UNIVERSITY OF SOUTHERN QUEENSLAND

INVESTIGATING THE RELATIONSHIP BETWEEN WISDOM, INTELLIGENCE, AGE, AND GENDER AND THE ROLE OF MEDIATORS AND MODERATORS: AN AUSTRALIAN SETTING

A Thesis submitted by

Trilas M. Leeman, BPharm (Hons), BSc (Hons), Psychologist

For the award of

Master of Psychology/PhD (Clinical Psychology)

2020

Abstract

Wisdom and intelligence are complex distinct constructs which share some characteristics. Measures of wisdom should be distinguished from the construct of intelligence, because, although intelligence helps us engage in our environment, wisdom assists us in dealing with life's existential challenges. Yet, wisdom a master virtue, often lacks valid and reliable measures. This thesis investigated how wisdom and intelligence are influenced by age and gender, in two quantitative studies. Study One examined whether the structural validity of the popular 40-item five factor Self-Assessed Wisdom Scale (SAWS) would replicate in our sample. We also tested multigroup invariance, and SAWS Openness dimension as a wisdom precursor proposed by other models. Data from 709 respondents, aged 15–92 were randomly split into two. Confirmatory factor analysis (CFA) on Sample 1 showed that the SAWS factor structure did not fit the data. Exploratory factor analysis (EFA) on Sample 2 offered an alternative model, a 12-item four factor solution (SAWS-12), without a Humour facet. SAWS-12 demonstrated a good fit and measurement invariance (MI) across age groups and gender. In respect to findings relative to age, all adults were wiser than adolescents and young adults differed in wisdom from midlife adults. These two groups were similar to older persons. Despite women being wiser than men, the effect size was small. In Study Two, CFA cross-validated the SAWS-12 structure with 457 participants aged 16–87 and compared the measure with the Three-Dimensional Wisdom Scale-12 (3D-WS-12). SAWS-12 displayed good discriminant validity, but not 3D-WS-12, since 3D-WS-12 shared similar r = .34 with both SAWS-12 and crystallised intelligence (G*c*). Again, women scored higher on SAWS-12, but there were no gender differences on 3D-WS-12. On both measures, wisdom–age trajectory was curvilinear with peak at midlife, corroborating current literature. Older adults' mean wisdom scores did not differ from younger or midlife groups. Highest wisdom scorers were older on both wisdom measures, but better educated only on 3D-WS-12. On measures of G*c* and fluid intelligence (G*f*) there were no gender differences. While G*c* linearly inclined with ageing, G*f*'s inverse U–curve ageing trajectory was almost flat. Although intelligence failed to mediate the relationship between age and SAWS-12, G*c* mediated 3D-WS-12 with age. Age and gender did not moderate the relationship between intelligence and wisdom. This thesis established new findings. We confirmed SAWS Openness facet is a basic component of wisdom, whereas the Humour factor is not. We demonstrated ceiling and cohort effects, opposing and challenging declining G*f* with age reported in contemporary literature. SAWS-12 as a new measure of wisdom demonstrated excellent psychometrics superior to the 3D-WS-12, replicated in a new population across time, displayed convergent and discriminant validity, and MI across age groups and gender. This suggests SAWS-12 is a short, direct, reliable measure of wisdom, which offers distinct advantages to research where increments of time are the focus of the study, such as longitudinal studies, and for vulnerable population groups with short attentional spans.

Keywords: wisdom, SAWS, SAWS-12, 3D-WS-12, crystallised intelligence, fluid intelligence, social desirability, measurement invariance

Certification of Thesis

This Thesis is entirely the work of Trilas M. Leeman except where otherwise acknowledged. The work is original and has not previously been submitted for any other award, except where acknowledged.

Principal Supervisor: Professor Bob G. Knight

Associate Supervisor: Associate Professor Erich C. Fein

Student and supervisor signatures of endorsement are held at the university.

Acknowledgements

I would like to extend my gratitude and thanks to my esteemed and extremely supportive supervisors, Professor Bob Knight and Associate Professor Erich Fein. Your commitment, encouragement, and sound judgement throughout this project have been critical and invaluable in enhancing my learning and growth. I thank you both sincerely, specifically for your wisdom and emotional support at a crucial time in my PhD journey while I also navigated through my very personal loss and grief.

Thank you to Associate Professor Gavin Beccaria and the entire team of lecturers and staff in the Clinical Masters/PhD programme, for your knowledge and support throughout the very frenetic schedule of coursework and practicums in the first two years of the programme. My thanks to Sonya Winterbotham for your dedication in organising the collection of the data and to all the staff at USQ for your support, particularly those involved with creating and managing the online survey. To James Brown, Cassandra Eason, Frank Francis, George Petroff, and Bronwyn Rees: Thank you for the lifelines that reeled me in out of chaos, and for reminding me that humanity is still blessed with some exceptionally wise beings.

My appreciation goes to Vicky Drummond and Dr Anne-Marie Snider, thank you for your compassion, friendship, and outstanding work in editing this thesis. Your combined efforts meant the thesis was speedily edited. Thank you, Dr Debbie Mulligan, for your help and advice during the arduous process of completing this PhD. To Professor K. Warner Schaie, thank you for allowing us to use the Letter Series inventory from your long running Seattle Longitudinal Study.

Thank you to my long-time study buddies and now dear friends, Kathleen Keefe, Mary Perrottet, and Lucy Richardson who started the undergrad journey with me. Who knew this happy endpoint would eventually arrive? Thank you, dear

Andrea Gietzel-Tierney, for sharing my journey, during the most painful times of my life. Thank you to the staff in the Office of Research and Research Librarians for your support. I thank the participants for your time and commitment to the study; without whom this research would not have been possible. I extend my thanks to the examiners for your time and invaluable feedback, and acknowledge that this research has been supported by an Australian Government Research Training Program Scholarship.

To my PhD colleagues: with your support, laughter and jokes, the journey was less of a slog and at times fun. To dear Ruth, Ding, Georgena, Julianne, and Laura in our Study Den, thank you. I so enjoyed the monthly "bubbly celebrations" of our milestones, however small before the *Pandemic* put paid to such frivolities! To Bec, May, and Krisi, thank you for traversing the doctoral terrain with me. Your understanding and encouragements during the dissertation process were so vital to my success. I treasured our monthly Zoom catchups which helped to reduce the isolation, often the bane of the doctoral journey.

Thank you to my family, Nick, Ellen, and dear wee Melody for getting me out of my head and back into my heart. Your ongoing care and patience during my extended studies was the light that I needed. To my dear birth mother and father, who have long gone and my wonderful adoptive parents, who are also no longer with us: You gave me an enduring legacy in the benefits of persevering; my sincere appreciation. My deepest gratitude goes to my late spouse and amazing friend Ben for demonstrating what life on Earth is all about. Despite your physical absence, your belief in the "Little Light that Could", kept me on track. I miss you greatly and dedicate this work to you!

Dedication

This thesis is dedicated to my late husband, Associate Professor, Dr Bernard Nicholas Townsley Leeman.

You were and are still my lifeline. I will never walk alone.

I celebrate your life, your being, and your many lessons.

As I look at your favourite flower, the Sunflower, which I planted for you when you walked the Earth and will keep doing; I see your infectious smile.

I witness your love of life and boundless energy and enthusiasm in tiny little Melody's efforts to crawl, walk, and now in articulating speech.

As I walk the streets, I hear the myriad of languages that you spoke reminding me of your fearlessness and delight in learning new things.

Every conference I attend and every speech I give, I think of your relentless efforts trying to coach me on how to give a "Damn Good Speech."

LOL, I still hear your booming voice admonishing me to:

"Stand Straight, Don't Slouch! Now, look at the audience and smile. Show how happy you are to see them. Speak strongly and enunciate each word clearly."

Don't Shout!

As I snarl my way through my speech for the umpteenth time, finally, I hear a kindly voice saying,

"Okay, Good, Well done! Let's forget about the smiling, shall we?"

Oh Joy! As I remember, I know,

I will never walk alone!

Table of Contents

Abstract ii
Certification of Thesis iv
Acknowledgements v
Dedication vii
Table of Contents viii
List of Figures xiv
List of Tables xv
List of Abbreviations xvi
Chapter 1: Introduction: 1
1.1 Wisdom and the Good Life 10
1.2 The Scope of the Current Programme 14
1.3 Research Aims 14
1.4 Research Questions 15
1.5 Thesis Formatting and Structure 16
Chapter 2: Literature Review 18
2.1 How is Wisdom Conceptualised? 18
2.1.1 Personal and General Wisdom Theories 24
2.1.2 Explicit and Implicit Wisdom Theories 27
2.1.3 Performance and Trait Wisdom Models 32
2.2 Wisdom, Age, and Gender 35
2.2.1 Wisdom and Age 35
2.3 Synthesis of Wisdom and Age Findings 45
2.3.1 Relevance of Wisdom Assessment Task 45
2.3.2 Sample Composition and Culture Matters 45
2.3.3 Conceptual Models of Wisdom Development 46
2.4 Wisdom and Age Theorised from the Intelligence Perspective 49
2.4.1 Wisdom is Received with Age 49
2.4.2 Wisdom is Similar to Fluid Intelligence 50
2.4.3 Wisdom as Crystallised Intelligence 50
2.4.4 Wisdom as Combined Fluid and Crystallised Intelligence 51
2.4.5 The Declining Wisdom 52
2.5 Wisdom and Gender 53
2.5.1 Evidence of Age and Gender Interactions 54
2.6 Wisdom, Age, and Gender Conclusions 55

2.7 Wisdom and Education 56
2.8 A Brief Wisdom Conclusion 58
2.9 When is Wisdom Likely to Emerge? 59
2.10 The Intelligence Construct 62
2.10.1 Age of Cognitive Decline 64
2.10.2 Intelligence and Gender 69
2.11 How do we Measure Wisdom? 71
2.11.1 Performance Measures 72
2.11.2 Self-Report Measures 73
2.12 Development of the SAWS 77
2.12.1 Experience 79
2.12.2 Emotional Regulation 80
2.12.3 Reminiscence/Reflection 81
2.12.4 Humour 83
2.12.5 Openness 83
2.13 Psychometric Properties of the 30-Item SAWS 85
2.13.1 The SAWS 88
2.14 Validation Terminology of Measurement Tools 90
2.15 Types of Reliabilities 90
2.15.1 Internal Consistency 91
2.15.2 Test-Retest 91
2.16 Types of Validities 92
2.16.1 Face Validity 92
2.16.2 Concurrent and Convergent Validity 93
2.16.3 Discriminant Validity 93
2.16.4 Predictive Validity 93
2.17 Evidence of SAWS Validity and Reliability 94
2.18 Factor Analysis: EFA and CFA 96
2.19 Testing for Measurement Invariance (MI) 97
2.19.1 Configural Invariance 97
2.19.2 Metric Invariance 98
2.19.3 Scalar Invariance 98
2.19.4. Full Uniqueness MI 98
2.20 Socially Desirable Responding in Wisdom Measurement 99
2.21 The SAWS in non-Western Cultural Research 100
2.22 Scarcity of Western Research Validating the SAWS 107
2.23 SAWS Measurement Issues 111

2.23.1 Summary of the SAWS 112
2.24 Paucity of Brief Self-Assessed Wisdom Scales 115
2.25 Mediation and Moderation 118
2.26 Synthesis and Conclusion 120
2.27 Research Hypotheses 124
2.27.1 Research Hypotheses for Part 1–Study One 125
2.27.2 Research Hypotheses for Part II–Study Two 128
Chapter 3 Part I: Methods–Study One 134
3.1 Introduction 134
3.2 Justification for Methodology 134
3.3 Study Design 135
3.4 Participants 136
3.5 Procedure 138
3.5.1 Ethical Considerations 138
3.6 Measures 139
3.6.1 Demographics 139
3.6.2 Wisdom 139
3.7 Data Analysis Strategy 141
3.7.1 Factors to Retain During EFA 144
3.7.2 Sample Size for CFA and EFA 145
3.7.3 Stability of Correlations and Suitability of Data for Factor Analysis 146
3.8 Sample Size and Statistical Power for Two–Way Factorial ANOVA 146
Chapter 4 Part I: Results–Study One 147
4.1 Introduction 147
4.2 Statistical Analysis 148
4.3 Data Screening 148
4.4 CFA Findings for the SAWS 148
4.5 EFA Findings 150
4.5.1 The EFA Results for the SAWS 150
4.5.2 Items for the Revised and Refined SAWS (SAWS-12) 155
4.6 SAWS-12 CFA Findings with Openness as Antecedent Wisdom Factor 158
4.7 CFA Findings for the Refined Four Factor SAWS-R (SAWS-12) 160
4.8 Multigroup Measurement Invariance (MI) and Mean Wisdom Scores 162
4.8.1 The SAWS-12 Invariance Test for Age Groups 163
4.8.2 SAWS-12 Invariance Test for Gender 164
4.8.3 Assumption Testing for ANOVA 165
4.8.4 The ANOVA Findings 166

4.9 A Summary of Findings and Discussion from Study One 167
4.10 Brief Conclusion of Study One 171
Chapter 5–Part II: Methods–Study Two 173
5.1 Introduction 173
5.2 Justification for Methodology 173
5.2.1 Alternative Methodology 175
5.3 Study Design 176
5.4 Participants 176
5.5 Procedure 178
5.5.1. Ethical Considerations 178
5.6 Measures 179
5.6.1 Demographics 179
5.6.2 The SAWS–12 179
5.6.3 The 3D-WS-12 180
5.6.4 Crystallised Intelligence (Gc) 181
5.6.5 Fluid Intelligence (Gf) 182
5.6.6 The M–C 2 (10) 182
5.7 Data Analysis Strategy 184
5.8 Sample Sizes 185
5.8.1 Sample Size for Correlations 185
5.8.2 Sample Size for CFA 185
5.8.3 Sample Size for Two–Way ANOVA and Factorial MANOVA 186
5.8.4 Sample Size for Hierarchical Multiple Regression 186
5.9 Summary and Conclusion 186
Chapter 6–Part II: Results–Study Two 188
6.1 Introduction 188
6.2 Statistical Analysis 188
6.3 Data Screening 188
6.3.1 Range of Scores and Missing Values 188
6.4 Assumptions Testing for MANOVA 189
6.4.1 Normality 190
6.4.2 Univariate Outliers 190
6.4.3 Multivariate and Residual Outliers 190
6.4.4 Linearity 191
6.4.5 Multicollinearity and Singularity 192
6.4.6 Homogeneity of Variance–Covariance Matrices (Homoscedasticity) 192
6.5 Assumption Testing for Hierarchical Multiple Regression 193

