
</tr>
<tr>
<td>Staff attention</td>
<td>73.3 (69-78)</td>
<td>8.8‡ (6-16)</td>
<td>45 (18-53)</td>
<td>Schizophrenia 89%</td>
</tr>
<tr>
<td>(N = 9)</td>
<td></td>
<td></td>
<td></td>
<td>OBS 11%</td>
</tr>
<tr>
<td>Control</td>
<td>76.25 (70-72)</td>
<td>8.4‡ (4-16)‡</td>
<td>28.87 (2-45)</td>
<td>Schizophrenia 75%</td>
</tr>
<tr>
<td>(N = 8)</td>
<td></td>
<td></td>
<td></td>
<td>OBS 25%</td>
</tr>
<tr>
<td>Overall</td>
<td>74.85 (68-87)</td>
<td>8.56‡ (4-16)‡</td>
<td>35.09 (2-53)</td>
<td>Schizophrenia 81%</td>
</tr>
<tr>
<td>(N = 27)</td>
<td></td>
<td></td>
<td></td>
<td>OBS 19%</td>
</tr>
</tbody>
</table>

* in years
† () range in years
‡ data missing on 1 subject
ment, all 30 subjects were tested with the GIES and the GRS. Then, for a 12-week period, a registered occupational therapist and an occupational therapy aide led the sensory stimulation groups and the staff attention activity groups. All groups met for 30 minutes, four times a week in a small room on each ward. One therapist served as leader while the other served as an observer, and the roles were alternated each week. The procedure for each treatment condition is summarized as follows:

**Sensory stimulation group:** The subjects were seated around a table while the therapist presented one sensory stimulus to each subject. After all the subjects experienced the stimulus and had a chance to respond to it, the next stimulus was presented to each subject. This method was chosen because it gave each subject individual attention within the group setting (9), and the subject's attention was not likely to wander if a response was requested every few minutes.

The therapist attempted to focus the subject's attention on each sense. Associations to the stimuli were encouraged, and repetition was used to ensure attention and learning. The senses were stimulated in the following order: olfactory was always first because of its arousing characteristics (20), and gustation was always last because of its reinforcing characteristics. There was no therapeutic reason for the order of the other senses, but the arrangement we used was vision, auditory, tactile, and kinesthetic/vestibular.

Each sensory item was used repeatedly but in a different context. For example, the color yellow might be used as the visual stimulus following the smell of lemons. Another day, yellow might follow the olfactory stimulus peppermint; however, the therapist or a subject would say that yellow was the color of lemons and remind the group that they had smelled lemons or tasted lemonade previously.

The sessions were designed to become progressively more difficult. For example, in the first four weeks the therapist identified one tactile substance, then asked the subject to feel the item and repeat its name. This was followed by a brief conversation on how the item felt (for example, hard or soft, warm or cool). During weeks five through eight, subjects were asked to feel two items and to identify which was warm or cool, hard or soft, and so on. In the last four weeks, subjects were asked to find an item using their sense of touch from a group of items in a box.

During all 12 weeks, conversation was encouraged about the weather or some current event, but formal reality orientation (21), for example, using a reality board with corrected feedback to each patient, was not performed. It was expected that as subjects became more aware of their environment, they would use the reality orientation aides available to them on the wards.

**Staff attention group:** As in the sensory group, the subjects were seated around a table. The purpose of the group was to give each subject increased attention, generally through the use of conversations. Members were encouraged to suggest activities that they enjoyed and that the group members might enjoy. As such, reading the newspaper, reading poetry, and looking at cartoons were some of the requests, although listening to musical recordings became the predominate activity. Each session concluded with serving refreshments as a reinforcement for attendance.

**Standard hospital treatment (control) group:** Subjects assigned to this condition received the standard hospital treatment as per their treatment plan. Their involvement in this study was limited to assessment performed at the same time as the subjects in the two treatment approaches.

After termination of the sensory and attention groups at the conclusion of 12 weeks, all 30 subjects were retested with the GIES and the GRS. For the next six weeks the subjects received only the treatment as developed in their standard treatment plan, and after a six-week span they were tested with the same instruments as used in the pre- and posttesting phases.

**Results**

The data collected from the three evaluations were analyzed with an analysis of variance (ANOVA) with repeated measures design using the harmonic mean to control for the unequal group sizes (22).

**Reality Orientation.** The hypothesized improvement in reality orientation was assessed by analyzing the summed scores of six items from the GIES in a 3 (group) × 2 (sex) × 3 (trials) ANOVA design, with repeated measures on the last factor. Sex was included as a separate factor in the design because previous research had demonstrated a sex bias on the GIES (13). The data from only 23 subjects were analyzed because of deaths or refusals in each of the groups.

A significant trials main effect was found ($F(2,34) = 3.74, p < .05$), demonstrating that all groups
had improved their reality orientation from pretesting ($M = .91$) to posttesting ($M = 3.78$) and had maintained their improvement upon follow-up ($M = 3.07$). No other significant findings were found, and the previously reported sex bias of the GIES was not supported.

**Self-Care Skills.** The GRS covered four self-care skills. The score for each skill was analyzed in a $3$ (group) x $3$ (trials) ANOVA design, with repeated measures on the last factor. Sex was not included in the design since the GRS did not have a reported sex bias as did the GIES. The data from 27 subjects were analyzed.

