

## **Discussion & Conclusion**

This chapter summarizes the purpose and results of the current study.

Specifically, it provides a brief overview of previous researcher findings, a review of the research questions examined in this study, a discussion of the study's results, in addition to a discussion of the implications and limitations of the study, and recommendations for future research.

### **Purpose:**

The main purpose of this to examine the differential effects of intervention strategies designed for “writing problems and behavior problems” and “writing problems” for participants with writing disabilities as well as behavior problems.

### **Significance of the Study:**

Learning disabilities have been found to occur with a host of co-morbid conditions. Psychological co-morbidity has been cited by several researchers (Cohen & Bruun 1998; John 2003, Rasmussen & Eisen 1991). Hence, intervention strategies for the treatment of LD should be aimed at both the academic problems as well as the co-existing behavior problems (John 2003). In the present study, the investigator identifies students with writing disabilities and behavior problems and thereafter addresses their academic as well as behavior problems with intervention strategies.

This study is significant for several reasons. First, the study was conducted in India, where there is hardly any research done in the area of writing disabilities. Most

of the studies have been done on reading disabilities and mathematical disabilities.

Second, the study takes into account not only the writing disability but also the associated behavior problems.

Third, the study's results show the impact of intervention strategies on writing disabilities and behavior problems. Fourth, the investigator compares the impact of intervention aimed only for writing disabilities with intervention designed for both writing disabilities and behavior problems.

Research Questions and discussion for each research question:

1. How do intervention strategies designed for the remediation of “writing disabilities” affect the performance of students on writing tasks as well as associated behavior problems?

2. How do intervention strategies designed for the remediation of “writing disabilities” and “behavior problems” affect the performance of students on writing tasks and associated behavior problems?

3. How does the impact of intervention strategies designed for the remediation of “writing disabilities and behavior problems” compare to the impact of intervention designed only for the remediation of “writing disabilities” of students?

4. What are the gender differences in the incidence of writing disabilities as well as behavior problems?

5. What are the gender differences in the overall response to intervention for writing disabilities and behavior problems?

The following subsections provide a discussion of the results found within this study, while examining each of the research questions listed above.

*Question1: How do intervention strategies designed for the remediation of “writing disabilities” affect the performance of students on writing tasks as well as associated behavior problems?*

The performance of participants on writing problems was assessed with the help of copy test, spelling test and composition test. Each group was assessed three times that is during pre-test, post-test and follow-up. Only group A and group B received intervention for the remediation of “writing disabilities”. This intervention involved the used of self-regulation strategies. The specific self-regulation strategies used in the present study are self-instruction, goal setting and self-monitoring of performance. The findings of the study have already been presented in the previous chapter.

It was found that the performance of the participants of group A showed significant difference during post-test ( $t=12.949$ ) and follow-up ( $t=13.931$ ) test in copy test. The number of errors reduced during post and follow-up test. Examining the means and SD (Table no. 4.1) of the three groups during post-test in copy test, it is seen that the number of errors decreased significantly for the two experimental groups, however there was no change in performance of group C. This shows that the intervention helped in improving the copying skills of group A. Studies conducted on handwriting skills of children with LD have shown similar results (Graham & Harris, 2006). Even in the pilot study, the participants showed an improvement in the copy test. The number of errors decreased steadily after the baseline phase. Rosario (1991) also found similar results in copying skills of 25 children with LD. The intervention that included monitoring the daily performance, helped in decreasing the number of errors to 7.16 on an average at the end 25 sessions.

Similarly, group A showed an improvement in the spelling test. The number of correct spellings increased after intervention showing significant results at the post-test ( $t=-8.731$ ) and follow-up test ( $t=-7.292$ ). However, no significant difference was found between the post-test and follow-up test ( $t=.900$ ). The performance did not improve further after the post-test. The results of group A shows that the intervention had a positive impact on the spelling test. This improvement was also noted during the pilot study, where the number of correct spellings increased after first the intervention phase.

In the composition test, the number of elements increased during the post-test for group A. The post-test and follow-up test scores were significantly higher than the pre-test scores ( $t=-18.116$ ;  $t=-17.941$ ). The essays were longer and included on an average 4-5 elements (4.20-4.25). Graham and his colleagues have found similar results in their studies on expressive writing. Sexton, Harris & Graham (1998) conducted a study with six students belonging to the 5<sup>th</sup> and 6<sup>th</sup> grade. The students were taught the SRSD strategies for composition. The students planned well before writing and the length of their written piece also increased. Another study involving three fifth grade students also produced positive impact on the students' writing (Troia, Graham & Harris 1997).