6.5.1 Bivariate Correlations 193
6.5.2 Comparative CFAs for SAWS-12 and 3D-WS-12 195
6.5.3 Measurement Invariance (MI) for SAWS-12 and 3D-WS-12 198
6.5.4 Means for SAWS-12 and 3D-WS-12 with Age and Gender 200
6.5.5 Comparison of Means for Intelligence with Age, and Gender 203
6.5.6. Quadratic Assessment of Age Effects on Inductive Reasoning 205
6.5.7 Quadratic Assessment of Age Effects on Wisdom 207
6.5.8 Are High Wisdom Scorers Older and Better Educated Than the Rest? .. 210
6.6 Hierarchical Regression with Wisdom, Intelligence, and Demographics 211
6.7 Mediation and Moderation Analyses 216
6.7.1 Mediation of Age and Wisdom by Intelligence 217
6.7.2 Moderation of Intelligence and Wisdom by Age and Gender 220
6.8 Summary and Brief Discussion of Study Two 224
Chapter 7: General Discussion 228
7.1 Introduction 228
7.1.1 Validation of the 40-item SAWS with Confirmatory Factor Analysis 230
7.1.2 Exploratory Factor Analysis of the SAWS 232
7.1.3 Measurement Invariance, Reliability, Validity, and CFA for SAWS-12 and 3D-WS-12 235
7.1.4 A Note on Effect Sizes 239
7.1.5 Bivariate Correlations 239
7.1.6 The Effects of Gender on Wisdom and Intelligence 241
7.1.7 The Effects of Age on Wisdom, and Intelligence 244
7.2 Hierarchical Multiple Regression, Mediation, and Moderation 253
7.3 Wisdom, Intelligence, and the Good Life 255
7.4 Limitations and Strengths 258
7.5 Unique Contributions to Knowledge 262
7.6 General Implications and Future Directions 263
7.7 Conclusions 264
References 267
Appendix A: The SAWS Inventory 338
Appendix B: The SAWS-12 Inventory 341
Appendix C: The 3D-WS-12 Inventory 342
Appendix D: Shipley Institute of Living Scale: Vocabulary Inventory 343
Appendix E: The Letter Series Inventory 345
Appendix F: Social Desirability M–C 2 (10) Inventory 350

Appendix G: Conference Presentations 351
Appendix H: List of Publications 352

List of Figures

Figure 2.1: The Factor Structure of the SAWS 79

Figure 4.1: Scree Plot with Eigenvalues for SAWS Factors 151

Figure 4.2: Openness Distal to Wisdom with Unstandardised Estimates 160

Figure 4.3: SAWS-12 Four Factors with Unstandardised Parameter Estimates 162

Figure 4.4: Mean Wisdom Comparisons for Age Groups and Gender (*N* = 709) 167

Figure 6.1: SAWS-12 Four Factors with Standardised Parameter Estimates 197

Figure 6.2: 3D-WS-12 Three Factors with Standardised Parameter Estimates 198

Figure 6.3: Mean SAWS-12 for Gender and Age Groups (*N* = 457) 202

Figure 6.4: Mean 3D-WS-12 for Gender and Age Groups (*N* = 457) 202

Figure 6.5: Mean Vocabulary Scores for Three Age Groups (*N* = 457) 204

Figure 6.6: Mean Letter Series Scores for Three Age Groups (*N* = 457) 205

Figure 6.7: Curvilinear Relationship Between Letter Series and Age (*N* = 457) 207

Figure 6.8: Linear and Quadratic Trends for SAWS-12 with Age (*N* = 457) 208

Figure 6.9: Linear and Quadratic Trends for 3D-WS-12 with Age (*N* = 457) 209

Figure 6.10: Combined Conceptual and Statistical Mediation Model 216

Figure 6.11: Conceptual Model of Moderation 220

Figure 6.12: Simple Slopes for Vocabulary, SAWS-12, and Age 221

List of Tables

Table 2.1: Common Subcomponents of Wisdom (Meeks & Jeste, 2009) 20

Table 2.2: Common Subcomponents of Wisdom (Grossmann & Kung, 2019)........ 22

Table 2.3: Berlin Wisdom Paradigm Criteria 28

Table 2.4: Comparative Characteristics Between the SAWS and the 3D-WS 78

Table 2.5: Summary of Current SAWS Validity and Reliability 95

Table 3.1: Participant Characteristics 137

Table 3.2: Cut-off Criteria for Fit Indices in Covariance Structural Analysis 143

Table 4.1: Comparative CFA Results for SAWS 149

Table 4.2: Pattern Matrix for SAWS with Factor Loadings (*N* = 353) 152

Table 4.3: SAWS-12 Factor Loadings with Promax Rotation (*N* =353) 156

Table 4.4: Comparative CFA for SAWS-12 and 40-Item SAWS (*N* = 356) 161

Table 5.1: Participant Characteristics (*N* = 457) 176

Table 6.1: Distribution Characteristics for Measure Scores (*N* = 457) 193

Table 6.2: Correlations Between Study Variables (*N* = 457) 194

Table 6.3: Comparative CFA Results for SAWS-12 and 3D-WS-12 (*N* = 457)..... 196

Table 6.4: Measurement Invariance for Age and Gender (*N* = 457) 199

Table 6.5: Hierarchical Regression on SAWS-12 and 3D-WS-12 (*N* = 457) 214

Table 6.6: Mediation of Age and Wisdom by Intelligence (*N* = 457) 219

Table 6.7: Moderation with Johnson-Neyman Zones of Significance 222

Table 6.8: Moderation of Intelligence by Gender on Wisdom 224

List of Abbreviations

3D-WS	Three-Dimensional Wisdom Scale
3D-WS-12	Three-Dimensional Wisdom Scale (12-items)
ABS	Australian Bureau of Statistics
ACL	Adjective Check List
AD	Alzheimer Disease
AEO	Awareness of Own Emotions
AERA	American Educational Research Association
AGFI	Adjusted Goodness-of-Fit Index
AMOS	Analysis of Moment Structures
ANOVA	Analysis of Variance
APA	American Psychological Association
ASTI	Adult Self-Transcendence Inventory
AWS	Adolescent Wisdom Scale
BCE	Before Common Era
BIDR	Balanced Inventory of Desirable Responding
BIDR-16	Balanced Inventory of Desirable Responding short form
BSAWS	Brief Self-Assessed Wisdom Scale
BWP	Berlin Wisdom Paradigm
BWSS	Brief Wisdom Screening Scale
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence Interval
DIF	Differential Item Functioning

EBAS	Brief Scale of Self-Assessed Wisdom (Escala breve de autoevaluación de la sabiduría)
ECVI	Expected Cross-Validation Index
EFA	Exploratory Factor Analysis
FVS	Foundation Values Scale
g	General Intelligence
Gc	General Crystallised Intelligence
Gf	General Fluid Intelligence
GFI	Goodness of Fit Index
ID	Identification Number
IFI	Incremental Fit Index
IRT	Item Response Theory
IQ	Intelligence Quotient
K1	Kaiser ≥ 1 rule
KMO	Kaiser-Meyer-Olkin
KR20	Kuder-Richardson Reliability Index
LS	Letter Series
MANOVA	Multivariate Analysis of Variance
MAP	Minimum Average Partial
M–C 1 (10)	Marlowe-Crowne Short Form 1 (10-items)
M–C 2 (10)	Marlowe-Crowne Short Form 2 (10-items)
MCAR	Missing Completely At Random
MCSDS	Marlowe-Crowne Social Desirability Scale
MI	Measurement Invariance
MIDUS	Midlife in the United States

ML	Maximum Likelihood
MORE	Mastery, Openness, Reflectivity and Emotion Regulation including Empathy
NCME	National Council on Measurement in Education
NE	Nicomachean Ethics
NNFI	Non-Normative Fit Index
PA	Parallel Analysis
PCA	Principal Component Analysis
PTSD	Post-Traumatic Stress Disorder
PWB	Psychological Wellbeing
RES	Regulating Emotions in Situations
RMR	Residual Mean square Root
RMSEA	Root Mean Square Error of Approximation
SAWS	Self-Assessed Wisdom Scale
SAWS-12	Self-Assessed Wisdom Scale (12-items)
SAWS-R	Self-Assessed Wisdom Scale-Revised
SDR	Social Desirability Responding
SD-WISE	San Diego Wisdom Scale
SEM	Structural Equation Modelling
SILS	Shipley Institute of Living Scale
SILS-V	Shipley Institute of Living Scale-Vocabulary
SLS	Seattle Longitudinal Study
SPSS	Statistical Package for the Social Sciences
SRMR	Standardised Root Mean square Residual
STAMAT	Schaie-Thurstone Adult Mental Abilities Test

SWIS	Situated Wise Reasoning Scale
TLI	Tucker-Lewis Index
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States
USA	United States of America
USQ	University of Southern Queensland
VIF	Variance Inflation Factor
WAIS	Wechsler Adult Intelligence Scale
WDS	Wisdom Development Scale
WITHAQ	Wise Thinking and Acting Questionnaire
WRS	Wise Reasoning Scale
WWII	Second World War

Chapter 1

Introduction

Lao Tzu the Chinese philosopher tells us, “Knowing others is intelligence; knowing yourself is true wisdom” (Lao Tzu, n.d./1995, p. 14). Yet, just how wisdom and intelligence constructs differ from each other and how these concepts are expressed in men and women of differing ages, is much debated. Dittmann-Kohli and Baltes (1990) describe wisdom as a higher order intellectual functioning, closer to Cattell’s (1971) and Horn’s (1982) constructs of crystallised intelligence (*Gc*) or our ability to use knowledge, skills, experience, and accumulated information. In such a conceptualisation, wisdom increases steadily with age before decreasing near death (Kaufman, 2001). Wisdom has also been likened to fluid intelligence (*Gf*; Sternberg, 2005a), that is, one’s capacity to reason in novel situations, solve problems, and process information, largely independent of formal education or cultural practices (Cattell, 1987; Cattell & Horn, 1978; Horn & Blankson, 2005; Jaeggi et al., 2008). The G*f* model presumes wisdom increases until early adulthood and stabilises prior to declining in midlife (Kievit et al., 2016). Wisdom as an amalgamation of fluid and crystallised intelligence has also been postulated (Sternberg, 2005a), with wisdom increasing until late in middle age before waning (Horn & Cattell, 1966). Other wisdom scholars (Clayton & Birren, 1980; Staudinger, 1999) disagree that intelligence should be involved in the wisdom construct. Nevertheless, a growing body of literature recognises the importance of conducting empirical studies in both the fields of wisdom and intelligence to clarify the differences and similarities between the two constructs (Jeste et al., 2010).

Distinction between wisdom and intelligence is critical to ensure that those tools researchers employ to measure wisdom do not unintentionally also assess intelligence. This is important because, while intelligence helps us engage in our environment (Sternberg, 2019a; Sternberg & Detterman, 1986), wisdom positions us in a favourable space to deal with existential challenges and life's inevitable uncertainties (Ardelt, 2000a; Jeste et al., 2010). Numerous scholars (Ardelt, 2008; Clayton, 1983; Jeste et al., 2010; Staudinger et al., 1992; Sternberg 1985a, 2000; Sternberg et al., 2019) have attempted to distinguish wisdom from intelligence.

The notion that wisdom and intelligence are distinct constructs that share some characteristics has been advocated by experts and laypersons (Jeste et al., 2010; Sternberg & Jordan, 2005). Scholars suggest that wisdom (Baltes & Staudinger, 2000; Bangen et al., 2013; Brienza et al., 2018; Staudinger & Glück, 2011a; Webster, 2003) and intelligence (Gottfredson, 1997; Wasserman, 2012) are complex multidimensional concepts that are elusive to define and assess. The constructs have been conceptualised in many ways by both experts and commonfolk, across time. Currently, the online Merriam–Webster dictionary (n.d.) defines wisdom as, "Knowledge that is gained by having many experiences in life; knowledge of what is proper or reasonable; good sense or judgment". Conversely, intelligence is defined as:

> Ability to learn or understand or to deal with new or trying situations; the skilled use of reason; the ability to apply knowledge to manipulate one's environment or to think abstractly as measured by objective criteria (such as tests); mental acuteness: shrewdness

Folk and expert concepts of wisdom and intelligence show some overlap with the dictionary definitions. Implicit wisdom theories are laypersons' mental or internal representations of what wisdom is, including the characteristics of the wise (Baltes et al., 2002; Bangen et al., 2013; Staudinger & Glück, 2011b; Sternberg, 1998; Weststrate et al., 2019).

Laypeople perceive wisdom as a highly developed sense of human functioning, which incorporates interpersonal proficiencies such as, the skills necessary to listen, evaluate, and give advice (Baltes & Staudinger, 2000). Laypeople have also been found to associate wisdom with insight, reflective attitude, learning from experiences, concern for others (Bluck & Glück, 2005), reasoning, and the ability to use information (Sternberg, 1985a). Laypeople argue that wisdom entails leading a life that is good for the self, others, and the whole of society (Bluck & Glück, 2005). Although laypeople deem wisdom to increase with experience and age (Assmann, 1994; Löckenhoff et al., 2009), the notion is that wisdom cannot be learnt from schools or universities (Ardelt, 2008). In contrast, implicit theories of intelligence view the construct as the ability to solve problems, integrate diverse information, as well as learning from the environment (Sternberg, 1985a). Folk concepts consider intelligence to increase with age (Ardelt, 2000a) and the ability can be acquired in learning institutions (Ardelt, 2008). Ardelt (2008) found when she asked her university students to nominate a wise or an intelligent person, nominees tended to be midlife adults such as parents or college professors; findings consistent with theories and empirical research on the development of wisdom and intellectual knowledge (Jordan, 2005).

Explicit theories of wisdom and intelligence are conceptualisations of these constructs by experts and researchers (Sternberg, 1998), and there are many such concepts. For example, regarding wisdom, the Berlin Wisdom Paradigm (BWP; Baltes & Smith, 1990, 2008; Baltes & Staudinger, 1993, 2000; Scheibe et al., 2007) perceives wisdom as expert knowledge in crucial matters of life. In this paradigm, wisdom also involves good insight, judgement and advice giving concerning such matters. Other wisdom scholars (Ardelt, 1997, 2003, 2004; Brown, 2004; Clayton & Birren, 1980; Kekes, 1983; Orwoll & Perlmutter, 1990; Webster, 2003, 2007; Wink & Helson, 1997) conceptualise wisdom as a personality trait.

