CHAPTER-3
METHODOLOGY
Chapter 3

Methodology

In the previous chapter, a number of findings and concepts from the available literature have been delineated. It has been observed that in obsessive compulsive disorder, various cognitive and behavioral aspects of personality are grossly affected, due to which ensuring quality of life turns out to be big challenge for the patients. Studies have revealed that usually the major difficulties occur in execution of those areas, which are of greatest significance to the adolescent, that is, in academic performance, and various aspects of social interaction (Sukhodolsky et al., 2005). But in India, not many studies have been conducted relating to obsessive compulsive symptoms with cognitive processes and academic achievement.

3.1 Aim of the Study

The Present study purports to explore the role of obsessive-compulsive symptoms in intelligence-achievement relationship and cognitive processes of the adolescent students.

3.2 Elucidation of the terms

GENERAL INTELLIGENCE:

According to David Wechsler (1944) "intelligence is the aggregate or global capacity of individual to act purposefully, think rationally and to deal effectively with his environment." Intelligence can be assessed in terms of general Intellectual ability and specific ability.

OBSESSIVE COMPULSIVE SYMPTOMS: There are a number of variables related to obsessive compulsive symptoms.

Compulsions Symptoms:

Compulsions can involve either overt repetitive behaviors (such as hand washing, checking, or ordering) or more covert mental acts (such as counting, praying, or saying certain words silently (DSM-IV-TR, 2000).
Compulsions Impairment:
Compulsions impairment is measured by the amount of interference in social or work (role) functioning due to compulsions (Baer & Blais, 2010).

Obsession Symptoms:
Obsessions involve persistent and recurrent intrusive thoughts, images, or impulses that are experienced as disturbing and inappropriate. People who have such obsessions try to resist or suppress them, or to neutralize them with some other thought or action (DSM-IV-TR, 2000).

Obsessions Impairment:
Obsessions impairment is measured by the amount of interference in social or work (role) functioning due to Obsessions (Baer & Blais, 2010).

Total Impairment:
The total of both Obsessions and compulsions impairment (Shafran et al., 2003).

COGNITIVE PROCESSES:

“By cognitive processes, psychologists mean every aspect of our mental life—our thoughts, memories, mental images, reasoning, decision making, and so on—in short, all aspects of human mind” (Baron, 2006, p.5). The variables of the cognitive processes used here are span of memory, post criterion trial (PCT), retroactive inhibition and attention.

Span of Memory
“The number of units (digits/letters) an individual can repeat back in order after a single presentation of them. Most college students can remember 8 or 9 digits without making errors, but longer lists pose problems” (Santrock, 2006, p.237).

Post Criterion Trial (PCT)
Subject’s response to post criterion Trail (PCT) is determined by the percentage of correct response at a specific trial, after fulfilling the necessary criteria.

Retroactive Inhibition
“A disruption of memory that occurs when material learned later interferes with the retrieval of information learned earlier”. (Santrock, 2006, p.256).
Attention:
“Sustained concentration on a specific stimulus, sensation, idea, thought, or activity, enabling one to use information processing systems with limited capacity to handle vast amounts of information available from the sense organs and memory stores” (Colman, 2006, p.63).

ACADEMIC ACHIEVEMENT:

Academic achievement, the crux of this study has been variously defined: as level of proficiency attained in academic work or as formally acquired knowledge in school subjects which is often represented by percentage of marks obtained by students in examinations (Kohli, 1975).

Commensurate with the education system of West Bengal, the following components and indices of academic achievement were taken.

First Language First Paper:
In West Bengal Board of Secondary Education, Bengali is the first language and there are two papers in it. Bengali First Paper is the First language First Paper. Average marks of unit test and final examination of last two consecutive years were taken as achievement scores.

First Language Second Paper:
In West Bengal Board of Secondary Education, Bengali Second Paper is as the First language Second Paper. Average marks of unit test and final examination of last two consecutive years were taken as achievement scores.

Second Language:
In West Bengal Board of Secondary Education, English is selected as Second Language paper. Average marks of unit test and final examination of last two consecutive years were taken as achievement scores.

Mathematics:
In Mathematics, level of proficiency is measured by marks obtained in Arithmetic, Algebra and Geometry. In mathematics, average marks of unit test and final examination of last two consecutive years were taken as achievement scores.
Physical Science:
Student's scientific aptitude can be assessed by the marks obtained in physical science. Average marks of unit test and final examination of last two consecutive years were taken as achievement scores.

Life Science:
Student's aptitude in Biological sciences may be assessed by marks obtained in life science. Average marks of unit test and final examination of last two consecutive years were taken as achievement scores.

