UNIVERSITI TEKNOLOGI MARA

DEVELOPMENT OF BUARI-CHEN MALAY READING CHART AND ITS APPLICATION IN READING INVESTIGATION AND MAGNIFICATION PRESCRIPTION IN PERIPHERAL VISUAL FIELD DEFECTS

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ABSTRACT

Background: A well-designed, valid, and reliable reading assessment tool in a native language is crucial in a clinical setting. Reading research can reflect daily reading among persons with normal vision and vision disorders. Visual field defects (VFD) affect reading and other visual functions, including peripheral ones. Magnification approaches can improve readability. Previous research has not investigated a new reading tool's direct application in reading investigation, especially in diverse directions of peripheral VFD. The thesis explains how a new Malay reading investigation tool was developed and validated. Employing a new reading tool, reading, visual functions, and magnification approaches using acuity reserve methods were undertaken. **Methods:** A cross-sectional study explored 3 research stages. In Phase 1, 22 participants tested a new reading tool. Reading charts with contextual sentences and random words were developed for the Buari-Chen Malay Reading Chart (BCMRC). Intra-and inter-chart reliability was validated. Phase 2 tested reading and visual functions in 11 participants (22 eyes) with different directional visual field defects (VFD) (i.e., similar and opposite direction or mixed). Distance visual acuity (DVA), near reading acuity (NRA), and contrast sensitivity (CS) in different directional VFD were examined. Phase 3 compares reading magnification strategies using acuity reserve (fixed versus individual). Reading magnification (RM) and equivalent viewing power (EVP) were calculated, and aided reading performance with low vision devices was investigated. Near reading acuity, critical print size (CPS), and maximum reading speed (MRS) were compared. **Results:** BCMRC has strong internal reliability (contextual sentences, α=0.82; random words, α=0.85) and acceptable external reliability (α=0.76 against MNRead; α=0.80 against Bailey-Lovie). The similar directional VFD significantly influenced reading [$H(2) = 6.67$, $p = 0.036$]. NRA demonstrated a difference with directional VFD ($H(2) = 6.35$, $p = 0.042$). CS in similar directional VFD showed significant results [$H(2) = 6.354$, $p = 0.035$]. DVA was not varied in any VFD pattern. The individual method's for RM and EVP were lower than the fixed method's [RM: $t(20)=2.74$, $p=0.01$; EVP: $t(20)=2.36$, $p=0.03$]. The aided reading performance comparison indicated no significant difference between the fixed and individual methods for NRA [$U=43.50$, $z=-1.24$, $p=0.27$], CPS [$U=56.00$, $z=-0.32$, $p=0.80$], and MRS [$t(20) = -1.34$, $p = 0.20$]. Fixed method [$t(7)=-1.01$, $p = 0.342$] and individual method [$t(7)= -0.58$, $p = 0.731$] were not significantly different in the same or opposite VFD for aided reading using low vision devices. **Conclusions:** The new BCMRC has high internal and external reliability. The present outcomes highlighted the detrimental effects of a similar directional visual field defect on reading. Directional peripheral VFDs impacted near reading acuity and contrast sensitivity. Distance visual acuity wasn't affected by peripheral VFD. Individual and fixed acuity reserve approaches calculated magnification differently. Individual acuity reserve gave lower magnification and EVP but did not influence aided reading performance with low vision devices. Individual and fixed VFD reading speeds were similar in any directional VFD. The unique contribution of this study to the field of low vision rehabilitation is that the BCMRC can be proposed to vision practitioners as an instrument for near visual acuity testing and reading evaluation in vision rehabilitation among Malay native speakers and those with visual field disorder. It could assist practitioners in managing patients with vision problems interfering with the ability to read.

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TABLE OF CONTENTS

		Page
CONFIRMATION BY PANEL OF EXAMINERS		**ii**
AUTHOR'S DECLARATION		**iii**
ABSTRACT		**iv**
ACKNOWLEDGEMENT		**v**
TABLE OF CONTENTS		**vi**
LIST OF TABLES		**ix**
LIST OF FIGURES		**x**
LIST OF SYMBOLS		**xi**
LIST OF ABBREVIATIONS		**xii**
CHAPTER ONE INTRODUCTION		**1**
1.1	Introduction	1
1.2	Problem Statement	6
1.3	Research Questions	8
1.4	Research Objectives	8
1.5	Research Hypothesis	8
1.6	Significance of Study	9
1.7	Thesis Framework	10
CHAPTER TWO LITERATURE REVIEW		**13**
2.1	Visual System and Its Function	13
2.2	Reading	14
	2.2.1 Reading Models	15
	2.2.2 Factors Affecting Reading	18
	2.2.3 Assessment of Reading	21
	2.2.4 Reading Assessment Tools	26
2.3	Reading and Visual Field Defect	31
	2.3.1 Visual Field Defect	33
	2.3.2 Peripheral Visual Field Defect	34
	2.3.3 Classification of Peripheral Visual Field Defect	36
	2.3.4 Visual Field Defect and The Impact on Reading	41
	2.3.5 Visual Field Defect and The Impact on Visual Function	43
2.4	Reading Rehabilitation for Visual Field Defect	45
	2.4.1 Magnification for Low Vision Rehabilitation	46
	2.4.2 Acuity Reserve in Low Vision Reading	47
	2.4.3 Reading with Magnifier	48
CHAPTER THREE DEVELOPMENT OF READING PERFORMANCE INVESTIGATION TOOL		**51**
3.1	Introduction	51
3.2	Specific Objectives	53
3.3	Methods	54

3.3.1 Sampling 54
3.3.2 Experimental Procedures 55
3.4 Statistical Analysis 58
3.5 Results 60
3.5.1 Descriptions of BCMRC 60
3.5.2 Internal Validity Investigation of BCMRC 61
3.5.3 External Reliability Investigation of BCMRC 64
3.6 Discussions 66
3.6.1 Internal Reliability Investigation of BCMRC 69
3.6.2 External Reliability Investigation of BCMRC 70
3.7 Conclusions 70

CHAPTER FOUR INVESTIGATION OF THE READING AND VISUAL FUNCTIONS IN DIFFERENT DIRECTIONAL VISUAL FIELD DEFECT PATTERNS 72
4.1 Introduction 72
4.2 Specific Objectives 75
4.3 Sampling 76
4.3.1 Sampling Grouping 77
4.4 Experimental Procedures 85
4.5 Statistical Analysis 88
4.6 Results 88
4.6.1 Reading Performance in a Different Directional Visual Field Defect 88
4.6.2 Visual Functions in a Different Directional Visual Field Defect 89
4.7 Discussions 91
4.7.1 Reading Performance in a Different Directional Visual Field Defects 91
4.7.2 Visual Functions in a Different Directional Visual Field Defects 94
4.8 Conclusions 98

CHAPTER FIVE COMPARISON OF TWO ESTIMATED MAGNIFICATION TECHNIQUES FOR READING PRESCRIPTION 99
5.1 Introduction 99
5.2 Specific Objectives 101
5.3 Sampling 102
5.4 Experimental Procedures 103
5.5 Statistical Analysis 107
5.6 Results 108
5.6.1 Comparison of Reading Magnification Prescription Approaches 108
5.6.2 Reading Performance Between Different Magnification Approaches 112
5.6.3 Comparison of Aided Reading Speed in Different Directional Peripheral VFD 114
5.7 Discussions 114
5.7.1 Comparison of Reading Magnification Prescription Approaches 114
5.7.2 Reading Performance in Different Magnification Approaches and Directional Peripheral VFD 116
5.8 Conclusions 117