Wisdom as a personality trait provides another credible way of defining the construct (Ardelt et al., 2019). In this model, wisdom is perceived as a characteristic of the individual. Both laypeople and scholars, portray wise persons with attributes such as, benevolence, rational thinking, virtuosity, and the ability to integrate knowledge and character. Although wisdom as a trait might imply a stable or immutable feature of personality (Grossmann et al., 2019), some wisdom scholars (e.g., Ardelt et al., 2019) do not consider wisdom to be an inherited personality trait but rather, a characteristic that can develop over the life-course. Nevertheless, trait wisdom qualities have been found to exhibit short-term stability and consistency across situations and time (Ardelt, 2016). However, over the longer period, it may be that wisdom is akin to long-term changes observed in personality (Roberts et al., 2006). For instance, multiple studies indicate that wisdom can (a) be taught (Ferrari & Potworowski, 2008), (b) fostered through meditation (Levenson et al., 2005; Williams et al., 2016), or (c) mindfulness (Brienza et al., 2018; Sharma & Dewangan, 2017), (d) be shaped by experience and learning (Meeks & Jeste, 2009), and (e) develop through posttraumatic stress (Plews-Ogan et al., 2012). Clayton (1983) conceptualised wisdom as our ability to understand the self and others; and operates under the tenets of contradiction, paradox, and continual change. However, she defined intelligence as our ability to think logically, to conceptualise and to abstract from reality. Remarkably, concepts of wisdom and intelligence have remained similar across centuries and geographical regions.

Philosophers such as Aristotle (ca. 350 B.C.E./1999) spoke of practical wisdom (phrónēsis), that is, doing and acting wisely, as clearly distinct from intelligence. Although he viewed phrónēsis as a master virtue, that is necessary and sufficient for all virtues, he viewed intelligence as a form of “cleverness” or “shrewdness” (Schwartz & Sharpe, 2019). Most scholars concede wisdom and intelligence are involved in the pursuit of knowledge and truth and both constructs attempt to discover solutions to challenging questions (Assmann, 1994; Chandler & Holliday, 1990; Clayton & Birren, 1980; Csikszentmihalyi & Rathunde, 1990; Moody, 1986; Sternberg, 1990), yet the outcomes of wisdom and intelligence are different (Ardelt, 2008).

Whilst intelligence focuses on the *how* of doing things, wisdom centres on whether one *should* perform certain actions (Assmann, 1994; Ardelt, 2000a, 2008; Clayton, 1983; Holliday & Chandler, 1986; Kekes, 1983, 1995). Intelligence targets how to tackle specific problems, for example, how to give technical advice or acquire necessary life-supporting skills (Clayton, 1983). The question might be, “How can I protect myself from the novel corona virus when travelling?” Since wisdom concerns whether one *should* do certain actions; a related question would be, “Should I leave my dream job and fulfil my ambition to see the world?” When giving advice about life matters, the wise offer seekers options and ask recipients to grasp the implications or consequences of their actions. Tasks for assessing wisdom and intelligence differ (Clayton, 1983).

Intelligence is normally evaluated by IQ tests which are essentially non-social and impersonal, whereas wisdom assessment encompasses social domains such as intrapersonal and interpersonal judgements of human situations or dilemmas (Ardelt, 2008; Clayton, 1983). Psychometrically, individuals with good deductive and inductive reasoning skills or high in cognitive based abilities would score higher on IQ tests (Cattell, 1971), while the wise might score low. Wisdom which demands the understanding of human nature, the application of paradoxical logic and dialectical operations to intrapersonal and interpersonal problems, is unhelpful when it comes to cognitive operations requiring logical thinking to achieve high scores on intelligent tests (Clayton, 1983). Yet, both wisdom and intelligence are useful to humanity. Without intelligence we could not advance knowledge, but to use that knowledge to promote the welfare of the self and others in the pursuit of the good life would require wisdom (Baltes & Freund, 2003; Kupperman, 2005; Sternberg, 1998).

The preceding exposition highlighted similarities and differences between wisdom and intelligence constructs. A noteworthy Delphi study was conducted by Jeste et al. (2010) to define the characteristics of wisdom and determine whether wisdom is a distinct entity from other closely related constructs such as intelligence and spirituality. This panel of experts defined wisdom as:

> A uniquely human but rare personal quality, which can be learned and measured, and increases with age through advanced cognitive and emotional development that is experience driven. At the same time, wisdom is not expected to increase by taking medication. (p. 677)

Several important findings were reported from Jeste et al.'s (2010) study. Wisdom was found to differ from intelligence on 46 out of 49 statements presented to this panel of experts. The three similarities between wisdom and intelligence were: (1) scepticism, (2) desire for learning/knowledge, and (3) unimportance of participation in religious services, rituals, and membership in a faith community. Another important finding was the clarification that, contrary to laypersons' popular beliefs (Ardelt, 2008), wisdom can be learnt and measured. For example, many categories of behaviours are known to be influenced by modelling (Bandura, 1977), such as, helping behaviours in children. In organisations, mentoring by generative wise older leaders has also been shown to empower younger generations of leaders (Zacher et al., 2011) to become tomorrows' wiser leaders, for the benefit of all. Furthermore, the implicit idea that wisdom increases with age (Assmann, 1994; Baltes & Smith, 1990; Holliday & Chandler, 1986) has been elucidated by the Delphi panel of experts in Jeste et al.'s study. The panel of experts indicated that, wisdom can indeed increase with age, but only for those individuals who actively pursue its development. The reason being, wisdom acquisition requires motivation, reflection, and Openness to experiences amongst other commitments. These findings are similarly reported by other wisdom scholars (Kekes, 1995; Kramer, 1990; Pascual-Leone, 2000; Staudinger & Kunzmann, 2005; Webster et al., 2014; Wink & Helson, 1997).

As indicated previously, the constructs of wisdom and intelligence share some common features (Clayton, 1983; Jeste et al., 2010). Nevertheless, as far as could be ascertained from the literature, most wisdom measures do not incorporate intelligence protocols or subscales in their tools. Of the few instruments that do, the featured intelligence subscales appear to be assessing cognitive knowledge and not intelligence per se. The Foundational Value Scale (FVS; Jason et al., 2001), the Adolescent Wisdom Scale (AWS; Perry et al., 2002) and DiGangi et al.'s (2013) adaptation of the FVS, each include an intelligence subscale. Perry et al. (2002) created the AWS to examine the relationship between wisdom and adolescent substance use and problem behaviours. The sample of 2,027 high school seniors responded to the 5-point scale, self-report questionnaire, to indicate whether they thought they possessed any of described attributes or characteristics. The intelligence subcomponent characteristics were: *Intelligence*, *problem solving ability, genius, positive self-esteem, good judgement, focused (can become so involved in an activity that nothing else seems to matter)*, and *ability to cope with uncertainty*. Clearly, these items differ from those generally associated with traditional intelligence or IQ tests. For example, fluid intelligence (G*f*) is commonly assessed with items such as those in the Thurstone Letter Series (Schaie, 1985), which asks participants to study a series of letters (e.g., *a b a b a b a b*) then decide which letter should come next by choosing it from an answer with five letters (e.g., *a b c d e*). Crystallised intelligence (G*c*) is evaluated by vocabulary such as the vocabulary subscale found in the Shipley Institute of Living Scale (SILS; Shipley, 1940) which asks respondents to choose one word out of four which is similar to a prompting word. The prompting vocabulary ranges in degrees of difficulty, from target words such as “TALK” and “PERMIT” to “JOCOSE” and “LISSOM”. Although it is apparent tools like DiGangi et al.’s, the AWS, and the FVS do not evaluate intelligence as such, what is still unclear, is the role of intelligence in wisdom development.

Cattell’s (1987) investment theory proposes that, individuals need G*f* to acquire G*c* or complex abilities and experience. Since the desire to learn and in-depth knowledge is crucial to wisdom acquisition (Ardelt, 2000a; Blanchard-Fields & Norris, 1995; Kekes, 1983; Sternberg, 1990), then, it can be contended that, at least some basic intelligence is required for wisdom to actualise. In fact, according to Mickler and Staudinger (2008) an individual would need basic intelligence to solve personal or other people’s dilemmas such as those presented in their Bremen Wisdom Paradigm vignettes. Consequently, intelligence appears to be necessary but not a sufficient condition for wisdom, that is, an individual cannot achieve the highest level of wisdom without intelligence. According to Staudinger et al. (1997) wisdom is advocated to be the judicious application of knowledge or intelligence. Taken together, intelligence could arguably be considered a resource or a precursor necessary for wisdom development.

The idea of certain elements functioning as resources needed to facilitate the development of wisdom is not new. Indeed, several researchers have conceptualised wisdom development through the MORE Life Experience Model (MORE; Glück & Bluck, 2013; Glück et al., 2018), where the five crucial resources are: Mastery or managing uncertainty and uncontrollability, Openness to experience, Reflectivity and Emotion regulation including Empathic concerns, interact with challenging life experiences. In the MORE Life Experience Model, the resources function as wisdom precursors. We propose that, intelligence in the form of G*c* and G*f* may be resources or wisdom precursors that appear long before wisdom.

More than ever before, the global community is experiencing rapid technological advancements. Swift travel has facilitated the spread of novel infections, such as the 2019 coronavirus (COVID-19). Almost instantaneous communications spread awareness of climate change as we witness drought and fires ravaging one continent, while the opposite side of the world is deluged by floods. Terrorism, rampant racism, wars, poverty, economic disparity and political corruption are ever present in society. Sternberg (2003) had earlier observed, “If there is anything the world needs, it is wisdom. Without it, I exaggerate not at all in saying that very soon, there may be no world, or at least none with humans populating it” (p. xviii). Critical observations are still pertinent today in our ever-changing world. Indeed, Australia, like the rest of the world is in desperate need of greater wisdom.

Within the Australian context, the Australian Bureau of Statistics (ABS; n.d.) records extensive demographic data on the Australian populace. Up to now, there are no wisdom statistics offered by the ABS to determine how many Australians are wise (including projections for the future); nor is such data likely to appear anytime soon. The reason could be that, although wisdom as a concept dates to antiquity, its multidimensional nature has proven difficult to define and quantify (Baltes & Staudinger, 2000; Bangen et al., 2013; Brienza et al., 2018; Staudinger & Glück, 2011a; Webster, 2003). Perhaps, crucially, we need to study wisdom to discern what its benefits to humankind might be.

1.1 Wisdom and the Good Life

Besides the philosophers, the psychological concept of wisdom held great interest in other fields, including but not limited to (a) theology, (b) traditional literature, (c) historical sciences, and (d) society at large (Birren & Svensson, 2005; Robinson, 1990). For philosophers and theologians, wisdom has been a vital concept related to fundamental questions regarding what signifies a good life, how to balance between concern for the self and others and the prerequisites necessary for exercising good judgment under conditions of uncertainty (Wink & Dillon, 2013). The story of King Solomon (King James Bible, 1769/1990, 1 Kings 3: 16–28) is often recounted in Western societies as an exemplar of wise decision at times of ambiguity. Since two women claimed the same newborn infant as their own, King Solomon’s judgement to sever the babe in half, depended on the women’s reactions to uncover the true mother. King Solomon’s leadership led his state into unparalleled flourishing, generating positive effects for himself and his kingdom (Yang, 2013). Nevertheless, despite his general wisdom, the King lacked what is now defined as, personal wisdom (Clarke, 1974; Grossmann & Kross, 2014; Sternberg, 2013), which later culminated in his fall from grace (King James Bible, 1769/1990, 1 Kings 11: 11). Profoundly, for many cultures, religions, and early civilizations, wisdom meant living a meaningful and moral life, with reflection, reminiscence and not wasting one's life (Birren & Svensson, 2005).

Studies have shown that there is consensus over what constitutes a good life among members in different communities (Suh et al., 1998). Buddhists for example, conceive happiness as psychological health, which is the foundation for living a good life; and wisdom is viewed as an understanding of nature and the meaning of existence, as well as helping others live in harmony (Trowbridge, 2005). For the ancient Sumerians, Egyptians, Hebrews, and pre-Socratics in Greece, wisdom was more than just understanding how to live justly and honestly (Edmondson & Woerner, 2019), wisdom encompassed living in balance with the whole universe (Assmann, 2006). Curiously and counter-intuitively, post Aristotle, philosophers lost interest in discussing wisdom; despite "philosophy" deriving its name from *philosophía,* meaning, love of wisdom (Smith, 1998). The reason could be that, at first, the Sceptics, and later Christianity, attacked philosophers' concepts of wisdom (Smith, 1998). St Paul was instrumental in warning people against philosophy (King James Bible, 1769/1990, Colossians 2: 8). Yet, the need for wisdom remained. Theologians and historians of ancient religions kept wisdom studies alive (Robinson, 1990; Smith, 1998). However, within the psychological literature, wisdom has only been the focus of scientific study during the past four to five decades. Research in wisdom has been on the rise since the 1970s due to wisdom's perceived benefits, such as fostering healthy old age, promoting well-being across the lifespan, and for supporting the common good (Trowbridge, 2005).

It is generally agreed that wisdom facilitates a good life (Tiberius, 2008). For example, wisdom has been shown to be associated with positive life outcomes including happiness (*eudaimonia*), better health, psychological well-being, self-compassion, life satisfaction, self-acceptance, resilience, and negatively related to depression and fear of death (Ardelt, 1997, 2003; Glück et al., 2013; Jeste et al., 2019; Neff et al., 2007; Staudinger & Glück, 2011a; Wink & Dillon, 2013). Ardelt (2016) conducted a 10-month two-wave, longitudinal study of wisdom in old age and, physical, psychological *(eudemonic*), and subjective (*hedonic*) well-being, using a cross-lagged correlations approach on older adults (N = 123, M_{age} = 72 years) in the United States of America (USA).

Findings showed that, wisdom at Time 1, predicted well-being at Time 2. However, well-being at Time 1 did not predict wisdom at Time 2. This was an important study, as most previous research demonstrating subjective well-being (Ardelt, 1997, 2003; Bergsma & Ardelt, 2012; Ferrari et al., 2011; Grossmann et al., 2013; Le, 2011; Zacher et al., 2013), psychological well-being (Etezadi & Pushkar, 2013; Taylor et al., 2011; Webster et al., 2014), and physical health (Ardelt, 2000b) were by and large from cross-sectional data. Nevertheless, since the data for Ardelt's study was collected 15 years earlier, results might not generalise to a more current cohort of older persons. For instance, the current cohort of older adults nicknamed "Baby Boomers" have been found to regularly practice meditation or spiritual contemplation, which has been acknowledged to increase greater self-insight (Vohra-Gupta et al., 2007) and might positively impact wisdom development compared to their earlier predecessors, while the cohort who lived through the great depression in the 1930s in the United States (US) experienced decreased levels of general well-being (Frey & Stutzer, 2010) and wisdom. One criticism of Ardelt's study is that it might have been far more useful, if the sample had also included a wide cross section of the community and not just those who were highly educated. Empirical results have also shown that wisdom is beneficial for younger adults (Ardelt, 2020; Bruya & Ardelt, 2018; Webster, 2010).

