

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

# **Initial Development of a Neuropsychological Screening Measure for School Children**

A Thesis Presented in Partial Fulfillment of the  
Requirements for the Degree of Masters of Arts  
in Psychology at Massey University

**Andrea Susanna Reimann**  
**2003**

## Abstract

The present study developed a pilot neuropsychological screening measure, called the Repeatable Battery for the Assessment of Neuropsychological Status for Children (RBANS-C) which is designed to be used with children between five and ten years of age. This pilot measure was trialled on a sample of 30 New Zealand primary school children to evaluate its screening ability for children. It is based on the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) which is used to screen adults for neurocognitive deficits. Like the RBANS, the RBANS-C is made up of a battery of subtests that assess five cognitive domains, including attention, immediate and delayed memory, visuospatial/constructional abilities and language. Some of the subtests of the RBANS-C were altered to be more suitable for children while others were left the same as in the RBANS. The results from the pilot tryout indicated that some subtests have adequate psychometric properties while others do not. This is most likely due to the small sample size and to a lack of some research controls as well as to inadequacies of some of the subtests. Nevertheless, the results suggest that the RBANS-C seems to identify children with cognitive difficulties, and to some extent isolate those difficulties. No significant sex differences but some considerable age variations were observed since the measure lacks any adjustments for age effects which further improvements of the RBANS-C should incorporate. Also, future research on the RBANS-C will need to develop an alternative form and make necessary modifications to make the RBANS-C an effective neuropsychological screening tool for school children.

## Acknowledgements

I would like to thank my supervisor Professor Janet Leathem for her support to complete this thesis.

Furthermore, I would like to say many thanks to the staff, students and parents of Birkenhead Primary School who made it possible for me to carry out this research. Thanks, for your time, support and energy.

Thanks also to my parents who have always been so supportive, not only this year, but all the other years I was at university. I would not have been able to do it all without you. Thanks also to my sister Maya for her help during this research and during my other years at university.

Moreover, I want to say thanks to my brother Tom and my sister Kathrin who I would also like to dedicate this thesis to. Because of them I developed a passion for neuropsychology. The difficulties you both encountered throughout your lives inspired me to make a difference for other children who lived through experiences as you both.

Thanks also to you, Kay, for your continuous support this year and also during our previous years together at university, you are a great friend.

Last but not least, I want to say thanks to you, Marcello, for your love, for always being there for me and for being so supportive all year and especially while I was going through the many rough patches to complete this thesis. I do not know what I would have done without you. All the best for your studies to come.

## Table of Contents:

Title Page.....	i
Abstract.....	ii
Acknowledgements.....	iii
Table of Contents.....	iv
List of Tables.....	vi
List of Figures.....	viii
Chapter 1. INTRODUCTION.....	1
1.1. Childhood Traumatic Brain Injury.....	4
1.1.1. <i>Causes and Types of Brain Injuries</i> .....	4
1.1.2. <i>Neuropathology of Traumatic Brain Injuries</i> .....	6
1.1.3. <i>Mild Traumatic Brain Injuries</i> .....	7
1.2. Neuropsychological Assessment with Children.....	9
1.2.1. <i>Types of Neuropsychological Assessments with Children</i> .....	10
1.2.2. <i>Domains of Functioning Assessed</i> .....	11
1.2.3. <i>Neuropsychological Screening</i> .....	16
1.3. Issues in Test Development.....	18
1.3.1. <i>Psychometrics</i> .....	18
1.4. RBANS.....	21
1.5. The Present Study.....	24
1.5.1. <i>Aims</i> .....	24
1.5.2. <i>Hypotheses</i> .....	24
Chapter 2. METHOD.....	28
2.1. Participants.....	29
2.2. Procedure.....	29
2.3. Measures.....	29
2.3.1. <i>RBANS-C</i> .....	30
2.3.2. <i>Comparison Measures</i> .....	34
Chapter 3. RESULTS.....	38
3.1. Descriptive Statistics.....	38

3.2. Psychometric Properties.....	39
3.2.1. <i>Reliability</i> .....	39
3.2.2. <i>Validity</i> .....	40
3.3. Questionnaire Responses.....	45
3.4. Does the RBANS-C Identify Children With Cognitive Impairments?.....	46
3.5. Differences Between Age Groups.....	51
3.6. Sex Differences.....	52
Chapter 4. DISCUSSION.....	54
4.1. Findings.....	54
4.2. Limitations of Study and Future Research.....	56
4.4. Conclusion.....	57
References.....	58
Appendix A: Information Sheet, Consent Form, Questionnaire.....	65
Appendix B: RBANS-C.....	68
Appendix C: RBANS.....	80
Appendix D: Standard Tests.....	89
Appendix E: Raw Data.....	97

## List of Tables

<u>Table 1.</u> Characteristics of Sample.....	28
<u>Table 2.</u> Changes to RBANS Complex Figure.....	32
<u>Table 3.</u> Shows Descriptive Statistics of Raw Scores of RBANS-C Subtests of all Children Tested and Standard Scores of Standardized Assessment Battery of Children Retested .....	38
<u>Table 4.</u> Internal Consistency of RBANS-C Subtests.....	39
<u>Table 5.</u> Spearman’s Rho Correlation Coefficient to estimate Concurrent Validity of RBANS-C .....	41
<u>Table 6.</u> Factor Analysis of RBANS-C Subtests.....	42
<u>Table 7.</u> Spearman’s Rho Correlation Coefficients to Compare RBANS-C Subtests .....	44
<u>Table 8.</u> One-way ANOVAs Between Age Groups for RBANS-C Subtests.....	52
<u>Table 9.</u> Sex Differences of Complete Sample for All RBANS-C Subtests.....	53
<u>Table 10.</u> Raw Data of all RBANS-C Subtests Including Ages and Means for All Children.....	95
<u>Table 11.</u> Raw Data for 15 Children Retested with Standardized Assessment Battery including Means and Ages.....	96
<u>Table 12.</u> Standard Scores for Children Retested with Standardized Assessment Battery .....	97
<u>Table 13.</u> Raw Data for List Learning Items for entire Sample including Ages.....	98
<u>Table 14.</u> Raw Data for Story Memory Items for entire Sample including Ages.....	99
<u>Table 15.</u> Raw Data for Figure Copy Items for entire Sample including Ages.....	100
<u>Table 16.</u> Raw Data for Line Orientation Items for entire Sample including Ages.....	101
<u>Table 17.</u> Raw Data for Picture Naming Items for entire Sample including Ages.....	102

<u>Table 18.</u> Raw Data for Digit Span Items for entire Sample including Ages.....	103
<u>Table 19.</u> Raw Data for List Recall Items for entire Sample including Ages.....	104
<u>Table 20.</u> Raw Data for List Recognition Items for entire Sample including Ages.....	105
<u>Table 21.</u> Raw Data for Story Recall Items for entire Sample including Ages.....	106
<u>Table 22.</u> Raw Data for Figure Recall Items for entire Sample including Ages.....	107



## List of Figures

<u>Figure 1.</u> Differences Between RBANS and RBANS-C Figure.....	32
<u>Figure 2.</u> Results for All RBANS-C Subtests Except Picture Naming of whole Sample Respecting to Age and Cases Identified by Questionnaire and by Low Performance .....	47
<u>Figure 3.</u> Results for All Standard Tests Except BNT of All Children Retested Respective to Age and Cases Identified by Questionnaire and Low Performance.....	48
<u>Figure 4.</u> Age Differences for All Subtests of RBANS-C.....	51