History:
Achievement score in history indicates student's ability to understand and memorize historical facts and events. Average marks of unit test and final examination of last two consecutive years were taken as achievement scores.

Geography:
Marks of Geography measure student's knowledge about geographical events and facts. Average marks of unit test and final examination of last two consecutive years were taken as achievement scores.

Total achievement:
Total achievement is determined by the sum of all the separate scores obtained by the individual in different subjects stated above.

INTELLIGENCE-ACHIEVEMENT RELATIONSHIP
Intelligence-Achievement relationship has been defined as Correlation between general intelligence and achievement scores. The relation between intelligence and achievement has been known for centuries (Stead 1925; Taylor 1933; Eysenck 1960; Stephen 1960; Vernon 1961; Rao 1963; and Karnes et al., 1984), while this seems to be influenced by numerous non-cognitive factors as well (Deary et al., 2007; Laidra et al., 2007; Neisser et al., 1966; Sternberg & Kaufman, 1998). From the perspective of non-cognitive variables, personality and motivational characteristics are conducive to academic success. Extraverted children perform better in school till the age of 13 or 14, after which introverts gain a progressive advantage (Eysenck & Cookson, 1989). The relationship between neuroticism and academic
achievement has been studied (Eysenck & Eysenck, 1985). Again a negative correlation may be expected between psychoticism and achievement (Savage 1972, Nias 1973; Goh & Moore, 1978). A number of studies have been reported a positive relationship between motivation and achievement (Sinha 1970, Jawa 1972, Singru 1972, Kohli 1975). While crystallized intelligence seems to be a better predictor of any specific achievement, Rohde and Thompson (2007) found that improvement in GPA depends more on improvement in fluid intelligence.

3.3 Research Hypotheses:

**Hypothesis 1:** There would be significant difference between the two Genders (Boys versus Girls) in achievement in terms of (i) 1st Language 1st paper average, (ii) 1st Language 2nd paper average, (iii) 2nd Language average (iv) Mathematics average, (v) Physics average (vi) Life science average, (vii) History average, (viii) Geography average, and (ix) Total average.

**Hypothesis 2:** There would be significant difference between the two Groups (High versus Low Obsessive Compulsive symptoms) in achievement in terms of (i) 1st Language 1st paper average, (ii) 1st Language 2nd paper average, (iii) 2nd Language average (iv) Mathematics average, (v) Physics average (vi) Life science average, (vii) History average, (viii) Geography average, and (ix) Total average.

**Hypothesis 3:** There would be significant difference between the two Genders (Boys versus Girls) in Cognitive processes in terms (i) General intelligence, (ii) Span of memory, (iii) Number of test trials till 100%, (iv) PCT, (v) Retroaction and (vi) Attention.

**Hypothesis 4:** There would be significant difference between the two Groups (High versus Low Obsessive Compulsive symptoms) in Cognitive processes in terms (i) General intelligence, (ii) Span of memory, (iii) Number of test trials till 100%, (iv) PCT, (v) Retroaction and (vi) Attention.

**Hypothesis 5:** There would be significant difference between the two Genders (Boys versus Girls) in intelligence-achievement relationship.

**Hypothesis 6:** There would be significant difference between the two Groups (High versus Low Obsessive Compulsive symptoms) in intelligence-achievement relationship.
3.4 **Schematic Representation of Research Design: Cross Sectional Comparison**

**Independent Variables**

- Groups (High versus Low Obsessive Compulsive Symptoms)
- Gender (Male, Female)

**Dependent Variables**

- Academic Achievement (Achievement in Language, Mathematics, Physics, Life science average, History, Geography and Total average)
- Cognitive processes (General intelligence, Span of memory, Number of test trials till 100%, PCT, Retroaction and Attention)

**Intelligence - Achievement Relationship**

**Control variables**

1. Age (14 Years)
2. Bengali Medium School
3. Class-VIII
4. Language (Bengali)
5. Location
6. Academic Record (Satisfactory)
7. Parental Income
8. Parental Education
9. Parental Occupation
10. Freedom from any chronic disease or diagnosable psychiatric morbidity (may have sub-clinical level of Obsession and compulsion)

**Sampling Unit:** A total of 210 school students (100 boys and 110 girls) of Class VIII from different schools of Kolkata City.
3.5 **Sample:**

For selection of sample, the researcher contacted the authorities of different Bengali Medium Schools in Kolkata city. Prospective participants were the boys and girls with the age of 14 years (Class VIII). The total number of participants was 210 (100 boys and 110 girls). These schools were selected from different zones of Kolkata city like south, North, South East, South West and Central zone. Finally five Boys and five Girls schools were short listed covering all the zones and fulfilling the necessary criteria. The final sample was selected with those students who met the defined criteria. Apart from some of the general criteria, it was imperative to ensure that the sample was not suffering categorically from Obsessive compulsive disorder to the extent that it could be called a clinical condition. Therefore, it was decided that those students who would fall in the normal or sub-clinical level of obsession and compulsion, as ensured from their mental health history (never referred to a mental health worker, psychiatrist or psychotherapist), and scoring at sub-clinical level on CY-BOCS test for children, would only be incorporated. This was done, as our focus was on obsessive compulsive symptoms and not on the disorder per se.

