A Literature Review on the Outcomes of Sensory Integration Therapy

Topic Sentence: What are the effects of sensory integration therapy on children with learning disabilities?

Sensory integration (SI) treatment is a form of therapy utilized by many occupational therapists to enhance sensorimotor functioning. In the 1960s, an occupational therapist, Jean Ayres, studied the effects of learning disabilities on children. In the midst of discovery, Dr. Ayres identified certain sensorimotor deficits common to a subgroup of children with learning disabilities. Therefore, she developed the sensory integration theory, the Southern California Sensory Integration Test, and a treatment program aimed at remediation. Sensory integration therapy utilizes sensory input in the form of tactile, vestibular, proprioceptive, auditory, and visual stimuli in order to create adaptive motor responses (Wilson; Kaplan; Fellowes; Gruchy; & Faris, 1992). However, the use of sensory integration therapy is highly controversial and practitioners and researchers have not agreed upon the effects of the therapy.

The research question of my review is as follows: How does sensory integration treatment affect children with learning disabilities? The idealized independent variables are sensory integrative therapy as defined by a therapy program provided by occupational therapists that utilize SI principles and an alternative therapy group. The idealized dependent variables are the following: academic skills as defined by psychoeducational test batteries, gross/fine motor skills as defined by motor subtests of standardized tests, and self-esteem as defined by a standardized test. The idealized hypothesis is as follows: Sensory integration therapy as compared to alternative therapies will have a more positive impact on the academic skills, motor skills, and self-esteem of children with learning disabilities. Academic skills, motor skills, and self-esteem are the variables that will be measured to determine the effect of sensory integrative therapy. It is believed the sensory integration treatment will have a greater impact on the above variables as compared to alternative therapies such as tutoring and perceptual-motor training.

The independent variables in each of the articles were sensory integration therapy and an alternative therapy such as perceptual motor training or tutoring. The independent variables were defined differently in each article; however, all therapies were over a period of a couple of months. Two of the articles had a control group where the participants in that group received no treatment. The dependent variables differed somewhat from each other; however, they all measured some aspect of academic skills, gross/fine motor skills, and self-esteem. Standardized tests such as a psychoeducational battery, Bruininks- Oseretsky Test of Motor Proficiency, various self-esteem scales, and the Southern California Sensory Integration Test measured each of the dependent variables.

The hypothesis from the five articles can be summarized as the following: Sensory integration therapy as compared to alternative therapies will result in greater academic, gross/fine motor skills, and self-esteem. Results from the five studies did not support the hypothesis; therefore, sensory integrative therapy was not found to be the superior type of treatment for children with learning disabilities.

The external validity for each article was threatened due to the homogeneous population chosen to participate in the study. These results can only be generalized to children with learning disabilities and not to other children receiving sensory integrative therapy with various other disabilities. Internal validity was threatened in Polatajko, Law, Miller, Schaffer, and Macnab (1991), Wilson, et.al. (1992), and Wilson and Kaplan (1994) because of the small sample size.
ranging from 29 to 67 participants. Densem, Nuthall, Brushnell, and Horn (1989) reported that internal validity was challenged in their study because of the poor reliability and validity ratings on the subtests of the Southern California Sensory Integration Test. The populations in all studies consisted of young children identified with learning disabilities.

All articles agreed that sensory integration therapy did not prove itself to be the superior form of therapy for children with learning disabilities. Humphries, Snider, McDougall (1993) and Polatajko, et.al. (1991) found that sensory integration therapy and perceptual motor training were equally effective. Wilson, et.al. (1992) discovered tutoring to just as effective as sensory integration therapy and Densem, et. al. (1989) found that the physical education and sensory integration groups improved equally on the dependent measures. However, reading progress improved more in the sensory integration group with children who could read prior to the beginning of the study. In the follow-up study by Wilson and Kaplan (1994), it was found that the gross motor performance was significantly greater in those receiving SI therapy at follow-up as compared to tutoring. However, all studies agreed that children receiving therapy improved more on the dependent measures than children receiving no treatment. Therefore, it can be concluded that intervention is necessary for children with learning disabilities.

The only differences the studies had were the measurement of their dependent variables. However, it is not felt that this was a major implication or source of error in the methodology of the studies themselves. It was mentioned by Densem et.al. (1989) that motor skills are hard to accurately measure; therefore, change is hard to detect. All studies were randomized clinical trials, which adds credit to its external validity rating.

