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Title of the thesis: Impact of Cognitive Retraining (CR) on Intellectual functioning and Scholastic ability of Below Average to Borderline IQ children

ABSTRACT

Intelligence and Cognitive functioning are the two primary inter-related concepts that have been consistently discovered as the predictors of scholastic or academic success, occupational achievement and overall all adaptiveness to inevitable challenges in life (Sophie, Benedikt, Premuzic, & Tomas, 2011). Children with below average to borderline intellectual functioning ($70 < IQ < 89$) estimated to be constituting 13.6% of the general population (Jankowska, 2016), referred to as slow learners in the literature, are often overlooked as they do not fall into any clinically diagnostic category with regard to their difficulties and plights in coping up with the academic demands of a regular classroom (Salvador, 2013). Cognitive Retraining (CR), a well researched intervention approach has demonstrated success in improving the cognitive deficits of children and adults who have been unfortunate fatalities of various psychiatric and neurological conditions and developmental disorders (Kaldoja, Saard, Lange, Raud, Teever & Kolk, 2015). The present study was envisaged with the purpose of exploring the effect of Cognitive Retraining in improving the cognitive functioning, overall intelligence and scholastic ability of children with Below average to Borderline intelligence (BABI). Pre-and Post intervention research design was employed. The study sample included 90 primary school going children belonging to upper middle socio-economic strata as assessed using Kuppuswamy's scale of Socio-economic strata-Urban (2012 revision) falling within the age range of 8-10+ years and studying in third, fourth or fifth grades from any regular school. Children were screened using Colored Progressive Matrices (CPM) for their intellectual functioning and Developmental Psychopathology checklist (DPCL) to rule out psychopathology, if any. Children fulfilling all of the inclusion and none of the exclusion criteria for the study were included. Out of 90 children included in the study, 30 children having *Average to above average intelligence* ($IQ > 90$) constituted the *Normal Intelligence group* and 60 children with *BABI* ($70 < IQ < 90$)

with consistently low academic achievement constituted the *Experimental group* for baseline comparisons of cognitive abilities. From 60 children with BABI, 30 children were randomly placed in Intervention group (with CR) while 30 other formed the Control group (without CR). Various standardized tests were administered to assess intelligence and specific cognitive functions of each child at pre and post intervention level, namely.: Mallin's Intelligence Scale for Indian Children, Digit Cancellation test (DCT), Bender visuo-motor gestalt test-II (BVMGT-II), Rey Auditory Verbal Learning Test (RAVLT) and Rey Osterieith Complex figure test (ROCFT) (for pre assessment) and Rey Modified Complex Figure Test (RMCFT) (for post-assessment) and Trail Making Test (TMT-A & B). Scholastic ability was operationally measured in terms of Teacher's rating on a 7 point Likert scale on the basis of child's class room participation and performance on academic achievement on routine tests. Cognitive retaining involved 28 individual and group sessions for forty minutes each on twice or thrice a week basis.

The statistical analysis carried out to make baseline comparison of intellectual and cognitive functioning of *Normal Intelligence group (n=30)* and the *Below Average to borderline (BABI) group (n=60)* by applying independent sample t-test indicated that the BABI group was significantly lower on various parameters of intelligence as assessed on MISIC and other cognitive functions assessed except DCT, a measure of sustained attention and RAVLT delayed recall. The pre-post comparison was carried out using paired t-test. The result was found to be significant on all the parameters of intellectual functioning, cognitive functioning and scholastic ability for CR Intervention group. The Control group subjects showed improvement only selective cognitive functions viz., verbal retention, immediate visual retention, visual scanning and focused attention but the effect size was large for the Intervention group. The post-mean comparisons done using independent sample t-test indicated significant difference on all the parameters of Intellectual functioning and for the cognitive functions of immediate verbal memory, visual scanning, immediate visual memory, delayed visual memory, focused attention and set shifting. Multiple Linear Regression indicated TMT Trail 'B' and ROCFT copy trial, measures of *set shifting and working memory*, and *visual scanning* to be the predictors of academic achievement. Thus, it can be concluded that Cognitive Retraining, primarily targeting the fluid abilities of a child can produce transfer effect on overall intellectual functioning as well as the scholastic ability of children with below average to borderline intelligence.

Key Words: Cognitive Retraining, Borderline intelligence, slow learners, Scholastic Ability