**Table 3.1. The Sampling Criteria:**

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tbody>
<tr>
<td>• Age of the Subject : 14 Years</td>
<td>• School dropout</td>
</tr>
<tr>
<td>• Medium of school &amp; Class : Bengali medium &amp; Class-VIII</td>
<td>• History of failure in examination</td>
</tr>
<tr>
<td>• Parental education : Minimum Secondary level</td>
<td>• Suffering from severe physical disability.</td>
</tr>
<tr>
<td>• Parental Income: Rs (5000-35000)/month</td>
<td>• Suffering from any chronic disease</td>
</tr>
<tr>
<td>• Condition: Willing to cooperate with the Author</td>
<td>• History of referral to psychiatrist or psychotherapist for obsession or compulsion</td>
</tr>
<tr>
<td>• Parental occupation: Business or service but at least, one of the parents is employed</td>
<td>• Uncooperative with the Author</td>
</tr>
<tr>
<td>• Mother tongue: Bengali Speaking</td>
<td>• Both parents are unemployed</td>
</tr>
<tr>
<td>• Residence: Residing in and around Kolkata</td>
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<tr>
<td>• Having Consistency in schooling and academic record</td>
<td></td>
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<tr>
<td>• Having a CY-BOCS score below 15</td>
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3.6 **Selection of the Variables**

Independent variables and the rationale for their selection

3.6.1. **Independent variables: (1) Gender and (2) Groups.**

These variables and the rational for their selection are detailed below:

**Gender:** This present study was conducted to determine if there any sex variation in Obsessive compulsive symptoms, Cognitive processes Achievement scores and Intelligence- Achievement Relationship. For this purpose male and female students of Class VIII and of 14 years of age, belonging to the different schools of Kolkata city were selected. The reasons for selections are as follows:

*Rational:* Gender was selected as an IV because literature reveals gender difference in OCD symptoms. The average age of onset for childhood OCD ranges from 7.5 to 12.5 years (Geller *et al.*, 1998), with a mean of 10.3 years. It has been estimated that 30-80% of adults with OCD recall the onset of their symptoms beginning before 18 (Pauls, Alsobrook, Goodman, Rasmussen, & Leckman, 1995; Rasmussen & Eisen, 1992). The age of onset appears to be earlier in boys than in girls and peaks first in puberty then in early adulthood (Zohar, 1999). The majority of studies of childhood OCD find an average of 3:2 male: female ratio (Geller *et al.*, 1998) although the gender distribution is found to be approximately equal in adults (Antony, Roth, Swinson, Huta & Devins, 1998; Rasmussen & Eisen, 1992).

**Groups:** In this study ‘groups’ was selected as one of the independent variables. The two groups consisted of the participants with High and Low obsessive compulsive symptoms. These two groups were created from the total sample on the basis of their obtained total impairment scores on CHOCI.

*Rational:* The purpose of the study is to determine the role of obsessive compulsive symptoms in cognitive processes, achievement and intelligence achievement relationship. It was thought best to divide the available sample in two groups to find out how the symptoms influence these variables. While for detailed discussion we have separate symptom scores and separate impairment scores, for grouping the total impairment was taken as criterion, because in real life, obsessions and compulsions are associated in numerous ways. In
clinical cases an obsession may occur with or without an associated compulsion. Akhtar, Wig, Verma, Pershod, & Verma, (1975) found in a large series of patients, that 25% had obsessions and no related compulsive behavior. Similar findings were reported by Wilner et al. (1976). More often, obsessions lead to related compulsive behaviors, for example an obsessional thought of contamination by dirt or germs, leading to extensive washing of hands and body each time the obsession is experienced. In such cases the individual feels strong need to wash and an inability to relax until this has been accomplished. Compulsions without obsessions are very rare but they do occur. Wilner et al. (1976) reported that 6% of their series of 150 patients had compulsions only. Rachman and Shafran (1998) have recently pointed out that occasionally the compulsive behavior can give rise to an obsession; repeated checking of the gas cooker, for example, can be followed by obsessional thought that one’s mental stability and reliability may be impaired. Such instances, however, are rare.