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<tr>
<th>Author(s)</th>
<th>Independent Variable</th>
<th>Dependent Variable</th>
<th>Hypothesis Tested</th>
<th>Threats to Internal or External Validity?</th>
<th>Hypothesis Supported?</th>
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<tr>
<td>The authors are B. Wilson, B. Kaplan, S. Fellowes, C. Gruchy, and P. Faris</td>
<td>The independent variables in this study were a sensory integration therapy group and a tutoring group. Treatment was 50 minutes twice a week for 75 sessions. It does not differ from my idealized variable because SI therapy was compared to an alternative type of therapy.</td>
<td>The dependent variables in this study were academic skills, fine motor skills, visual motor skills, gross motor skills, postrotary nystagmus, self-esteem, behavioral measure, hyperactivity, and reactivity measures. They differ from my idealized dependent variables because behavioral skills and visual motor skills were added as a variable, and they are measured by very specific standardized outcome measures specific to the variable.</td>
<td>Sensory integration therapy will be more effective than tutoring in improving academic, motor, and behavioral skills and in enhancing self-esteem.</td>
<td>There was a threat to internal validity because of the small sample size of 29 people. Another limitation was the inclusion criteria used to select participants. The study will have limited external validity because it only focused on children with learning and motor disabilities aged 5-9 years old.</td>
<td>The differences between the two groups were measured using ANOVAS and MANOVAS. No significant differences in treatment effects were found between the two groups after 6-12 months of treatment.</td>
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<td>The authors are T. W. Humphries, L. Snider, B. McDougall</td>
<td>The independent variables in this study were sensory integration therapy, perceptual motor (PM) therapy, and no therapy. Treatment was conducted for 72 1-hour sessions (3 sessions per week). The only difference between these independent variables and my idealized variables is that it adds a no treatment group.</td>
<td>The dependent variables in this study were tactile dysfunction, vestibular dysfunction, dyspraxia, and generalized sensory integrative dysfunction as measured by the Southern California Sensory Integration test pre/post treatment. These variables differ because they measure dysfunction instead of the specific outcomes of therapy such as improved academics, motor skills, and self-esteem.</td>
<td>Higher incidence of improvement in SI functioning among learning disabled children receiving SI therapy or PM therapy compared to no treatment, and that SI therapy would be superior to PM training.</td>
<td>This study had no noted threats to internal validity because it included a large sample and it was a randomized control trial. In addition, no external validity threats were noted except that the population consisted of learning disabled students only.</td>
<td>This study showed that learning disabled students who received SI or PM therapy improved more on their sensory integrative functioning than students in the no treatment group. However, the SI group had no advantage over PM training. Therefore, SI and PM training have an advantage over no treatment, but SI is not superior as hypothesized.</td>
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<td>The authors are H. J. Polatajko, M. Law, J. Miller, R. Schaffer, and J. Macnab</td>
<td>The independent variables in this study were sensory integration (SI) therapy and perceptual motor (PM) therapy. Both groups received 1-hour therapy sessions per week for 6 months. These variables do not differ from my idealized variable.</td>
<td>The dependent variables were academic skills, motor skills, and self-esteem. They were measured by the Woodcock-Johnson Psychoeducational Battery, Bruininks-Oseretksy Test of Motor Proficiency, Behavioral Academic Self-Esteem Rating Scale, and the Personality Inventory for Children. These variables do not differ from my idealized variables.</td>
<td>Students in the SI therapy group will improve their academic skills, motor skills, and self-esteem more than students receiving PM therapy.</td>
<td>Internal validity was threatened due to the small sample size of 67 students. In addition, external validity was threatened due to the homogeneous population of learning disabled children.</td>
<td>This study shows no significant differences between the SI and PM therapy groups. Both groups improved on the academic and motor measures. Therefore, the hypothesis was not supported.</td>
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<td>The authors are J. F. Densem, G. A. Nuthall, J. Bushnell, and J. Horn</td>
<td>The independent variables in this study were sensory integration (SI) therapy, physical education (PE), and no treatment. The mean number of therapy sessions was 17.4 for the SI group, and 16.0 for the PE group throughout four months.</td>
<td>The dependent variables in this study were language, motor, sensory-integrative skills, reading, handwriting, self-esteem, behavior, and intervention programs as measured by specific standardized tests. These variables are slightly different; however, they all fall into either the categories of academic skills, motor skills, or self-esteem.</td>
<td>Sensory integration therapy will be superior to physical education and no treatment groups on the measurement of the dependent variables.</td>
<td>The noted threat to internal validity is that measuring motor skills lends itself to inadequacy. Also, the Southern California Sensory Integration Test has questionable reliability and validity. And again the external validity is threatened due to the homogeneous population.</td>
<td>Covariance analysis found no significant difference between the groups on the dependent variables except for reading progress among children who could read previous to the therapy.</td>
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The authors are B. N. Wilson and B. J. Kaplan

The independent variables in this study were sensory integration (SI) therapy and tutoring. These variables are the same as the idealized variables. (This is the follow-up study to the B. N. Wilson, et. al.).

The dependent variables in this study were academic skills, fine motor skills, visual motor skills, gross motor skills, behavioral measures, and hyperactivity. They were measured by psychoeducational test batteries, Bruininks-Oseretsky Test, Developmental Test of Visual-Motor Integration, and the Abbreviated Symptom Questionnaire.

Gains achieved through sensory integration therapy will be more enduring than those achieved through specific skills training.

Internal validity was challenged because of the small sample size. Only 22 of the 29 previous subjects participated in the follow-up study. The external validity was threatened because of the homogeneous population.

Pearson’s Product Moment Correlations were calculated for the dependent measures of each group. Only one significant difference was found between the two groups at follow-up: gross motor area. In addition, there were no significant correlations between the amount of improvement a child made during treatment and maintenance of therapeutic gains.

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