Ardelt (2020) conducted a short-term longitudinal study on a sample of 318 undergraduate university students. Of the sample, 165 were enrolled in “growth” classes which targeted students’ psychosocial growth or psychological wellbeing (PWB), spirituality, and death acceptance, while the rest of the sample or control group attended normal classes. Findings demonstrated that those students who were in the growth classes were able to develop an increase in wisdom, PWB, and were accepting of death as a natural feature of the lifecycle. The control group, however, significantly decreased in wisdom and did not change significantly in PWB, spirituality, or death acceptance. Support for Ardelt’s findings come from an earlier study by Bruya and Ardelt (2018) who conducted a similar study with different university students in a different region of the US. What these two studies suggested is that wisdom which is perceived as the most valuable human strength and can be developed, measured, and learned at university, and the results are generalisable. It is therefore imperative to study wisdom, as wisdom as a “master virtue” (Aristotle, ca. 350 B.C.E./1999; Fowers, 2008) is thought to guide us to live a good life (Assmann, 1994; Holliday & Chandler, 1986).

To conclude, understanding the relationships between wisdom and intelligence are important steps in promoting the rigorous empirical research of these complex constructs. In our complex and uncertain world, wisdom could be that lantern atop the cliff on a rocky shore at the darkness of winter, that helps us navigate our way to a better world for all.

1.2 The Scope of the Current Programme

Since this thesis investigates issues in the wisdom and intelligence fields, a potential problem is that the scope of the programme may be too broad. To focus and constrain this project, my thesis will focus on two of the three fundamental topics in the field of wisdom research (a) the definition of wisdom, (b) the measurement of wisdom but not on (c) the development or teaching of wisdom. I have chosen to define wisdom and intelligence in so far as it is necessary to help in our understanding of the constructs; a prerequisite to examining the relationship between wisdom, intelligence, and age in men and women. As far as wisdom measurement is concerned, only self-report tools will be utilised, whereas vocabulary and inductive reasoning will serve in the assessment of the intelligence construct. To narrow the focus of this project, I will not engage academic discussions on the development or teaching of wisdom in this thesis.

1.3 Research Aims

The overarching aim of this research programme is to investigate the relationships between wisdom, intelligence, age, and gender. The research programme will be presented in two parts. Part 1 will comprise of Study One which aims to determine whether a popular self-report measure of wisdom; the Self-Assessed Wisdom Scale (SAWS; Webster, 2003, 2007) is a valid and reliable measure of wisdom by examining its five dimensions. If results indicate further development, the SAWS would be adjusted accordingly. Another aim is to investigate whether the Openness dimension is antecedent to wisdom or a core component of the wisdom construct. Since measurement invariance (MI) or equivalence has been identified as an issue that arises when comparing groups

(Bialosiewicz et al., 2013; Kim et al., 2012; Meredith, 1993), another aim of the programme is to examine any potential refinements of the SAWS for MI.

Since the current research aims to investigate the relationship between wisdom and intelligence in men and women of different age categories, Part II will be comprised of Study Two. In psychology, replication is considered one of the most important tools for verification (Schmidt, 2009). Therefore, the aim of Part II is twofold (a) to verify the factor structure of the refined SAWS measure and (b) to have a "one to one" comparison of the refined SAWS with another popular wisdom measure, and with other measures such as, measures of intelligence (vocabulary and inductive reasoning) and a social desirability measure. Ultimately, the main goal is to clarify the wisdom–intelligence–age–gender trajectory. To achieve the aims stated above, a quantitative methodology will be adopted for the two studies presented in Part I and Part II. Research questions will be posed next.

1.4 Research Questions

The current research programme aims to investigate the relationship between wisdom, intelligence, age, and gender. Consequently, this research examines several questions to guide the current study. The overarching question this programme attempts to answer is,

- How does age and gender influence wisdom and intelligence? Second, another lesser question asks,
- What is the trajectory of wisdom and intelligence throughout the adult lifespan?
- How does wisdom and intelligence differ from each other?

From these three questions, specific issues underlying the use of unvalidated indicators of wisdom to measure the construct will be investigated. Since Webster's

(2007) 40-item SAWS is our main wisdom assessment tool, the following questions pertain to this measure,

- Would the structural validity of the SAWS hold in an Australian sample?

Some wisdom scholars have questioned the inclusion of the Openness facet in the SAWS, suggesting a state of being open might be antecedent to wisdom. To investigate this possibility, the following question was posed,

- How does the Openness facet of the SAWS fit in the overall factor structure of the measure?

From the above questions and an extensive search of the literature in both wisdom and intelligence, several hypotheses will be put forward for investigation in the current research programme. The formatting and the structure of the current thesis will now be addressed.

1.5 Thesis Formatting and Structure

The thesis will generally follow the formatting style prescribed by the American Psychological Association's seventh edition publication manual (APA; 2020). When the APA (2020) manual is not in agreement with the University of Southern Queensland's (USQ) *Higher Degree by Research Thesis Presentation Schedule*, the latter guidelines will generally take precedence. As an example, unlike the APA manual, USQ prefers the thesis title to appear in capital lettering. Furthermore, for clarity, USQ recommends chapter headings, headings within chapters, and "nested" subheadings to be appropriately numbered using Arabic numerals.

Chapter 1 began by setting the scene for the present research programme and describing a broad synopsis of the current understanding of the differences between wisdom and intelligence constructs. The value of wisdom and intelligence in society was discussed and the importance to keeping the empirical study of the constructs highlighted.

An expanded review of the wisdom and intelligence literatures as related to age, gender, and other demographic variables is described in detail in Chapter 2. The chapter presents research in those fields and offers appropriate background information that is relevant to our understanding of existing issues, gaps in the literature, and the foundation for the current research programme. Chapter 2 concludes with the research hypotheses for the current project.

Part I of the thesis is divided into two chapters, focusing on Study One. Chapter 3 reports on the methods utilised for Study One, which is a quantitative analysis, including participant details, procedure, and ethical considerations. The findings from Study One are presented in Chapter 4, which also explores some research hypotheses such as those relating to the SAWS factor structure.

Part II focuses two chapters on Study Two and a discussion chapter. Study Two extends on the findings from Study One and further investigates whether results from Study One are replicable in a different population sample. Chapter 5 describes the methods of Study Two, also quantitative in nature. Chapter 6 reports the findings from Study Two and explore the hypotheses relating to the relationship between wisdom, intelligence, age, and gender. Chapter 7 of the research programme will present an overall detailed discussion of the results from Studies One and Two. The chapter also addresses limitations and strengths of the study, unique contributions to knowledge, and general implications and future directions for research. Chapter 7 closes with a concluding summary and comments on the current research programme.

Chapter 2

Literature Review

The current research programme is primarily focused on wisdom. As indicated in Chapter 1, intelligence and wisdom share some similar features. To clarify the relationship between wisdom, intelligence, age, and gender, it is crucial for researchers to use valid and reliable measures. Therefore, this chapter will provide an overview of the scholarship on wisdom, intelligence, age, gender, and other demographic variables. Theories and models that have been developed to increase our understanding of the wisdom and intelligence constructs will be investigated. The validation process of a wisdom measurement instrument will be reviewed. Finally, gaps identified in the literature will lead to the research hypotheses for this thesis. To begin this review of the literature, the wisdom construct will be examined.

2.1 How is Wisdom Conceptualised?

Wisdom is a multifaceted construct which is considered to be both the zenith of human development (Baltes & Staudinger, 2000; Erikson, 1959, 1963, 1964) and a fundamental human virtue (Kekes, 1995; Kunzmann & Baltes, 2005; Vaillant, 2002) that is highly desired and revered almost universally (Assmann, 1994; Dahlsgaard et al., 2005). Since early Western history, dating back to Aristotle's Nicomachean Ethics (NE; Aristotle, ca. 350 B.C.E./1999), wisdom has been considered a virtue. Aristotle defined two types of virtues or dispositions, intellectual and moral. He considered the former "*nous*" or understanding as part of wisdom. Today we see "nous" or understanding as wisdom, play a prominent role within the positive psychology movement of more recent times (Kunzmann & Baltes, 2005; Vaillant, 2002), with the wise perceived as embodying the ideals of intelligence, maturity, caring, engagement, and thoughtful cognitions, amongst other accolades. Although the entry of wisdom as a construct in Western psychological research was relatively recent (in the 1970s), once the wisdom term was operationalised scholars began to explore the construct and its benefits to humanity. Most of the early wisdom research was located in the US (e.g., Clayton, 1975, 1976; Clayton & Birren, 1980) and in Europe at the Max Planck Institute for Human Development and Education in Berlin led by Paul Baltes (1987) and his colleagues. Although currently wisdom studies are conducted around the world, most of the research is still predominantly centred in the US, Canada, and Europe (e.g., Austria and Germany). The scientific study of wisdom generally focuses on three main areas (a) conceptualisations of wisdom including lay and expert definitions, (b) understanding how wisdom develops, and (c) measuring the construct. The current programme focuses on measurement.

As indicated in Chapter 1, many definitions of wisdom have been proffered (Aldwin, 2009; Ardelt, 2003; Knight & Laidlaw, 2009; Webster, 2003; to name a few). Each of the current proposed wisdom definitions tend to emphasize slightly different subcomponents of the construct. The disparate definitions partly stem from the fact that wisdom, as a multifaceted concept that is highly contextual has proven difficult to define and measure. Nevertheless, some wisdom scholars have attempted to compile a list of the most common definitions of wisdom.

Meeks and Jeste (2009) reviewed the wisdom literature searching for commonalities among wisdom definitions in published, Western, wisdom and peer reviewed articles. Of the 10 major wisdom definitions identified by the scholars, six subcomponents were found to be the most prevalent, as they were included in at least three of the wisdom definitions. The six commonly proposed subcomponents of wisdom are presented in Table 2.1 with a brief description.

Later, Bangen et al. (2013) updated the list by Meeks and Jeste (2009), incorporating Western and Eastern definitions of wisdom. From 24 implicit and explicit wisdom definitions, the authors identified nine main subcomponents of wisdom which included the six subcomponents identified by Meeks and Jeste (see Table 2.1). The three additional subcomponents were (a) *Openness*, (b) *Spirituality*, and (c) *sense of Humour*. It is noteworthy that these three additional subcomponents were included in less than half of the wisdom definitions reviewed.

Table 2.1

Common Subcomponents of Wisdom (Meeks & Jeste, 2009)

Wisdom Subcomponent	Short Explanation
1. Prosocial attitudes / behaviours	The viewpoint is that wisdom is working towards a common good and the tendency to show empathy, compassion, and altruism.
2. Social decision making / pragmatic knowledge of life	This is related to having practical knowledge and judgement about human nature and life skills.
3. Emotional homeostasis	The ability to manage one’s emotions even in times of adversity.
4. Reflection / self-understanding	Interest in self-knowledge and understanding.
5. Value relativism / tolerance	Tolerance and ability to embrace different points of view.
6. Acknowledgement of and dealing effectively with uncertainty / ambiguity	The ability to deal with uncertainty and the limits of knowledge.

More recently, Grossmann and Kung (2019) updated the list by Bangen et al. (2013) with the inclusion of cross-cultural definitions. This list is quite illuminating in several ways. First, as shown in Table 2.2, only the definitions by Achenbaum & Orwoll (1991) and by Jason et al. (2001) incorporate all the subcomponets. Second, the most prominent subcomponent is the benevolence/prosociality, that is, belief in the common good and showing empathy and compassion (Bangen et al., 2013). The subcomponent is prevalent in both Eastern (Takahashi & Overton, 2002; Yang, 2001) and Western concepts of wisdom and is incorporated in 21 of the 26 wisdom definitions reviewed by Grossmann and Kung. Third, other newer subcomponents integrate reverence for nature, integrity, modesty and unobtrusiveness, maturity, enlightenment and speciality skills such as business, science, and politics. Fourth, although Bangen et al.'s (2013) list contained *knowledge/decision-making* and *self-reflection,* Grossmann and Kung excluded these two subcomponents from their list, citing insufficient data to warrant their inclusion. Also, Baltes and Staudinger (2000) incorporated *lifespan contextualism* as an integral part of their wisdom definition. However, Grossmann and Kung, subsumed Baltes and Staudinger's *lifespan contextualism* to the closely related subcomponents of *perspective-taking* and *recognition of change.*

Table 2.2

Common Subcomponents of Wisdom (Grossmann & Kung, 2019)

Researcher/s	Recognising Uncertainty and change	Perspective taking and integration	Intellectual humility	Benevolence/ Prosociality	Emotion regulation	Spirituality	Other
1. Kekes (1983)	Yes	-	-	-	-	-	-
2. Taranto (1989)	Yes	-	-	Yes	-	-	-
3. Baltes & Staudinger (2000)	Yes	Yes	Yes	-	-	-	-
4. Achenbaum & Orwoll (1991)	Yes	Yes	Yes	Yes	Yes	Yes	Integrity
5. Denney et al. (1995)	-	-	-	Yes	-	-	Specific skills e.g., business, politics, science
6. Ardelt (1997)	Yes	-	-	Yes	Yes	-	-
7. Hershey & Farrell (1997)	-	Yes	-	Yes	Yes	Yes	Enlightened
8. Wink & Helson (1997)	Yes	Yes	-	Yes	-	Yes	-
9. Sternberg (1998)	Yes	-	-	Yes	-	-	-
10. Levitt (1999	-	-	Yes	Yes	-	-	Honesty
11. McKee & Barber (1999)	Yes	-	-	Yes	-	-	-
12. Olejnik (1999)	Yes	-	-	-	-	-	Biographical perspectives
13. Jason et al. (2001)	Yes	Yes	Yes	Yes	Yes	Yes	Reverence of nature
14. Yang (2001)	-	-	Yes	Yes	Yes	-	Modesty/ Unobtrusiveness
15. Montgomery et al. (2002)	-	-	-	Yes	-	-	Moral principles

Researcher/s	Recognising Uncertainty and change	Perspective taking and integration	Intellectual humility	Benevolence/ Prosociality	Emotion regulation	Spirituality	Other
16. Perry et al. (2002)	Yes	-	-	Yes	Yes	Yes	Reverence for nature
17. Takahashi & Overton (2002)	-	-	-	Yes	Yes	-	-
18. Webster (2003)	-	Yes	Yes	-	Yes	-	-
19. Glück et al. (2005)	Yes	Yes	-	Yes	Yes	-	-
20. Brown & Greene (2006)	Yes	-	-	Yes	Yes	-	-
21. Jeste & Vahia (2008)	-	-	-	Yes	Yes	-	-
22. Meeks & Jeste (2009)	Yes	Yes	-	Yes	Yes	-	-
23. Grossmann et al. (2010, 2012)	Yes	Yes	Yes	-	-	-	-
24. Jeste et al. (2010)	Yes	Yes	Yes	Yes	Yes	-	Maturity
25. Grossmann (2017)	Yes	Yes	Yes	Yes	-	-	Big picture/Broad context
26. Brienza et al. (2018)	Yes	Yes	Yes	Yes	-	-	Big picture/ vantage point of an outsider
N = definitions with component	18	12	10	21	13	5	

Note. Adapted and used with permission from “Wisdom in Culture,” by I. Grossmann and F. Y. H. Kung (2019). In S. Kitayama & D. Cohen (Eds.), *Handbook of cultural psychology* (2nd ed., pp. 343–364). Guilford Press.