3.6.2. Dependent variables and the rational of their selection:

In this present study there are three dependent variables: (1) Academic achievement, (2) Cognitive Processes and (3) Intelligence-Achievement Relationship. These dependent variables and the rationale of their selection are discussed below:

**Academic achievement:** It refers to the average of marks obtained by the individual in different subjects in two consecutive examinations. There are eight subdivisions of this DV, namely First language first paper average, First language second paper average, Second language average, Mathematics average, Physical science average, Life science average, History average and Geography average.

**Rational:** This DV was selected because earlier literature reveals that obsessive compulsive tendencies result in a number of functional impairment in the child. Studies have revealed that usually the greatest difficulties occur in execution of those areas, which are of greatest significance to the child and the adolescent, that is, in academic performance, and various aspects of social interaction (Sukhodolsky et al., 2005). Another study by Piacentini, Bergman, Keller, and McCracken, (2003) surveyed the complaints reported by 151 OCD children and adolescents and their parents. They observed that parents of clinic referred OCD children and adolescents identified the most significant problems as trouble with concentrating on schoolwork (47%), doing homework (46%), and getting ready for bed...
The children and adolescents themselves complained more of difficulties relating to concentrating on school work (37%), doing homework (32%), and doing household chores (30%).

**Cognitive Processes**

Cognitive process refer to the process of gaining information about the internal and external environment, Storage and processing of information and utilize the information selectively and optimally for problem solving and decision making in the most effective way. Thus cognitive processes include attention, perception, learning, memory and thinking, utilizing language, reasoning and emotions. In this present study cognitive process has been used as one of the dependent variables. The following aspects of cognitive processes are being studied in the present research: General intelligence, Span of memory, Number of trials till 100%, Post criterion trial (PCT), Retroactive Inhibition and Attention.

**Rationale:**

Cognitive processes like intelligence, memory, attention etc. are integral parts of academic achievement. The present study was interested to explore the pathway by which obsessive-compulsive symptoms influence achievement. Therefore, the cognitive processes specified above were selected.

Earlier studies revealed that like the adult OCD patients the principal problem among child OCD is also cognitive in nature (Rangaswami, 1999). Another study showed that poor achievement of high obsessionial thought group may be attributed to their intrusive thoughts, which are key source of cognitive disturbance (Malakar, Basu & Chaudhuri, 2009). People with high obsessionial thoughts pay more attention to the dysfunctional beliefs (Clark & Purdon, 1993), which, coupled with schemas concerned with the need to control them produces distress. Obsessional thoughts are known to impair cognitive performance on domains like visuo-spatial memory, verbal fluency (Roh et al., 2005), spatial working memory, spatial recognition (Purcell, Maruff, Kyrios, & Pantelis, 1998) and executive functions (Andres-Perpina, Lazaro-Garcia, Canalda-Salhi, & Boget-Lucia, 2002).
Intelligence - Achievement Relationship:

In the present study Intelligence-Achievement relationship was defined as Correlation between general intelligence and achievement scores has been used as a dependent variable. Almost all the studies obtained a significant positive correlation between these two constructs (Deary et al., 2007; Laidra et al., 2007; Neisser et al., 1966; Sternberg & Kaufman, 1998), though the amount of relationship varies.

Rational: In recent years this index is being used extensively, particularly because it is argued that discrepancy between IQ and achievement test scores should be used as proper index of the intellectual condition (Bennett & Clarizio, 1988; Barnett & Macmann, 1992).

3.6.3. Enumerating The Control Variables And The Rational For Their Selection

The dependent variables of this study, that is, Intelligence-Achievement relationship and Cognitive processes could be influence by a number of variables other than those selected as independent variables (Groups and Gender). To ward off the influence of variables other than the independent variables, it was imperative to identify the important relevant variables and to control them for maximizing the effect of independent variables. The relevant variables that had been identified and controlled were as follows-

A) Age (14 Years)

Many studies with obsessive compulsive disorder shown that the average age of onset for childhood OCD ranges from 7.5 to 12.5 years (Geller et al., 1998), with a mean of 10.3 years. It has been estimated that 30-80% of adults with OCD recall the onset of their symptoms beginning before 18 (Pauls et al., 1995; Rasmussen & Eisen, 1992). The age of onset appears to be earlier in boys than in girls and peaks first in puberty then in early adulthood (Zohar, 1999). In this study students with 14 years of age were selected, because it was assumed that significant symptoms would be more or less prominent by this time.