Regarding hygiene, a significant group by trials interaction was found ($F(4,48) = 2.275, (p < .05)$). In examining the group means (see Table 2), the following findings were noted. The sensory stimulation group demonstrated a steady increase in caring for their personal hygiene needs from their pretesting level. The staff attention group exhibited a similar improvement from pre- to posttesting but, at follow-up, their level of functioning dropped sharply. The control group exhibited a steady decrease from their pretesting level. Also, the analysis of the hygienic scores revealed a significant trials main effect ($F(2,48) = 4.27, (p < .05)$), with all groups having a significantly higher rating at posttesting ($M = 2.59$) than at pretesting ($M = 2.0$) and follow-up ($M = 1.97$) assessment.

Finally, no statistically significant results were found for grooming, care for oneself at the toilet, and eating skills.

**Interpersonal Skills.** From the GRS, three skills reflected the interpersonal functioning of the patients. The score for each was analyzed in the same manner as the self-care skills.

Whereas two factors, helping on the ward and individual response, yielded no significant main effects or interactions, the factor of group activities demonstrated significant group by trials interaction ($F(4,48) = 3.98, (p < .01)$). As shown on Table 3, the means indicate that the sensory stimulation group improved their interest in group activities from pre- to posttesting and had minimal reduction at follow-up. The staff attention group remained at the same level across all three assessment points, but the control group demonstrated a reduction in interest in group activities from their pretesting level.

**Discussion**

Because reality orientation improved for all subjects irrespective of their group affiliation, the hypothesized increase in reality orientation for the participants in sensory stimulation was not supported. To account for this finding, it may be important to explain the time frame of this study. The pretesting was undertaken in midwinter, the posttesting in the spring, and the follow-up in early summer. As the weather improved, changes were brought about in the ward routines, specifically, recreational activities and outdoor activities increased. Whether or not elderly individuals tend to be more responsive and oriented during the warmer months than the colder ones needs further study. However, it was possible to conclude that sensory stimulation had less of an impact on reality orientation than previously presumed.

Self-care skills were measured in four areas: hygiene, grooming, eating, and toilet usage. The major finding, in the hygiene dimension, showed that both the sensory stimulation group and the staff attention group improved functioning relative to the control group for the pre- and postassessment periods. If the study had terminated at that point, one would have concluded that the attention received from staff in a regular activity was critical, in that the two treatment groups both showed improved hygiene care. After a six-week period of no group sessions, however, the sensory stimulation subjects continued to maintain and improve their hygiene skills while the staff attention group subjects showed a decline. Consequently, one may conclude that staff attention was an important factor for increased sensitivity to hygiene, but that does not account for the follow-up maintenance of gains in the sensory stimulation group when compared to the staff attention group.

In the final area of interpersonal skills, the interest in group activities clearly demonstrated the benefit from a sensory stimulation program. Those subjects who participated in this condition continued to show an improvement in overall ward group participation after the therapy was discontinued. They continued to seek out group activities, whereas the staff attention group showed no change in group activities, and the control group showed further lack.

### Table 2
**Summary Table of the Means of Each Group Over Time for Hygiene**

<table>
<thead>
<tr>
<th>Assessment Period</th>
<th>Posttesting* (12 weeks)</th>
<th>Follow-up* (18 weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
<td>Pretesting*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensory stimulation</td>
<td>2.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Staff attention</td>
<td>2.78</td>
<td>3.22</td>
</tr>
<tr>
<td>Control</td>
<td>2.5</td>
<td>2.25</td>
</tr>
</tbody>
</table>

* Range of scores was 0-5
of interest or withdrawal. Thus, one major gain from sensory stimulation therapy with geropsychiatric inpatients would appear to be in the area of reducing social isolation. It has been documented that institutionalization results in an increase in withdrawal behaviors and passivity (7-9). Furthermore, social isolation also stems from major psychiatric disorders and from limitation caused by advanced age. Individuals who experience these three conditions tend to become more and more isolated as time continues. However, this study indicates that re-stimulating the senses seems to prevent further decline and may result in a reversal of that trend. In this study, the most regressed patients from the ward were selected as subjects. What effect a sensory stimulation program would have on higher functioning individuals cannot be answered. Study in this area might determine the limits of this technique.

The follow-up phase of this study was beneficial in understanding what happened to individuals after treatment was discontinued. Subjects who received sensory stimulation appeared to show continued improvement relative to those who were in a staff attention group or in a control group. The argument that sensory stimulation serves as a means for generating increased awareness in one’s environment and as a means for forestalling further deterioration appears substantiated. Because the time limit between posttesting and follow-up was brief (that is, six weeks), we cannot judge how long the effects from a sensory stimulation program remain.

Summary
This study supported many of the acclaimed benefits from using a sensory stimulation program with elderly psychiatric inpatients. Specifically, sensory stimulation forestalled deterioration and rekindled interest in the environment. This was noted primarily with regard to increased attention to daily hygiene and renewed interest in group/social affairs. Continued study with sensory stimulation programs would prove useful in delineating the most receptive target population for this treatment modality.

Acknowledgments
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REFERENCES
19. Ross M, Burdick D: Sensory Integration Training Manual for Regressed and Geriatric Patients. Connecticut Valley Hospital, Department of Rehabilitation Services, 1978

Table 3
Summary Table of the Means of Each Group Over Time for Group Activities

<table>
<thead>
<tr>
<th>Assessment Period</th>
<th>Pretesting*</th>
<th>Posttesting* (12 weeks)</th>
<th>Follow-up* (18 weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory stimulation</td>
<td>1.4</td>
<td>2.5</td>
<td>2</td>
</tr>
<tr>
<td>Staff attention</td>
<td>2.11</td>
<td>2.22</td>
<td>2.11</td>
</tr>
<tr>
<td>Control</td>
<td>2.25</td>
<td>2</td>
<td>1.625</td>
</tr>
</tbody>
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* Range of scores was 0-5