Significant between subjects effect ( $F=291.933$ ;  $p=.000$ ) was found for the post-test scores of the three groups, showing statistical difference in the performance of the three groups for the copy test. Moreover, the result of the post-hoc analysis also shows that there was a statistically significant difference between groups A and C in the post-test ( $MD=-21.750$ ) and follow-up test ( $MD=-22.900$ ) scores on all three measures of writing with a 95% confidence interval. Similarly in the spelling test group A and group C showed significant difference during post-test ( $MD=2.200$ ) and

follow-up test (MD=2.000) with a 95% confidence interval. Even for the composition test, the post-test and follow-up test scores were significantly different (MD=2.600; MD=2.450) for group A and group C. This finding indicates that while the group A showed improvements in all three areas of writing, group C did not show any change in performance. Furthermore, the group A showed reduction in the average number of behavior problems as compared to group C. Even though this was not established statistically, the teachers observed that the students were more attentive, less distracted and impulsive. This shows that the intervention had an impact even on the behavior of the participants.

As mentioned earlier, the investigator used self-regulation strategies for the intervention of writing problems. In the meta-analysis conducted by Baker, Chard, Ketterlin-Geller, Apichatabutra and Doabler (2009), the effect sizes for the studies using self-regulation strategies, ranged from +0.80 to +1.85. The average weighted effect size was +1.22 and the 95% confidence interval around this effect size ranged from a low of +0.92 to a high of +1.53. These results are similar to the findings of the present study. The improvement in the performance of group A in all three measures of writing shows that the intervention strategies had a positive impact on their performance. Hence, it may be said that self-regulation strategies benefit children with LD in all three areas of writing.

*Question 2. How do intervention strategies designed for the remediation of “writing disabilities” and “behavior problems” affect the performance of students on writing tasks and associated behavior problems?*

The combined effect of intervention designed for the remediation of writing and behavior problems can be understood by looking into the performance of the

participants in group B that received intervention for writing as well as behavior problems.

The results of group B showed a significant difference at the post-test ( $t=15.787$ ) and follow-up ( $t=16.245$ ) test scores in copy. The number of errors decreased after the intervention.

The participants in group B showed improvement in the spelling test during the post-test and follow-up test. For spelling test the difference between post and follow-up was not significant. The students did not improve further. The effect of intervention was not completely maintained after post-test. However, the difference between pre-test and post-test scores shows that the participants did gain from the intervention. The number of correct spellings increased up to 5 on an average across the three times of testing. Even in the pilot study, the maintenance phase showed a decrease in the number of correct spellings for all three participants.

The results for the composition test were also found to be significant for group B across all times of testing. The number of elements increased to a maximum of 6.40 out of 7 elements as a result of the intervention. Self-regulation strategies have been found to be effective in improving the composition skills in previous studies (Sexton, Harris & Graham, 1998; Troia, Graham & Harris, 1997).

Thus, group B showed improvement in all three areas of writing. In addition Group B received behavior modification therapy for the intervention of behavior problems. The intervention comprised positive as well as negative reinforcements. Significant reduction in the behavior problems was recorded for group B during post-test ( $t=37.038$ ;  $p=.000$ ). However, there was no difference in their performance from post-test to follow-up test. The teachers observed fewer problem behaviors during the post-test and follow-up test as compared to pre-test. Similar data was obtained during

the pilot study where the participants showed a decrease in the average number of behavior problems.

Miranda, Jarque, & Tarraga (2006) have reported the benefits in reducing problem behaviors in school going children in their meta-analysis. Eight out of these 16 studies used behavior therapy. All of them showed a positive impact in reducing disruptive behaviors and increasing desirable behaviors.

Therefore, it may be concluded that the group B showed improvement in writing as well as behavior. Thus, the intervention strategies that target the writing and behavior problems have a positive impact on the performance in writing as well as behavior.

*Question 3. How does the impact of intervention strategies designed for the remediation of “writing disabilities and behavior problems” compare to the impact of intervention designed only for the remediation of “writing disabilities” of students?*

The differential effect of the two experimental treatments used for the remediation of writing as well as behavior problems can be studied by examining the results of the two intervention groups A and B.

The groups A and B were found to be significantly different in the post test and follow-up test for copy (MD=4.850; MD=4.200) and composition (MD=-1.700; MD=-2.200). The number of errors in the copy test in case of group B was less than that of group A. Similarly, the number of elements was found to be more in case of group B. Reference is also made to the results of the single-subject study, where the performance of participants during the intervention phase 2 (SR + BMT) was found to be better than the scores during intervention phase 1 where only self-regulation techniques were used. This indicates that the additional behavior therapy had a better impact on copy and composition test.