B) Studying in Bengali Medium School and Class (VIII)

Only the students studied in Class-VIII of Bengali medium schools were included in the sample. Variation in medium and class may have a negative impact on the dependent variables of the present work.
C) Language

Only the students whose mother tongue was Bengali were chosen as target population. Since obsession sometimes takes the form of inhibition with words in a particular language, homogeneity of mother tongue was essential.

D) Location

The subjects who were selected as the study participants resided in and around Kolkata. The rural and urban areas differ in disease related awareness and problems. In order to maintain the homogeneity within the sample, subjects were selected from the different areas of Kolkata city.

E) Academic Record (Satisfactory)

Since the academic achievement was assessed in terms of two consecutive examinations, only those who have passed in two consecutive examinations were taken. Since the syllabus for failed students would differ from that of the passed student (failed students working with the same syllabus twice), they were excluded.

F) Parental income

In this present study, the income group of Rs. 5000.00 to Rs. 35,000.00 was considered. People from very low income group may have different disease awareness and orientation. Again much variation in income group may adversely affect the homogeneity of the sample.

G) Parental education

In this present study, participants whose parents have at least secondary level of education were included in the sample. In many instances it has been seen that poor educational background of the parents lead to the poor development of their child. In order to maintain homogeneity of the sample the above mentioned criteria were considered.

H) Parental Occupation

The participants, whose at least one of the parents is employed in any institution or has chosen his/her occupation as business were included in this present study. Since, people from different occupational class may have different disease awareness and orientation which may adversely affect the homogeneity of the sample.
I) Freedom from any chronic disease or diagnosable psychiatric morbidity (may have sub-clinical level of Obsession and Compulsion)

All participants were free from any chronic disease or diagnosable psychiatric morbidity as revealed through information schedule. Also, they had a score below 15 on CY-BOCS to ensure that they were below clinical level of OCD.

3.7 Selection Of Sampling technique

In order to obtain an ideal sample a number of techniques have been introduced. The adequacy of a sample (i.e. its lack of bias) depends upon the method used in collecting the sample (Garrett, 1966)

The stratified purposive sampling Procedure: - Among the various sampling techniques, the purposive sampling technique was selected for the present study.

The sampling procedure was as follows –

For selection of sample at first the researcher identified several Boys and Girls Bengali Medium Schools at different zones of Kolkata city. Accordingly, a list was prepared consisting of name and locations of these schools. Finally covering all the different zones and fulfilling the necessary criteria, five Bengali Medium Boys and five Bengali Medium Girls schools were shortlisted. Thereafter the researcher contacted with authorities of these schools and study group was selected. Thereafter, background information was collected from the prospective participants and the students who met the defined criteria and also volunteered for the study were included as the subjects.

The Final Sample

A total of 300 data were collected from which 210 were ultimately retained considering the sampling criteria. Among the 210 participants, 100 were male and another 110 were female. The age level was restricted to 14 years and all of them studied in Class VIII. All data were collected only after obtaining the informed consent of the participants.

The demographical variables of the sample are demonstrated in the graphs below—
Graph-1: Graph shows the percentage of number of family members of adolescents.

Graph-2: Graph shows the percentage of monthly family income of adolescents.
Graph-3: Graph shows the percentage of educational status of father and mother of the adolescents.

Graph-4: Graph shows the percentage of job status of father and mother of the adolescents.
Graph-5: Graph shows the percentage of number of siblings of adolescents

No sibling One sibling Two siblings Three siblings
Number of Siblings

Percentage (%)

Male Female

Graph-6: Graph shows the percentage of position of adolescents among their siblings

Single position First position Second position Third position Fourth position
Position among siblings

Percentage (%)

Male Female
Graph 7: Graph shows the percentage of suffering from earlier major physical diseases by the adolescents since childhood.

Graph 8: Graph shows the percentage of relationship of adolescents with their parents.
3.8 Measures Used In This Study

1. Information Schedule (Appendix-A)

An information schedule was prepared, which included information on Name, Age, Sex, Family members, Number of Siblings, Position among the sibling, Relationship with parents, History of parental Separation etc. Also, information regarding Mental and Physical health, History of Academic failure, Problems regarding study was included.


*Description of the Tool:* It is a non-verbal culture free intelligence test. It assesses a person’s present clarity of observation and level of intellectual development. A person’s total score provides an index of his intellectual capacity with relatively little influence from the cultural environment in which the individual grew up. The scale consists of 60 problems divided into five sets, or series of diagrammatic puzzles. Each puzzle has a part missing, which the person taking the test has to find among the options provided. It is designed to be used with children as well as adults.