Finally, of the three subcomponents added to Meeks and Jeste's (2009) list by Bangen et al. (2013), only *Spirituality* made the Grossmann and Kung's (2019) list. Noticeably, *Openness* and *Humour* failed to appear in this most recent updated list. Indeed, some wisdom scholars (Ardelt, 2011b; Glück & Bluck, 2013; Glück et al., 2018) do not view *Openness* and *Humour* as core wisdom components, although Webster (2019) and Webster et al. (2011) disagrees with such views. Later in this chapter we address the issue of Openness and Humour in wisdom and specifically in the SAWS.

Of note is that the current research programme examines wisdom from the personal wisdom perspective. For our greater understanding of the wisdom and intelligence constructs, an overview of some common theories and models will now be presented, beginning with the wisdom construct.

2.1.1 Personal and General Wisdom Theories

Staudinger and Glück's (2011a) review of the wisdom literature defined personal and general wisdom as two main categories of the construct. The former is insight into life and the ability to make wise decisions regarding difficult and uncertain problems in one's personal life (Staudinger, 2013, 2019). Wisdom is acquired from personal insight, experience, reflection and introspection (Ardelt, 1997, 2003; Glück et al., 2013; Levenson et al., 2005; Mickler & Staudinger, 2008; Staudinger, 2013; Webster, 2003, 2007; Wink & Helson, 1997). Individuals facing a personal crisis would call upon personal wisdom to overcome their difficulties. The MORE Life Experience Model (MORE) encountered in Chapter 1, is an example of the development of personal wisdom (Glück & Bluck, 2013) which was subsequently revised by Glück et al. (2018).

To recap, the MORE model proposes that five highly relevant personal resources interact with challenging life experiences to foster the emergence of wisdom. The internal psychological attributes are: a sense of Mastery, Openness to experience, Reflectivity, Emotion Regulation and Empathic concerns (Glück & Bluck, 2013; Glück et al., 2018). The MORE core resources aid individuals to confront life challenges in a manner conducive to the growth of wisdom. Characteristically, wisdom is asserted to develop across the lifespan with the said personal elements essential to its attainment (Glück et al., 2018).

In a cross-sectional study, Glück et al. (2018) tested their model on 170 participants, including 47 wisdom nominees on data collected earlier by Glück et al. (2013). The MORE resources were compared with several self-report wisdom measures which included: The SAWS, the Three-Dimensional Wisdom Scale (3D-WS; Ardelt, 2003) and the Adult Self-Transcendence Inventory (ASTI; Levenson et al., 2005), as well as the BWP, which assess wisdom through think-aloud narrative protocols. Findings indicated that the MORE resources of Emotion Regulation and Empathic concerns are related to wisdom. However, the wisdom responses varied depending on the context or situation. Other wisdom researchers have also tested the relevance of the MORE resources. Kim and Knight (2017) applied three of the MORE wisdom resources of a sense of Mastery, Openness to experience, and Emotion Regulation to study life satisfaction among caregiver spouses using data from the survey of Midlife in the United States (MIDUS), caregiving spouses (n = 114, M_{age} = 62.96, SD = 11.63) and matched non-caregivers (n = 114, M_{age} = 62.29, SD = 9.93). Results showed the three MORE wisdom resources functioned as possible personal resilience factors that positively contributed to life satisfaction among caregiver spouses compared to the matched non-caregivers. Nonetheless, the

MORE model appears to focus on the reflective and affective components of wisdom and less on the cognitive elements. Additionally, what remains to be ascertained is whether longitudinal studies will determine the predictive ability of the MORE Life Experience Model.

Conversely, Staudinger (2019) defined general wisdom as, “Sound judgment and deep insight in difficult and uncertain matters of life (in general)” (pp. 183–184), where insight into human life and the world in general is from the observer’s stance (Glück et al., 2013). As an example, dealing with another’s crisis would tap into general wisdom as individuals are using their own ability to make a wise decision by offering advice regarding another’s life dilemmas (Staudinger, 2013, 2019). Such skills appear to develop between the ages of 14–25 years and are not necessarily related to ageing (Pasupathi et al., 2001). The reason could be that cognitive abilities and knowledge are known to increase during adolescence as a normal biological maturation process and interaction with the environment (Case, 1992; Inhelder & Piaget, 1958; Piaget & Inhelder, 1973) to give one such example of the latter, exposure to education (Richardson & Pasupathi, 2005). There is empirical support that wisdom increases during adolescence (Pasupathi et al., 2001), which may not increase with age after the maturation process has taken place. Staudinger and Baltes (1996) have found that general wisdom could be facilitated or increased through training at any age, for instance, by encouraging participants to confer with a trusted other individual before responding to the general wisdom task.

Although the core source of personal wisdom is through introspection and self-reflection, wise individuals draw on the experiences of what they have learnt about the self, others, and the world, when giving advice to another (Glück et al. (2013). In fact, Ardelt (2003) has suggested that a self-reflective attitude helps individuals develop wisdom-related knowledge, as well as concern for other people. The indication is also, that personal and general wisdom are related to age, with the former developing later. Empirical support from Mickler and Staudinger (2008) suggests general wisdom appears to develop earlier than personal wisdom. The reason could be, personal insight into one's own life and the ability to use the insight to solve personal problems is a difficult feat (Greenwald & Pratkanis, 1984), and arguably much more arduous than it is to obtain insight into another's life challenges. Mickler & Staudinger also found that personal wisdom declined with age, while general wisdom remained stable.

Taken together, it appears that personal and general wisdom are not identical but share some common features. As an example, for both personal and general wisdom, personal experiences are essential to the development of wisdom (Staudinger, 2019). Still, personal wisdom focuses on the self, whilst general wisdom centres on one's insight into life in general from an observer's perspective regarding other people's difficulties (Staudinger, 2019). Nevertheless, for overall wisdom development, Staudinger (2013) suggested both personal and general wisdom are necessary.

In Chapter 1, explicit and implicit wisdom theories were introduced. These theories will now be further expanded in the following subsection.

2.1.2 Explicit and Implicit Wisdom Theories

Around the Western world, researchers have published explicit wisdom theories (e.g., Baltes & Smith, 1990; Baltes & Staudinger, 2000; Kekes, 1983; Scheibe et al., 2007; Sternberg, 1990, 1998). Explicit theories are derived from philosophical definitions and psychological constructs of human development, that is, expert knowledge, opinion, and established theories (Staudinger et al., 1994;

Sternberg, 1998). Paul B. Baltes and his colleagues from the Max Planck Institute for Human Development in Berlin, were the first to define wisdom comprehensibly (e.g., Baltes & Smith, 1990; Baltes & Staudinger, 2000; Kunzmann & Baltes, 2005; Scheibe et al., 2007). These researchers define wisdom as, expert knowledge related to life planning, life management, and life review. This conceptualisation of wisdom is known as the Berlin Wisdom Paradigm (BWP) or the Berlin model. The BWP includes five components as depicted in Table 2.3.

Table 2.3

Berlin Wisdom Paradigm Criteria

Criteria	Short Explanation
1. Rich factual knowledge	Knowledge about life and its course.
2. Rich procedural knowledge	Knowledge about strategies of judgement in managing life concerns.
3. Lifespan contextualism	An awareness of lifespan changes and their relationship.
4. Value relativism	Knowledge about differences in individual and cultural goals, values and priorities.
5. Uncertainty	Knowledge about the relative indeterminacy and unpredictability of life.

Note: Adapted from Staudinger, U. M. (1999). Older and wiser? Integrating results on the relationship between age and wisdom-related performance. *International Journal of Behavioral Development, 23*(3), 641–664. https://doi.org/10.1080/016502599383739

The Berlin model is based on lifespan, expertise, and psychology theories (Baltes, 1987). An example of a vignette used in the open-end protocol, “A fifteen-year-old girl wants to marry soon. What should she, what should one, consider and do?” An expert answer should reflect more of the five components. Conversely, a novice answer would include less components. To date, data collected has generally been supportive of the model. Indeed, commenting on the usefulness of explicit theories Baltes and Staudinger (2000) argue that they, “Lend themselves to empirical inquiry in terms of quantifiable operationalization as well as the identification of relevant antecedents, correlates, and consequences of wisdom and wisdom-related concepts” (p. 124).

However, the BWP has been criticised for being intellectually biased (Glück & Bluck, 2011). The BWP has also been criticised for failing to incorporate the reflective, affective, and moral qualities of the wise (Ardelt, 2004; Labouvie-Vief, 1990); leading Trowbridge (2005) to remark, “Wisdom requires *doing* and *being* as well as knowing” (p. 204; italics by original author). Critics of the BWP have also questioned whether expert knowledge translates into real-life expertise in behaviour in solving others, as well as one’s own difficulties (Ardelt, 2004). Glück (2018) asserted that, very intelligent individuals who are not necessarily wise, may be able to “fake” wise responses during the “think-aloud” techniques to presented dilemmas, a situation she had personally encountered. More recent versions of the Berlin model, incorporate personal wisdom, such as self-knowledge, and prosocial values in addition to general wisdom (Kunzmann & Baltes, 2005; Mickler & Staudinger, 2008).

Another example of an explicit definition of wisdom is the Balance Theory of Wisdom (Sternberg, 1998, 2001, 2003). Sternberg (1998) postulated the Balance

Theory of Wisdom, as the use of an individual's common sense, intelligence, creativity, and knowledge. The conceptualisation is derived from intelligence models such as Sternberg's (1985a) Triarchic Theory of Intelligence. Wise decisions draw on tacit or informal action-oriented knowledge of knowing where, how, when, to whom and why to apply knowledge which has been acquired through one's experiences, values, and interests (Sternberg, 2001, 2003). The aim is to achieve a balance of a person's interests in one's environment over both the short and long term, in an effort to achieve common good.

The interests balanced in the Balance Theory of Wisdom (Sternberg, 1998) encompass competing (a) intrapersonal–aspirations to enhance one's own knowledge, (b) interpersonal–desires to enrich others' knowledge, and (c) extrapersonal–the necessity to contribute to the welfare of one's community. The responses to the environmental context aim for adaptation to existing environments, shaping of existing environments, and selection of new environments.

Sternberg (1998) emphasised these aspects are not fixed but oscillate, depending on the context or situation when a wise decision is being enacted. Wisdom is thought to be guided by positive ethical values towards common good. The Balance Theory of Wisdom (1998) seeks to depict both developmental and individual differences so the theory could apply cross-culturally as there is scope for environmental aspects. Nevertheless, the theory has been criticised for lacking empirical evidence (Brugman, 2006). As the Balance Theory of Wisdom (1998) was derived from the theoretical basis of intelligence, it therefore lacks the inclusion of reflective and affective components. Although the theory does allow for individual differences; because there is no consensually accepted definition of what "common good" might mean, interpretation is left to the individual whose decision might not reflect wisdom.

In contrast, implicit or lay wisdom definitions try to portray how the wider community define wisdom (Baltes & Staudinger, 2000). Some Western wisdom scholars (Clayton & Birren, 1980; Glück & Bluck, 2011; Holliday & Chandler, 1986; Sternberg, 1985b) have tried to define wisdom implicitly. These implicit theories have been crucial for informing ideas relating to the scientific theories of wisdom and therefore, wisdom research (Sternberg, 1998). Part of the reason is that experts who propose explicit or formal theories of psychological constructs also have their own implicit theories which they draw on (Sternberg, 2019a). Ardelt (2003) developed her explicit theory of wisdom, using findings from Clayton and Birren's (1980) implicit wisdom studies.

Clayton and Birren (1980) examined how wisdom can be understood by men and women of different ages. In a pilot study the researchers asked participants from an adult lifespan sample to describe a wise individual. Their research revealed 12 descriptive words: *Empathetic*, e*xperienced, gentle, intelligent, introspective, intuitive, knowledgeable, observant, peaceful, pragmatic, sense of humour,* and *understanding*. The researchers added three qualifiers: *Aged, myself, and wise*. The 15 words were paired up and the 105 pairs were then rated by a sample of 83 young, middle-aged, and older university individuals for similarity on a 5-point Likert-type scale. Multidimensional scaling analysis indicated that wisdom was multidimensional and incorporated cognitive (e.g., knowledgeable), reflective (e.g., introspective), and affective (e.g., empathetic) components. Although the concept of wisdom becomes more differentiated with age, there was no relationship between participants' own age and the perception of their own level of wisdom. While this study was exemplary in that gender was balanced and the age group categories were nearly identical, a more nuanced study would include not just educated individuals, but a community sample of variable educational achievements. With such a design, findings would have been generalisable to the wider community.

Psychological concepts of wisdom have also been divided into performance and trait models. A summary of these studies will be discussed in the next subsection.

2.1.3 Performance and Trait Wisdom Models

The BWP exemplifies wisdom as a performance model (Baltes & Smith, 1990, 2008; Baltes & Staudinger, 1993, 2000; Scheibe et al., 2007). Performance models assess general wisdom-related knowledge. Other wisdom researchers conceptualise wisdom as a characteristic of the individual, an attitude or a personality trait; where people have insight into their own lives (e.g., Ardelt, 1997, 2003, 2004; Webster, 2003, 2007; Wink & Helson, 1997). Trait wisdom models assess personal wisdom.