The group A and group B did not show significant difference in spelling test. The performance of both the groups was similar during post-test (MD=-.450) and follow-up test (MD=-.450). Similar results were found in the pilot study where no difference in performance was observed during the two intervention phases. Both the groups had a similar improvement. This shows that behavior anomalies may not be having a serious impact on spellings.

According to Graham and his colleagues, non-academic roadblocks such as behavior problems hinder the process of learning, making it difficult for the child to completely benefit from interventions. Interventions that deal with the behavior of the participants apart from the academic difficulties yield better results (Harris et al. 1994; & Di Gangi, Maag & Rutherford, 1991). The results of this study show that the impact of interventions designed for the remediation of writing and behavior problems is higher than the intervention designed only for writing. The additional effect of behavior therapy has brought a positive impact on the overall performance and behavior of the participants.

#### Summary of the study:

A thorough literature review revealed that the writing disabilities are understudied as compared to the other subtypes of Learning disabilities. Moreover, it also revealed that there is a lack of studies where intervention has been designed for LD and the associated problems. Therefore, the investigator conducted this study to overcome this gap in research. The aim of this research was to study the effect of intervention strategies on writing disabilities and behavior problems.

After a careful screening procedure, 60 participants were selected out of 110 from Baroda city. There were 10 girls and 50 boys in the study. All the participants

were randomly assigned to three groups. Group A was given intervention only for writing problems while group B was given intervention for writing as well as behavior problems. Group C was assigned as the control group receiving no intervention.

For the screening of participants the investigator used the following standardized tools.

- 1) NIMHANS Index for Specific LD (2002)
- 2) Malins Intelligence Scale for Indian Children (1969).
- 3) Child behavior checklist (2005).

The intervention for writing involved the use of self-regulation strategies. The specific strategies used in this study are self-instructions, goal setting and self-monitoring of performance. Self-regulation strategies have been proved to be an example of evidence based intervention for the remediation of writing problems by several studies .

The performance of the participants was tested at three times, pre, post and follow-up. The data collected at the three times for the three groups was analyzed using t-test, one-way ANOVA and two-way ANOVA.

From the results obtained from the study the following conclusions may be made:

- Students with LD show co-existing behavior problems.
- Self-regulation strategies have a positive impact on all three areas of writing.
- Behavior anomalies do not seem to affect spelling.
- Behavior therapy brings additional improvement in writing skills.

### Implications of the study

The study is significant for several reasons. First, the study was conducted in India, where there is hardly any research done in the area of writing disabilities. Most of the studies have been done on reading disabilities and mathematical disabilities.

Second, the study takes into account not only the writing disability but also the associated behavior problems.

Third, the study's results show the impact of intervention strategies on writing disabilities and behavior problems.

Fourth, the investigator compares the impact of intervention aimed only for writing disabilities with intervention designed for both writing disabilities and behavior problems. The result of the study supports the view for an overall comprehensive intervention for children with LD that address the academic as well as non academic problems.

Fifth, the intervention strategies used in the present study may be easily adapted in classroom by teachers. Special educators or general teachers in special education may be trained to deal with children with LD in the classroom setup using strategies employed in this study.

Moreover most of the researches studying the effect of self-regulation strategies have used single subject design. This study has used single subject design for the pilot study and experimental study with 60 subjects to study the effect of the experimental treatment.

In conclusion, the present study has implications for research on LD in general and specifically for India.

#### Limitations of the present study

- The sample size of females in the study is small. Moreover, the study has been conducted on a total sample of only 60 subjects.
- Only five schools were included in this study. A few more could have been taken, however due to the limitation of time it was not possible. The academic session of the schools had come to an end which made it difficult to approach schools for data collection.
- This study was conducted only in urban setting.
- India is a multilingual country; children typically grow up speaking in 2 or more languages. The medium of instruction in schools also vary from school to school and location of the school. This study involved only participants belonging to schools where the medium of instruction was English.

### Recommendations for future research

- Classroom based interventions using similar strategies may be used in a normal classroom by the teacher.
- Teachers may be actively involved in future research.
- They may be provided training in the techniques and asked to use it in their classroom.
- Research with participants from different settings such as area urban and rural areas.
- Research on schools with different medium of instructions (English/ vernacular) may be conducted.
- Research may be conducted on other aspects of writing disability which could not covered in this research.