The majority of the internal consistency coefficients exceed 0.90 having a modal value of 0.91. The test–retest reliabilities ranging from 0.83–0.93 with the higher values being associated with younger subjects. In case of predictive validity, coefficients reported in studies with English and non-English speaking children and adolescents generally range up to 0.70. The SPM has high loading on ‘g’ or general factor as described by Spearman. In present study norms developed by Ojha (1992) in Indian context (Delhi North Zone) was used.

*Administration:* This is a self administered intelligence test. There is no time limit to complete it.

*Scoring and Interpretation:* A person’s total score is compared with the percentage of a number of reference groups of the same birth cohorts. For practical purpose, it is convenient to consider certain percentages of the population and to group people’s score accordingly. In this way, it is possible to classify a person according to the score obtained as different grades.
Selection of the Tool: In the present study Ravens Progressive Matrices (Standard Progressive Matrices) was used due to the following reasons.

(i). Ravens Progressive Matrices are non-verbal culture free intelligence tests that provide the index of an individual's intellectual capacity with relatively little influence from the cultural environment in which the individual grew up.

(ii). These matrices can also be used for the people with physical disabilities as well as for the people who are intellectually subnormal or who have deteriorated.

(iii). The administration and scoring procedure is simple and uncomplicated.

(iv). Earlier studies conducted in Kolkata (Malakar, Basu & Chaudhuri, 2010) have used these matrices on the target population of the present study and found it to be satisfying.

3. Children's Obsessional Compulsive Inventory (CHOCI) (Shafran et al., 2003): (Appendix-B)

Description: The CHOCI was developed for the assessment of content and severity of obsessive and compulsive symptoms. It was initially designed as a self-report as opposed to the time-consuming clinician-rated CY-BOCS. The CHOCI comprises of two parts: the first part has items pertaining to compulsive problems and the second part has items pertaining to obsessive problems. Each part comprises ten items pertaining to obsessive problems. Each part comprises of ten items representing symptoms and five items representing impairment ratings of the symptoms. The symptom items are rated on a 3-point scale with responses: not at all, somewhat, and a lot. The impairment ratings are rated on a 5-point scale with responses from not impaired to very impaired, but the responses are not identical for all items.

The items of the CHOCI are scored on four subscales which are labeled: Obsessions symptom, Obsessions impairment, Compulsions symptoms, and Compulsions impairment. In addition the sum of both impairment subscales constitutes the Total impairment scale.

Reliability of CHOCI is satisfactory, as Chronbach's alphas were above 0.80 for all four subscales. The validity of CHOCI has also been established. CHOCI impairment subscales and Total impairment correlated 0.38, 0.42, and 0.49 with clinician-reported obsessive and
compulsive symptoms. Means for all scales were significantly different between children diagnosed with an obsessive compulsive disorder and children with no known disorders.

**Bengali translation and Application in India:** The items were translated and back translated to obtain a Bengali version. Its applicability has been examined by Sanyal (2010) on a similar group of children. The alpha reliability for total impairment was found to be .76.

**Administration:** The Children’s Obsessional Compulsive Inventory (CHOCI) is self administered. This Inventory takes about 15 minutes to complete.

**Scoring and Interpretation:** The CHOCI consists of 19 items assessing compulsive symptoms and 13 items assessing obsessive symptoms. These items are scored on a 3-point scale ranging from 1-“not at all” to 3-“a lot”. In addition, the CHOCI contains two sections (six items each) assessing the degree of impairment experienced as a result of (1) compulsions and (2) obsessions. The impairment ratings are rated on a 5-point scale with responses from not impaired to very impaired, but the responses are not identical for all items. The CHOCI thus consists of four subscales: (1) Compulsive symptoms, (2) Impairment associated with compulsions, (3) Obsessional symptoms, and (4) Impairment associated with obsessions. Subscale scores are determined by summing the responses to each item within the scale, and a Total Impairment score is calculated by summing the two impairment subscales. A cut-off of 17 on this impairment scale has demonstrated adequate sensitivity and specificity in determining a diagnosis of OCD.

**Selection of tool:** In the present study The Children’s Obsessive Compulsive Inventory was used due to the following reasons-

(i) The CHOCI can be used as a self report form as opposed to the time consuming clinician- rated CY-BOCS.

(ii) The administration and scoring procedure is simple and uncomplicated. The measure can be completed in approximately 15 minutes and takes about 5 minutes to score.

(iii) CHOCI has adequate psychometric properties.
(iv) Earlier studies have used this measure in Kolkata (Basu et al., 2010) and found it to be satisfying.

(v) The applicability of this inventory has been examined by Sanyal (2010) on a similar group of children and found it to be satisfying.