Assessing wisdom as a personality type is another useful way to explain what the basic components of wisdom might be. While wisdom as a trait implies a stable or immutable characteristic of the individual, wisdom may also be viewed as a state, where wisdom related knowledge varies depending on the situation and context (Grossmann et al., 2019). For example, some wisdom researchers (e.g., Brienza et al., 2018; Grossmann et al., 2016) using a wise reasoning tool showed that self-reported wisdom related knowledge can vary from day to day, situation, and context. Many researchers and laypersons refer to wise persons possessing wisdom related characteristics and not wisdom as situational or wise reasoning knowledge (Ardelt et al., 2019; Bluck & Glück, 2005; Jeste et al., 2010). That wisdom should refer to the individual rather than to their wisdom-related knowledge or wise reasoning skills, is strongly supported by some authors (e.g., Ardelt, 2004; Ardelt et al., 2019; Moody, 1986).

In agreement, Ardelt et al. (2019) do not consider wisdom to be an inherited personality trait, but rather, a characteristic that can develop over the life-course. The observation is that trait wisdom qualities display short-term stability and consistency across situations and time (Ardelt, 2003, 2016), implying that trait wisdom might resemble long-term changes observed in personality (Ardelt, 2000c; Roberts et al., 2006), rather than representing an inborn personality trait.

Support for wisdom as a trait or personality type comes from both Western and Eastern implicit and explicit definitions where wisdom is considered to encompass and integrate cognitive, reflective, and prosocial personality attributes (Ardelt, 2003; Meeks & Jeste, 2009; Sternberg & Jordan, 2005; Takahashi & Bordia, 2000). Other scholars (e.g., Erikson, 1963, 1982) consider wisdom to develop over the life-course but highlight the noncognitive, emotional, and social aspects of acquiring wisdom with less emphasis on wisdom-related knowledge. Likewise, Webster’s (2003, 2007, 2019) SAWS model of wisdom places emphasis on the noncognitive elements where wise persons are considered to possess humour, have experienced critical life events, engage in self-reflection and life review, are open to myriads of experiences, and are adept at regulating their emotions. In all these wisdom models, the importance is not on wisdom-related knowledge, as is the case with performance models.

Wisdom assessed as a trait, follows an inverted U–shape curve with age, peaking at midlife (Ardelt et al., 2018; Bergsma & Ardelt, 2012; Thomas et al., 2017; Webster et al., 2014). In contrast, wisdom assessed as general wisdom related knowledge, inclines upwards from adolescence to young adulthood, remains stable across adulthood before declining in very old age (Pasupathi et al., 20001). With emphasis on what the traits of the wise might be, there are possibilities for wisdom development over the life-course and the likelihood that wisdom could be enhanced in individuals.

Knight and Laidlaw (2009) suggested wisdom improvement through psychological interventions, whereas others (e.g., Sternberg, 2019a) have proposed learning or modelling behaviour could increase wisdom. For example, wisdom might be encouraged to develop through teaching in schools (Ferrari & Potworowski, 2008), mentoring in organisations (McKenna & Rooney, 2019; Northouse, 2018; Zacher et al., 2011), and advice giving in the military (Zacher et al., 2015). Wisdom has been found to be shaped by experience (Meeks & Jeste, 2009) and can develop through posttraumatic stress (Plews-Ogan et al., 2012). Weststrate et al. (2018) found wisdom developed in individuals who had experienced life changing events which were often negative and not considered normal human development. Less traumatic wisdom acquisition methods include wisdom fostering practices such as meditation (Levenson et al., 2005; Williams et al., 2016) and mindfulness (Brienza et al., 2018; Sharma & Dewangan, 2017).

The current study focuses on trait rather than performance models of wisdom for reasons discussed under explicit theories of wisdom in Subsection *2.1.2*. Following the conceptualisations of the wisdom construct, many wisdom scholars attempted to understand how the concept is expressed for men and women and wisdom’s relationship to demographic variables such as age, gender, and even education. Let us now turn to the scholarship of wisdom, age, and gender.

2.2 Wisdom, Age, and Gender

Current empirical studies reporting on the relationship between wisdom, age, and gender are vast, complex and inconsistent. Scientific research on the variables of wisdom, age, and gender are conducted in both Western and non-Western societies and have witnessed an upsurge in the past three decades (e.g., Alves et al., 2014; Ardelt, 2003; Cheraghi et al. 2015; Dortaj et al., 2018; Fung et al., 2020; Glück et al., 2013; Greene & Brown, 2009; Grossmann et al., 2010; Levenson et al., 2005; Taylor et al., 2011; Webster, 2003, 2007; Webster et al., 2014; Wink & Helson, 1997; Yang, 2001; to name a few). Yet, even with burgeoning published peer reviewed articles worldwide, coherent interpretation of research findings are still neither straightforward nor easy to accomplish. The following subsections report on these divergent results prior to synthesising and trying to make sense of what such disparate research findings might mean. To begin, an examination of empirical findings on wisdom and age will be investigated.

2.2.1 Wisdom and Age

The cartoonist Wilson cautions us, “Wisdom doesn’t necessarily come with age. Sometimes age just shows up all by itself” (Wilson, n.d., para. 1). Wilson’s salient observation is echoed in some scientific wisdom studies and highlights that wisdom is a rarity (Jeste et al., 2010). For example, Law and Staudinger (2016) pointed out that wisdom is not a result of typical maturation. Wisdom is believed to manifest from resolving one’s difficult life experiences (Webster, 2003, 2007, 2019), through self-reflection (Weststrate & Glück, 2017; Weststrate et al., 2018), and learning from such experiences (Glück et al., 2018; Staudinger & Glück, 2011a). Yet, in most cultures, wisdom is generally associated with older age (Assmann, 1994; Heckhausen et al., 1989; Orwoll & Perlmutter, 1990). Some researchers (e.g., Glück & Bluck, 2013; Kekes, 1983; Staudinger, 1999) contend that a wise person is usually old, due to the time required to attain such growth.

To reiterate once more, what has been gleaned from the literature on the wisdom and age trajectory, is that it is mixed and complex. As the following subsections will show, dependant on the wisdom measure used in the assessment, wisdom has been demonstrated to (a) increase with age, (b) decrease with age, (c) neither increase nor decrease with age after 25 years, but between 15–25 years is charted by unprecedented wisdom growth, (d) be unrelated to age, and (e) show a curvilinear relationship with age with the apex at midlife. In order to treatise wisdom and age, an examination of empirical literature reporting on wisdom increasing with age was conducted.

2.2.1.1 Increasing Wisdom with Age. Some wisdom scholars have shown a positive relationship between wisdom and age (e.g., Bang, 2015; Grossmann et al., 2010; Staudinger & Glück, 2011a; Wink & Helson, 1997). Such positive relationships between wisdom and the process of ageing have been reported when assessing wisdom either with self-report tools or with "open-ended" that is "think aloud" narrative or performance wisdom measures.

Bang (2015) examined the relationship between the self-report 3D-WS dimensions of cognitive, reflective, and compassionate and age differences in African American college students (*N* = 198; age range = 18–25 years). The scholar demonstrated a significant age contribution with respect to the reflective and affective dimensions of the measure, but not the cognitive facet. Specifically, older college students showed higher reflective and affective wisdom. The Bang study, highlights that perhaps, the measure and its dimensionality might influence the age–

wisdom results. Grossmann et al.'s (2010) work explores the effects of ageing on wisdom using a wise reasoning tool, which helps to tap into general wisdom.

Grossmann et al. (2010) presented an American sample aged 25–90 years with fictitious, albeit content-rich, newspaper article clips describing societal and interpersonal conflicts. In their Study I, the sample (*N* = 247) included young adults (25–40 years), midlife adults (41–55 years), and older persons (60–90 years), who were tasked with solving conflicts between social groups. One year later, of the 247 individuals, 200 responded to their Study 2, involving interpersonal conflict. After exposure to the vignettes, participants were asked to think out aloud about the presented dilemmas, with guided prompts from the interviewers such as, "W*hat do you think will happen after the event you read about*?" or *"Why do you think it will happen this way*?" and *"What do you think should be done*?" Participants' responses were content analysed for aspects of expert rated wise thinking and then coded by trained raters.

Findings demonstrated a positive linear relationship between wisdom and age, well into old age. It is worth noting that although fluid reasoning (G*f*) is documented to decline linearly in old age (Park et al., 2002) and Grossmann et al. (2010) confirmed this to be the case in their research, the scholars discovered, reasoning about social conflicts improved with age. The study is important because the researchers used a randomly selected sample that was large for a narrative research protocol. Unlike other vignettes which often use a single line, the Grossmann et al.'s tasks were context-rich, believable materials concerning social conflicts. Kunzmann et al. (2018) and Kunzmann (2019) speculated that the vignettes could be tapping into the ability of the respondents to relate the wisdom tasks to their own experiences therefore encouraging wiser responses. Nevertheless, it is unclear whether older persons would still reason wisely if the dilemmas provoked strong emotional arousal. One explanation could be that cognitive resources required for the control of complex emotions and regulating one's emotional states follows a curvilinear trajectory with ageing, with maximum control at midlife and lower control levels at younger and older ages (Labouvie-Vief et al., 2007). Another explanation might be the finding that to examine and regulate emotions, Openness to new experiences is necessary (Webster et al., 2014). Personality data from both cross-sectional and longitudinal studies have shown small declines in Openness with ageing (Donnellan & Lucas, 2008; Stephan, 2009; Webster et al., 2014). However, Webster et al. (2014) demonstrated significant decreases in both Openness and Emotional Regulation in older persons and the curves were both curvilinear, with low scores at younger and older ages with Openness and Emotional Regulation scores peaking at midlife. With such decrements in Openness and Emotional Regulation aspects in later life, older persons might not be able to express emotions in a balanced manner when highly agitated.

Support for Grossmann et al.'s (2010) findings come from earlier data by Staudinger (1999), who reported only a small decline in wisdom at very old age when working with the Berlin Wisdom Paradigm (BWP). There is also support from longitudinal data collected by Wink and Helson (1997), who assessed a North American sample of 94 female college graduates and 44 of their male partners with a measure of practical wisdom using a self-report Adjective Check List (ACL) and other variables of interest. In their study, practical wisdom scores were found to increase for both the women and their partners, over a 25-year period.

In summary, wisdom appears to increase with age, not just on assessment with self-report measures, but also using performance tools. However, on some self-report measures, the dimension/s showing incremental wisdom with ageing seem important. On performance measures, it appears that the higher the content and guidance provided to participants by assessors, the easier it is for respondents to provide wise responses.

In conclusion, the literature above indicates that wisdom requires time, difficult life experiences (Webster, 2003, 2007), self-reflection (Weststrate et al., 2018), and learning from one's experiences (Glück et al., 2018; Staudinger & Glück, 2011a). As such, and intuitively, we would not expect wisdom to be linearly related to age if these behaviours are not activated by the individual.

2.2.1.2 Declining Wisdom with Age versus Wisdom of Adolescents. Contrary to wisdom increasing with age, there is also empirical literature to support wisdom declining with age (e.g., Ardelt, 2003, 2016; Baltes & Staudinger, 2000; Meacham, 1990). Philosophers such as Meacham (1990) for example, theorise that children are wise but lose their wisdom as they grow up due to life's adversities. However, there is no empirical support for such an assertion. Using her 3D-WS, Ardelt (2003) sampled older Americans (*N* = 180; age range = 52–87 years); her findings showed a negative relationship between wisdom and age. Similarly, Ardelt (2016) in a 10-month short longitudinal study with community older Americans (*N* = 153; age range = 55–87 years), found the composite 3D-WS score was consistently negatively related to age at Time 1 and Time 2. Ardelt's studies also help to highlight the scarcity of adolescents and younger participants in some wisdom research. Inclusion of adolescents and young adults in scientific wisdom studies is important if researchers hope to clarify the wisdom–age trajectory. Wisdom related knowledge is suggested to increase from adolescence (Pasupathi et al., 2001). In fact, adolescence has been flagged as the optimal period for the development of wisdom (Richardson & Pasupathi, 2005).

Pasupathi et al. (2001) investigated wisdom-related knowledge and judgement in adolescents (*N* = 146; age range = 14–20 years) with a comparative group of young adults (*N* = 58; age range = 21–37 years) using the BWP. They demonstrated that, although adolescents performed at lower levels than young adults, adolescence was a time of normative marked age-related increase in wisdom related knowledge and judgement. For the younger adults, wisdom was found neither to increase nor decrease with age after 25 years. What might be inferred from Pasupathi et al.'s findings is that Ardelt's (2003, 2016) conclusions regarding wisdom's diminution with age, may well have been different with the inclusion of adolescents and younger adults in her study. This is because the 3D-WS includes many reverse worded items, and these reverse worded items are harder for older persons to interpret correctly (Glück, 2019). Younger individuals with increasing fluid abilities may not be as adversely affected, thus, the inclusion of younger age groups might have counterbalanced the negative correlation of the 3D-WS with age.

In conclusion to the current subsection, Glück (2019) posited that, measures of wisdom should not be negatively related to age. A wisdom measure such as the 3D-WS shows negative relationship with age in samples entirely composed of older persons, as negatively worded items pose difficulties for this age group to manipulate and interpret correctly. Inclusion of a lifespan sample appears to solve the problem. Although philosophers such as Meacham (1990) propose that wisdom precipitously declines with age, there is no empirical support for such assertions. The lack of significant correlations between some wisdom measures and age have also been reported and are elaborated next.

2.2.1.3 Wisdom is Unrelated to Age. Some wisdom scholars employing cross-sectional methods have found that young and older persons do not differ on wisdom, on both self-report and performance measures (Ardelt, 2010; 2011a; Glück et al., 2013; Mansfield et al., 2010; Moberg, 2008; Taylor et al., 2011; Webster, 2007; Zacher et al., 2015). For instance, Glück et al. (2013) investigated the reliability and validity of four popular wisdom measures which included the SAWS, the ASTI, the BWP, and the 3D-WS. The sample consisted of wisdom nominees (*N* = 47, *M* = 60.90, *SD* = 16.30; age range = 26–92 years) and a control group (*N* = 123, *M* = 54.10, *SD* = 15.80; age range = 19–95 years). The study revealed that wisdom was unrelated to age on the ASTI and the BWP. However, for the SAWS, the relationship was positive and weakly significant ($r = .15$, $p = .052$), but negative and significant for the 3D-WS ($r = -.17$, $p = .025$). The SAWS and the 3D-WS self-report measures posted opposite findings, whereas, the ASTI, another self-report tool, had zero correlation with age. These ASTI results will be examined in Subsection *2.3.3*.

The 3D-WS was originally designed by Ardelt (2003) to assess wisdom in older persons, but many researchers have used the measure with lifespan samples. When Ardelt (2010) investigated whether older persons (*N* = 178; age range = 52–87 years), were wiser than undergraduate college students (*N* = 477; age range = 18 years and older), she found no relationship between the 3D-WS and age. Likewise, when Taylor et al. (2011), using a lifespan sample of mainly Australian participants (*N* = 176, *M* = 36.60, *SD* = 12.07; age range = 18–68 years) compared the psychometric properties of the SAWS and the 3D-WS, found no relationship between either measure and age. Perhaps of relevance is that both Ardelt and Taylor et al. included young, as well as older adults in their samples. The findings from these two studies might contribute to our greater understanding of the 3D-WS's negative correlation with age.