4. **Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS)** (Goodman et al., 1989): (Appendix-C)

**Description:** The CY-BOCS is adapted from the Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman et al., 1989a,b) for adults. Structure, response scale, and scoring rules from the original scale were retained in the CY-BOCS, but the wordings of the probing questions were changed to make them more appropriate for children. The CY-BOCS is widely used, especially in many treatment trials. The CY-BOCS has five sections: instructions, obsessions checklists, severity items for obsessions, compulsions checklist, and severity items for compulsions. Both checklists are used to identify the most prominent obsessions and compulsions. The CY-BOCS comprises 10 severity items, five for obsessions and five for compulsions. The severity items assess five aspects pertaining to obsessions and compulsions: frequency, interference, distress, resistance, and control. The 10 severity items are rated on a 5-point scale with responses: none, mild, moderate, severe, and extreme for the frequency, interference, and distress items; always resists, and completely yields for the resistance items; complete control, much control, moderate control, little control, and no control for the control items.

Reliability of CY-BOCS is satisfactory. Test-retest intraclass correlations across a 41-day interval were 0.70 and 0.76 for the Obsessions and Compulsions subscales and 0.79 for the total score in a group of children diagnosed with obsessive compulsive disorder. Interrater intraclass correlations among four raters were 0.91 and 0.66 for the Obsessions and Compulsions subscales and 0.84 for the total score. Cronbach’s alphas were 0.87 for the total score in a first group of children diagnosed with OCD, and 0.80 and 0.82 for the Obsessions and Compulsions subscales and 0.90 for the total score in a second group.

The validity of CHOCI has also been established. Correlations of the subscales and the total score with clinician-reported impairment, obsessions and compulsions, and with parent-reported obsessions and compulsions were high and significant. Correlations of the CY-
BOCS scales with self-reported anxiety were low and not significant and with self-reported depression, and parent-reported aggression and ADHD were moderate, but significant.

**Administration:** The Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS) is administered by the clinician as it is only available as a clinician-rated scale. This scale takes about 5 minutes to complete.

**Bengali translation and Application as a Self rated scale:** The items were translated and back translated to obtain a Bengali version. In the present study, it was used to screen out those children who had OCD, worthy of clinical attention. For this purpose, the scale was used as a self rating one. Its applicability in general population has been examined earlier by Sanyal (2010) on a similar group of children. The alpha reliability was found to be .72 for the total score. The cut off point was taken as 15, that is students below 15 were taken as belonging to non-clinical or sub clinical level, as in CY-BOCS a score from 4-15 indicates sub-clinical symptoms (Janardhan Reddy, Rao, & Khanna, 2010).

**Scoring and Interpretation:** Factor analysis confirmed that the severity items can be scored on two subscales: Obsessions and Compulsions. However, factor analysis also suggested scoring on two alternative factors: Severity, which includes interference and distress items, and Disturbance, which includes frequency, resistance, and control items. In addition, all 10 severity items can be scored on the total score. The 10 severity items are rated on a 5-point scale with responses: none, mild, moderate, severe, and extreme for the frequency, interference, and distress items; always resists, and completely yields for the resistance items; complete control, much control, moderate control, little control, and no control for the control items.

**Selection of tool:** In the present study The Children’s Yale-Brown Obsessive Compulsive Scale (CY-BOCS) was used due to the following reasons-

(i) The administration and scoring procedure is simple and uncomplicated.

(ii) The measure can be completed in approximately 5 minutes.

(iii) CY-BOCS has adequate psychometric properties.
5. **Sumon’s Memory Attention Module (SMAM) (Appendix-D)**

Sumon Memory Attention Module is a software programme for conducting experiments on memory as well as attention. This module was developed by Mr. Sobhan Patra and designed by Mr. Sumon Mukherjee, Dept. of Psychology, Calcutta University. The various memory and attention experiments which are programmed in this module are-(1) Immediate Memory Span, (2) Capacity of Memorization (PCT-Criterion Preset), (3) Capacity of Memorization (No PCT-Criterion), (4) Capacity of Memorization (Without PCT), (5) Span of Attention, (6) Retroactive Transfer, (7) Proactive Transfer (With Delayed Measure), (8) Proactive Transfer (Growth Measure only), (9) Whole -VS- Part Method, (10) Span of Memory(Gradual), (11) Capacity of Memorization (Paired Recall), (12) Capacity of Memorization (Spacing between Trial), (13) Capacity of Memorization (Spacing between Test), (14) Capacity of Memorization (Spacing between Experiment), (15) Immediate Memory Span, (16) Capacity of Memorization (PCT-Criterion Preset), (17) Capacity of Memorization (No PCT-Criterion), (18) Span of Attention, (19) Span of Attention, and (20) Retroactive Transfer. In this present study only program 19 and 20 were used for measuring Span of Memory, Post Criterion Trial (PCT), and Number of Trial till 100%, Retroactive Interference, and Attention. The various functions of this 'Module' are storing of stimuli, deleting stimuli, making a stimulus set, selecting the stimulus set pattern, using instruction master, using subject master, designing a program, starting an experiment, getting a report, taking a pause and import database. This 'Module' was used here because it is simple but organized and can be completed within stipulated time period.

It has been used in the present study to assess different aspects of memory and attention. The stimuli used were non-sense syllables for memory and letters for attention. Lists for memory experiment were prepared keeping in mind the basic rules of NSS preparation and many of them had been precluded in the program itself. In the experiment of span of attention, the list was prepared by the stimuli already stored in the program. In memory experiment, the exposure time and interstimulus interval were set at 1000 milliseconds each, and maximum retrieval time was extended up to 1000 seconds, that is the respondent was expected to complete retrieval maximum within 1000 seconds. In experiment on span of attention, the exposure time was set at 200 milliseconds. For both the conditions of memory experiment (Span of memory and Retroaction) the number of syllables was fixed at 10. The instruction for each phase was entered into prefixed visual mode. There were on the
whole 3 lists (A, B, and C) used for memory experiment. Another stimulus list of increasing number of letters was used for determining span of attention.

**Phase 1 - Determining the memory span and Retroaction experiment:** Initially rapport was established and necessary instructions were shown. It was ensured that the participant had understood the instruction properly. Then a standard experiment was conducted to determine the memory span and the amount of retroaction of the participant. The experiment started with a control condition where a stimulus list of 10 non-sense syllables (List A) was shown to the participant through the predetermined exposure pattern, for a number of times until 100% criterion was reached. Memory span was determined through the control condition, by the number of syllables s/he could remember in correct order after the first presentation of the syllables. The learning trial method was followed subsequently whereby the participant had to reproduce as many syllables as s/he recalled in correct order for each trial. Such trials continued till all syllables were reproduced in proper order (100% criterion). Post Criterion Trial (PCT), that is reproduction without presentation of stimulus, was taken down. Thereafter a brief rest was given for 150 seconds, during which the participant engaged in non-interfering filler task (line drawing). After this, the participant was asked to recall the stimulus list A. After the control condition was over, the subject was given a rest for 300 seconds when the participant again engaged in non-interfering filler task (line drawing). Subsequently, the experimental condition began. Here another list (List B) was presented to the participant. The participant had to learn it till 100% correct reproduction. Then PCT was taken. Following this, immediately another list (List C) was presented. The participant had to learn the list C for 150 seconds (for the duration of which rest was given after control condition). After that, the participant was asked to recall List B. The software yielded retroaction score by subtraction of the percentage of reproduced syllables of List B from the percentage of reproduced syllables of List A.

**Phase 2 - Span of attention:** Here the stimuli were presented for 200 milliseconds to the participant, one at a time. The number of letters in the stimuli was increased progressively, starting with three letters. The participant had to recall the letters immediately after the presentation of each stimulus. The experiment was discontinued after two consecutive failures made by the subject. Therefore, the span of attention was the maximum number of letters subject could able to focus.
The software was loaded on a laptop with a 840x680 pixel screen and the participants were tested individually.

6. Measure Of Academic Achievement: Average Of Major Examinations Of The Last Two Academic Years:

In order to portray the index of academic achievement of the target population, an average of the results of the two consecutive examinations (unit test and final examinations) were calculated. Thereafter, the average of the average marks of two consecutive examinations of the last two academic years was calculated for each subject. Finally, these average marks of all the subjects of last two academic years were transformed to total average for convenience of calculation.

Selection of the measure: In the present study average of major examinations of last 2 consecutive years was used due to the following reasons:

1. Now-a-days in West Bengal Board Semester or unit test system are followed with final examination.
2. Earlier studies conducted in Kolkata (Basu et al, 2010) have used this measure and found it to be satisfying.

3.9 Data Collection

Data were collected individually from the students of selected schools by administering the tools described earlier. Data was collected individually at the school premises by special appointment.

3.10 Scoring and statistical analysis

All data were scored according to manual, and entered on SPSS programme data sheet. SPSS 20 was used for statistical analyses. Descriptive statistics and correlations were calculated. Subsequently, the sample was divided in two groups – high and low OCS in terms of the median value of 12 as used in CHOCI. Multivariate Analyses of Variances were conducted to test the Hypotheses.

The results are presented in Chapter 4.