To conclude, Ardelt's studies in 2003 and 2016, using an older sample aged 52+ years, found wisdom was negatively related to age. Even the study by Glück et al. (2013), with a larger control group (*N* = 123) with a mean age of 50+ years and a smaller wisdom nominee group (*N* = 47) with a mean age of 60+ years found a negative relationship between wisdom and age on the 3D-WS. As argued in Subsection *2.2.1.2* the negative correlations disappear when younger age groups are included in the sample as demonstrated by Ardelt's study in 2010 and Taylor et al.'s research in 2011. It appears that sample composition is pivotal to whether the measure is negatively related with age or not. Other wisdom scholars have reported a curvilinear wisdom–age trajectory, that is, lower scores early and late in life, with the zenith around midlife.

2.2.1.4 Curvilinear Relationship Between Wisdom and Age. Recent wisdom scholarships, using a variety of measurement tools, have reported a curvilinear relationship between wisdom and age with the apex at midlife (Ardelt et al., 2018; Brienza et al., 2018; Thomas et al., 2017; Webster et al., 2014). Webster et al. (2014) using a lifespan sample of Dutch adults (*N* = 512; age range = 17–92 years), investigated the relationship between wisdom and mental health using the SAWS. Findings indicated a curvilinear relationship between wisdom and age with midlife adults scoring significantly higher on wisdom compared to younger and older persons. Whether these results were due to a cohort effect can only be determined through longitudinal studies.

Ardelt et al. (2018) examined the relationship between wisdom, age and education on a sample of German adults (*N* = 14,248, *M* = 36.46, *SD* = 12.68; age range = 18–98 years) using the 3D-WS. The authors also reported an inverted U-shaped curve between wisdom and age with the apex at middle age. Ardelt et al.’s study was notable for its large sample size. Nevertheless, since the sample was more educated in comparison to the wider German population, generalisability is limited. Despite the impressive sample size, Ardelt et al. indicated in their study that older adults over the age of 70 were underrepresented, thus reducing generalisability of the study. Also, conceivably, the research would have been more convincing if the researchers had not disclosed that the respondents were involved in a wisdom study. This is important given that wisdom is a highly sought-after positive personal attribute (Baltes et al., 1992; Heckhausen et al., 1989). Consequently, participants might have been inclined to appear wiser in their responses. Perhaps an inclusion of a measure to assess social desirability responding (SDR) or the tendency to give positive self-image (Crowne & Marlowe, 1960; Lelkes et al., 2012; Paulhus, 1991) would have been useful to ascertain whether the findings were contaminated by SDR bias. Both Ardelt et al.’s (2018) and Webster et al.’s (2014) studies measured wisdom as a personality trait. The curvilinear relationship between wisdom and age has also been found by Brienza et al. (2018) using the Situated Wise Reasoning Scale (SWIS), a self-report measure which assesses wisdom as a state, meaning wisdom measurement can depend on the situation or context (Grossmann et al., 2019). Additionally, it may also be argued that the curvilinear pattern is to be expected in studies with samples composed of respondents aged midlife and older.

The curvilinear age trajectory has also been observed in situations requiring emotional regulation. This observation could be important as most wisdom measures, such as the SAWS, ASTI, 3D-WS and BWP incorporate statements that require emotional regulation in their processing and might therefore impact research outcomes.

Drawing on neo-Piagetian concepts of cognitive development, Labouvie-Vief (2003, 2009) and her colleagues (e.g., Labouvie-Vief et al., 2007) proposed an emotional development model which tries to explain age-related changes in emotional functioning across the adult life-course. From this perspective the understanding and regulation of emotions increases with age, peaking at midlife, but then begin to regress from approximately age 60, due to declines in cognitive resources. The model has support from some wisdom scholarship. In Webster et al.'s (2014) study mentioned above, the authors note, "Many of the life events indexed in the SAWS are strongly emotional in tone and require emotional regulation strategies" (p. 114). They also found that middle-aged adults scored significantly higher than both the younger and older adults on the Emotional Regulation subscale of the SAWS. The suggestion is that compared to young and older persons, middle-aged adults excel at using emotional regulation strategies without getting overwhelmed by emotions. This curvilinear relationship between affect regulation and ageing adds another layer of complexity to the wisdom–age relationship.

To conclude, wisdom researchers started to examine the curvilinear relationship between wisdom and age only recently. It appears that, previous reporting of bivariate correlations masked the curvilinear nature of the association between age and wisdom. Cross-sectional studies have also reported this curvilinear relationship, regardless of whether wisdom was measured as a state or a trait. Another layer of complexity in these cross-sectional studies is the finding that emotional regulation is age dependent, with maximum control at midlife (Labouvie-Vief, 2003, 2009; Labouvie-Vief et al., 2007). To the best of our knowledge, no longitudinal studies could be found reporting on the curvilinear relation between wisdom and age. Until such studies are available, it remains unclear whether the cross-sectional data findings are due to cohort effects. The next section is a synthesis and integration of the disparate research regarding the relationship between wisdom and age.

2.3 Synthesis of Wisdom and Age Findings

Taken together, the inconsistent findings clearly present a complex picture regarding the age–wisdom relationship. To synthesise and make sense of such contradictory findings, a few interpretations will be examined in the following subsections. To begin, we appraise the relevance of the research task.

2.3.1 Relevance of Wisdom Assessment Task

Task relevance appears to enhance wisdom related responses. Using the BWP on an adult lifespan sample (N = 192) Thomas and Kunzmann (2013) showed that age differences in wisdom related knowledge were moderated by the relevance of the task being assessed. Younger adults with experiential knowledge, for example in marital conflict, and greater Openness to talk about such matters, stimulated greater wisdom-related knowledge compared to older persons. Despite this, with age-neutral tasks, there were no linear age differences in wisdom-related knowledge.

2.3.2 Sample Composition and Culture Matters

The importance of sample composition has previously been discussed in detail in Subsection *2.2.1.2* in terms of the age of participants, specifically in relation to the 3D-WS. Cultural differences may also play a role in explaining the confounding wisdom and age results. Grossmann et al. (2012) used a wise reasoning measure on a sample of Americans (N = 225) and Japanese (N = 186) of three age categories that included younger adults (25–40 years), midlife adults (41–59 years), and older persons (60–75 years). The task was to solve intergroup or interpersonal conflicts. Wisdom was assessed as recognition of multiple perspectives, such as, the limits of personal knowledge and the importance of compromise. Findings showed that, wisdom increased with age for Americans, but not for the Japanese. The observed disparity between the two nations might be explained by the Japanese scoring consistently higher across all the three age categories than the Americans. How wisdom has been conceptualised by researchers is observed to bias the wisdom–age connection.

2.3.3 Conceptual Models of Wisdom Development

Intuitively and according to developmental theories of wisdom, it is expected the wisest persons to be the oldest in the population (Kekes, 1983), yet empirical evidence has not always supported this idea. Glück et al. (2013), using four measures of wisdom, including the SAWS, the 3D-WS, the ASTI and the BWP, failed to find that the wisest were the oldest with any of these measures. One possible explanation is that there is no consensus on a definition of wisdom. Different conceptualisations of the construct have been operationalised inconsistently with different measurement tools. Sternberg (1998, 2005a) and Glück (2019) have argued that, the relationship between wisdom and age crucially depends on the way wisdom has been conceptualised and operationalised in the research. Specifically, the facet of wisdom emphasised by the wisdom measure. When Glück (2019) re-examined the data from Glück et al.'s (2013) lifespan sample of participants (N = 170) which included wisdom nominees (N = 47) she uncovered important new information.

Generally, wisdom measured as self-transcendence, increases with age (Levenson et al., 2005). Yet, Glück et al. (2013) found there was a zero correlation between the ASTI and age. Glück (2019) reasoned that the lack of correlation was because only a few self-transcendence items are included in the ASTI measure, and therefore reflected the ASTI total score as unrelated to age.

Glück (2019) further argued that some facets of wisdom involve complex cognitions and are subject to fluid reasoning (G*f*). Li et al. (2004) theorised that, the inevitable decline in G*f* with age could account for the low scores for older participants in psychological measures. According to Glück (2019) most individuals, excluding the wise, revert to an unsophisticated way of thinking in older age to resolve complex issues. A wisdom measure such as the 3D-WS, where responses indicating poor judgement comprise most of a participant's total score, it is predicted higher age will result in lower scores on the 3D-WS measure. A sample of complex statements in the 3D-WS which Glück suggest attract unwise responses from older adults include, "*In this complicated world of ours, the only way we can know what's going on is to rely on leaders or experts who can be trusted*", or "*Simply knowing the answer rather than understanding the reasons for the answer to a problem is fine with me*", and "*I prefer to let things happen rather than try to understand why they turned out that way*".

Glück (2019) analysed the contradictory results reported by researchers using similar protocols to the BWP. She found that some vignettes, such as those by Grossmann et al. (2010) provided greater context and participants were encouraged to search for a broader range of outcomes. Therefore, Grossmann et al.'s results indicated that wisdom increased with age. However, with the BWP protocol, the vignettes are shorter, lack context and are believed to tap into attributes of fluid intelligence. Hence, wisdom declined as G*f* decreased with age. What is also interesting is that on the BWP, if participants are given tasks relevant to their age, then wisdom scores increase (Smith et al., 1994; Staudinger et al., 1992; Thomas &

Kunzmann, 2013). The suggestion is that, at least on the BWP, wisdom and age results are likely confounded by both the relationship between G*f* and wisdom and the assessment protocol employed by the researcher.

Negatively worded items in a measure such as the 3D-WS are believed to result in cognitive overload and are especially difficult for older persons to process (Glück et al., 2013). Incorporating reverse worded items as a way of reducing or preventing response bias in self-rated psychological indicators, has pointed to respondent inattention and confusion leading to response error (van Sonderen et al., 2013; Weijters, 2013). Suárez-Álvarez et al. (2018) found it was not the reverse items per se which lead to problematic responses, but the combination of positive and negative items in the same instrument. The scholars demonstrated on such combined measures, the variance and precision of the instruments were reduced and results were also dependent on respondents' verbal skills.

Regarding the curvilinear relationship between wisdom and age, some researchers (Webster et al., 2014) have suggested that, although older persons might have greater life experiences compared to midlife individuals, the latter shows greater Openness to experiences awarding them an advantage in wisdom. Increase in rigidity or dogmatism (Schultz & Searleman, 2002), which has been shown to be curvilinearly related to age; as well as the decrements in the processing of complex emotions with ageing (Labouvie-Vief, 2003, 2009; Labouvie-Vief et al., 2007) might also account for the inverted U–curve wisdom–age trajectory.

Finally, if wisdom development involves the desire to learn (Ardelt, 2003), then, becoming wise would depend on whether one has the incentive and the resources to develop psychologically. Along these lines, the MORE Life Experience model (Glück & Bluck, 2013; Glück et al., 2018), would suggest that not everyone has the experience or the personal resources to become wiser with age. Older age does not automatically confer individuals the ability to self-reflect and integrate one's life experiences in a wisdom fostering manner; qualities both wisdom scholars and lay persons agree are necessary for wisdom to actualise (Ardelt, 2004; Glück, 2019; Glück & Bluck, 2013).

In Chapter 1, distinctions between the conceptualisations of wisdom and intelligence were elucidated. Let us now move on to examine how the relationship between wisdom and age has been conceptualised from the intelligence viewpoint.

2.4 Wisdom and Age Theorised from the Intelligence Perspective

Over time scholars have defined the wisdom construct in many ways. For example, as self-transcendence (Aldwin et al., 2019; Levenson et al., 2005), as expertise in the fundamental pragmatics of life (Baltes & Staudinger, 2000), expertise in uncertainty (Brugman, 2000), altruism (Brown & Greene, 2006), recognising uncertainty and change (Achenbaum & Orwoll, 1991; Brienza et al., 2018), as well as displaying modesty and unobtrusiveness (Yang, 2001). Indeed, it was noted in the first paragraph of Chapter 1 that the developmental trajectory of wisdom has been equated with that of either crystallised intelligence, that of fluid intelligence, or a combination of both. Sternberg (2005a) reviewed the literature on the relationship between wisdom and ageing. He identified five perspectives or theoretical models which assume to explain the relationship between wisdom and age. In the following subsections an overview of these viewpoints is examined.

2.4.1 Wisdom is Received with Age

The first theoretical model discussed by Sternberg (2005a) is one derived largely from implicit or laypeople's perceptions of wisdom and ageing where wisdom is "received" in later years of life, arriving with older age and experience.

The supposition is that wisdom in the young, such as children, is either lacking or low until old age brings on wisdom. Furthermore, even though old age may be characterised by physical debility, the twilight years are also supposed to bring about spiritual awakening, facilitating the acquisition of wisdom (Sternberg, 2005a). This *received* theoretical viewpoint, seems closely related to Erikson's (1963, 1968, 1982, 1986, 2008) psychosocial model of human development. The eighth and final stage of this model proposes that, faced with one's own mortality, leads either to "integrity or despair". However, for those who successfully resolve this last crisis of growth, they are blessed with wisdom. Although the *received* theory is appealing, it lacks empirical support. Wisdom experts and scholars generally do not endorse this view (Glück, 2016).

2.4.2 Wisdom is Similar to Fluid Intelligence

Sternberg's (2005a) second model, described the "fluid intelligence" view of wisdom and ageing trajectory. According to this concept, wisdom is like fluid intelligence (G*f*), where wisdom is theorised to increase during adolescence and early adulthood. Wisdom then remains stable in early and middle adulthood prior to diminishing at the end of adulthood with approaching old age (Kievit et al., 2016). According to Jordan (2005) and McAdams and de St. Aubin (1992), an individual might hold onto their wisdom until early old age. Unlike the *received* view of wisdom, wisdom akin to fluid intelligence has empirical support (e.g., Baltes & Staudinger, 2000).

2.4.3 Wisdom as Crystallised Intelligence

Sternberg's (2005a) third model, viewed wisdom as "crystallised intelligence" or G*c*. This perspective suggests a linear upward trend of wisdom from early life to old age like crystallised intelligence (Horn & Cattell, 1966; Schaie, 1996). The indication is that wisdom generally starts to decline about 10 years prior to one's death, due to the onset of disease which might impair its continued development (Jordan, 2005; Kaufman, 2001; Sternberg, 1998). Some empirical support for wisdom as crystallised intelligence, comes from longitudinal work (e.g., Hartman, 2000; Wink & Helson, 1997). Cross-sectional data from Grossmann et al. (2010) using the think-aloud narrative protocol, with a wise reasoning scale, reported a positive linear trajectory between wisdom and age, well into an individual's 90s.

2.4.4 Wisdom as Combined Fluid and Crystallised Intelligence

In Sternberg's (2005a) fourth model of wisdom and ageing, he explained the view of wisdom as a combination of both "fluid and crystallised intelligence" (Birren & Svensson, 2005) or the G*f*–G*c* perspective. The combination indicates a more complex wisdom developmental trajectory than that for either G*f* or G*c* alone. The viewpoint is that wisdom, like G*f*, increases from early life until midlife when decrements in fluid abilities begin to set in. Despite the continued increase in G*c* by late middle age, these increases are considered inadequate to offset the decline in fluid abilities and by extension, wisdom. Support for the theory comes from classical scholarship by Horn and Cattell (1966), who found that G*f* such as, associative memory and intellectual speed were apt to significantly decline after early adulthood. In contrast, G*c* in the form of verbal comprehension, increased with age and only stabilising at middle age. Modern support for the empirical study by Horn and Cattell comes from a study by Kaufman (2001) who found similar trends with G*f*, measured as performance and G*c*, assessed as verbal intelligence using the WAIS-III IQs. Thus, marked decreases in G*f* and smaller gains in G*c* by middle age predict an overall downward trend in wisdom, starting in late midlife. In addition, it is also possible that G*f* and G*c*, analogous to the MORE resources, are wisdom precursors that are necessary for its development. Support for this notion comes from Mickler and Staudinger (2008), who found that a basic amount of intelligence was required to solve wisdom tasks.

2.4.5 The Declining Wisdom

Sternberg's (2005a) fifth model, expounded on the view of "declining wisdom", as philosophised by Meacham (1990), that wisdom declined with age beginning early in life. Children are therefore deemed wise, as they are open to the world, yet both adversities and even personal accomplishments can erode this wisdom over their life-course. For example, difficulties might decrease wisdom if they result in doubt and loss of trust in the world. Personal achievements may lead to egocentrism, unrealistic optimism, intolerance, and loss of empathy, increasing scepticism, dogmatism (Meacham, 1990; Schultz & Searleman, 2002), and a decreased Openness to experiences (Webster et al., 2014) may lead to the loss of wisdom. Although there is empirical scholarship to support the general wisdom decline in very old age such as over 75 years (Baltes & Staudinger, 2000), the declines appear related to deteriorations in physical health. Meacham's (1990) view of declining wisdom lacks empirical support. From the previous five views, except for the *received*, model, the other theories assume that wisdom increases during early life, however, not many wisdom studies include adolescents in their research.

To conclude this section, according to Sternberg (2005a), wisdom may develop along several possible pathways which follow similar trajectories to crystallized (G*c*) and/or fluid intelligence (G*f*). Thus far, from the intelligence model, wisdom has been postulated to be *received* in old age, neither increase nor decrease with age after 25 years, although between 15–25 years there are substantial increases, or decline precipitously from childhood. At least one consensus, is that, the decline in mental health, in late old age is accompanied by declines in wisdom. Since the trajectory of either wisdom or intelligence with age is an individual difference, this partly helps to explain the incongruent empirical findings (Sternberg, 2005a). The wisdom and gender relationship is yet another complexity to account for.

2.5 Wisdom and Gender

No single position on the gender–wisdom relationship is conclusively empirically supported. What is not disputed, is that those rare individuals who are recognised for their wisdom, include both men and women (Aldwin, 2009; Jung, 1964). Many wisdom scholars (e.g., Ardelt, 2003; Bang, 2015; Glück et al., 2013; Moberg, 2008; Webster, 2007; Webster et al., 2014) have found no relationship between wisdom and gender.

In Glück et al.'s (2013) research, the scholars found of the four measures examined, including the BWP performance measure, and three self-report measures (SAWS, ASTI, and 3D-WS), none revealed any gender differences. However, Webster (2003) did report gender to correlate moderately with the 30-item SAWS (r = .29) in a small sample of Canadian adults (N = 85; age range =22–78 years), where women scored higher than men. Yet, with the 40-item SAWS, Webster (2007) found no such gender differences for wisdom. When Dortaj et al. (2018) investigated the psychometric properties of the 40-item SAWS on a sample Iranian high school, university, and community participants (N = 395), women scored significantly higher than men on the Experience and Emotional Regulation facets of wisdom.

During the construction of her 3D-WS, Ardelt (2003) found no gender differences in wisdom. However, in 2009, Ardelt used her 3D-WS, to determine similarities between wise men and women in a US sample of college students (N =

464) and older persons over 50 years (*N* = 178). Results demonstrated that men scored higher on the cognitive dimension of wisdom than older women. Women in both groups scored higher on the interpersonal dimension compared to men. There were no gender differences among the top 25% wisdom scorers; signifying that, wise individuals have integrated the cognitive and affective dimensions of wisdom (Orwoll & Achenbaum, 1993). Unfortunately, Ardelt's research population came from a narrow geographical area and the results for the older cohort were based on data from 10 years earlier and it is unclear if these differences still persist. Findings would have been much more persuasive if the author had included a wider geographical area for the data collection.

In summary, wisdom is believed to be a rare developmental goal in men and women (Assmann, 1994; Erikson, 1982; Jeste et al., 2010). Current wisdom theories do not support general gender differences (Aldwin, 2009; Glück, 2019; Glück et al., 2013) and the current review of the literature revealed very few studies that support gender differences. Other than the random idiosyncratic nature of samples, it remains unclear why the same researchers (Ardelt, 2003, 2009; Webster, 2003, 2007) using their own measures, post opposing findings at different times. The final subsection deals with age and gender interactions.

2.5.1 Evidence of Age and Gender Interactions

Maroof et al. (2015) examined the relationship between wisdom with age and gender in a sample of Pakistani college and university individuals (*N* = 400; age range = 17–50 years) using the 3D-WS. Results indicated a significant positive relationship between wisdom and age. Men scored significantly higher than women on both the affective and reflective dimensions of wisdom. The finding is somewhat counterintuitive in Western cultures where women tend to score higher on the affective or compassionate component of wisdom (Ardelt, 2009; Glück et al., 2009; Levenson, 2009; Orwoll & Achenbaum, 1993). However, there was no significant gender difference on the cognitive facet. Findings are not generalisable as the sample was highly educated and excluded older persons. A more comprehensive study would seek to include a lifespan sample as well as a sample from the greater community.

Cheraghi et al. (2015) employed the 3D-WS, to study the effects of wisdom on age and gender in a lifespan sample of Iranians (N = 438; age range = 18–80 years). The sample was divided into young (18–34), middle-aged (35–54), and older persons (55 and over). The authors reported a positive relationship between wisdom and age, but only for men. Older women scored lower on the cognitive dimension compared to younger women and older men. However, the older women's average wisdom scores were comparable to those of older men on the affective dimension. Younger women scored significantly higher on the 3D-WS total score compared to younger men. The study was noteworthy, in that the sampling technique was random considering convenience sampling is widespread in wisdom research.

To conclude this subsection, culture is an important consideration and culture has been found to influence the way wisdom is expressed in men and women of different ages (Cheraghi et al., 2015; Grossmann et al., 2012; Kung & Grossmann, 2018; Maroof et al., 2015; Staudinger, 1996; Yang & Intezari, 2019). Until the findings are replicated in other societies, results would appear to remain culture bound.

2.6 Wisdom, Age, and Gender Conclusions

The empirical data on the relationship between wisdom, age, and gender are complex and reveal contradictory and inconclusive findings. Currently, there is no universally accepted view of the relationship between wisdom and age. Understandings on this relationship are chaotic, varying from wisdom increasing with age to decreasing with age, maintaining stability after age 25, to a curvilinear relationship. Generally, the wisdom and gender relationship appears less complicated with most research endorsing lack of gender differences. Yet, opposing research exists. Perhaps, because wisdom's trajectory is an individual difference, this may partly help to explain the incongruent empirical findings (Sternberg, 2005a). Many wisdom scholars (Cheraghi et al., 2015; Dortaj et al., 2018; Ferrari et al., 2011; Grossmann & Kung, 2019; Kim & Knight, 2015; Kung & Grossmann, 2018; Takahashi & Overton, 2002; Yang, 2001; Yang & Intezari, 2019) indicate that there are cultural variations on the conceptions of wisdom. Such cultural variations could potentially confound the relationships between wisdom, age, and gender. Differences in results are also known to be influenced by the way that wisdom has been operationalised and the type of measure used in the study (Glück, 2019). Wisdom has also been investigated in relation to other demographic variables, such as educational achievement, which is elaborated next.

2.7 Wisdom and Education

In most societies educational achievement appears to play an important role in the conception and acquisition of wisdom. Wisdom researchers generally agree that, wisdom development entails motivation to actively pursue psychological growth (Kramer, 1990; Wink & Helson, 1997), specifically Openness to experiences (Webster, 2003, 2007). Education might provide the conduit to continue to be curious about new experiences thereby averting mental rigidity and dogmatism which are known to hinder wisdom development (Meacham, 1990; Schultz & Searleman, 2002) and decrease Openness to experiences (Webster et al., 2014).

Ardelt et al. (2018) investigated the relationship between the 3D-WS and education, on a large sample of Germans (*N* = 14,248; age range = 18–98 years). Findings demonstrated that education stimulated wisdom to develop. For participants with elementary education, average wisdom scores first increased until midlife before declining. Yet, for respondents with high school or university education, age was unrelated to wisdom, suggesting that higher education might have preserved an openness to experiences and prevented mental rigidity and dogmatism and therefore a loss of wisdom in later life. Kohn and Schooler (1983) and Kohn et al. (2000) found in their extensive studies, people who had achieved higher education were more open to change and had greater opportunity to engage in more complex work with less supervision. However, those with lower educational achievements were inclined to be more authoritarian, engaged in less complex, often repetitious employment and still required closer supervision. Arguably, engaging in exhausting repetitive physical work, often associated with lower education, leaves limited time for an individual to participate in activities promoting psychosocial growth.

Hershey and Farrell (1997) investigated the relationship between different occupations and wisdom. The scholars presented participants with a list of occupations and personality characteristics which the participants rated on a scale from extremely unwise to extremely wise. Findings showed that those occupations requiring advanced education and carrying high social status, tended to be ranked as more indicative of wisdom. When Orwoll and Perlmutter (1990) examined some demographic variables of the wise, including age, gender and education, 68% of respondents indicated that wisdom is related to education. When participants were asked to nominate a wise individual, nominees were generally highly educated older persons.

A longitudinal study conducted by Wink and Helson (1997), found that highly educated participants, especially clinical psychologists, demonstrated gains in practical wisdom from ages 27–52 years. Similarly, when Ardelt (2010) using her 3D-WS to compare the wisdom of college students (N = 477, M_{age} = 21 years) with the wisdom scores of older persons (N = 178, M_{age} = 71 years), she found that college-educated older persons demonstrated higher average wisdom scores and more specifically, higher average scores on the reflective and compassionate wisdom dimensions, than young college students. However, older adults without a college degree, had significantly lower average wisdom scores and scores on the cognitive wisdom dimension than college-educated older adults and college students.

To conclude, it appears that education can be important in the development of wisdom. Arguably, education might provide the impetus to pursue psychological activities to promote wisdom growth. Education could protect persons from rigidity and dogmatism or inflexibility, two known deterrents to wisdom development (Meacham, 1990). From the studies discussed, wisdom is impacted by education though it is unclear what mechanism of influence is employed.

2.8 A Brief Wisdom Conclusion

Despite the absence of one universal definition of wisdom, there is consensus that wisdom is a multidimensional concept with cognitive, affective, and motivational components. What is also clear, is that the wisdom–age–gender relationship is not yet resolved and requires deeper investigation. While most researchers agree that wisdom is positively linked to a successful life and a useful virtue to cultivate (Ardelt, 1997; P. Baltes & Baltes, 1990; Blanchard-Fields & Norris, 1995), not all older adults have been found to grow wiser with ageing (Knight & Laidlaw, 2009). The current study raises the possibility of identifying those older adults who “lack wisdom”, in the hope that psychological interventions might assist them in the attainment of wisdom. The idea of psychotherapy targeted at adults of all ages to encourage the attainment for wisdom is consistent with the concepts of Knight and Laidlaw (2009), where therapy of individuals lacking wisdom could assist their progression into ageing well.

Although wisdom is a psychological individual difference, it can also be viewed as an advanced form of human achievement that is sought through experience, can be learnt, and increases with age (Jeste et al., 2010). The suggestion is that wisdom develops over the lifespan (Ardelt, 2011a; Baltes & Staudinger, 2000). A conceptual question is then, “When are the ‘seeds or building blocks’ of wisdom laid down?”

2.9 When is Wisdom Likely to Emerge?

Some early theories of wisdom saw it as first developing after the ages of 11 or 12 years (Labouvie-Vief, 1990; Riegel, 1973). These early theories tracked wisdom development to the college years, or early adulthood (generally at the ages of 18–24 years). Thus, wisdom is viewed as starting far earlier than the *received* view which proposes wisdom starts in old age (Sternberg, 2005a). Richardson and Pasupathi (2005) posited that adolescence was the prime life stage for wisdom to start manifesting, furthermore, Sternberg (2019b) advocates for wisdom studies in schools. When Ardelt (2010) compared the wisdom of undergraduate college students with that of older adults, she found that college students were as wise as the older sample.

Many wisdom scholars (Anderson, 1998; Csikszentmihalyi & Nakamura, 2005; Lapsley & Murphy, 1985; Pasupathi et al., 2001; Richardson & Pasupathi, 2005; Rubin & Schulkind, 1997) have argued that, the *seeds of wisdom* are sown during late adolescence and early adulthood. Qualities of emerging wisdom during late adolescence and early adulthood have been linked to increases in cognitive abilities, including the development of abstract dialectical thinking (Inhelder & Piaget, 1958; Kramer 2000; Labouvie-Vief, 1990, 2003; Piaget & Inhelder, 1973; Takahashi & Overton, 2002), normative personality growth, increased Openness to experiences and exposure to education. Arguably, the indication is that wisdom is related to the maturation process that adolescents and young adults go through. Indirect support comes from implicit wisdom conceptualisations which assume positive age and wisdom correlations (Baltes & Smith, 1990; Clayton & Birren, 1980; Heckhausen et al., 1989; Holliday & Chandler, 1986; Löckenhoff et al., 2009).

There is empirical support for the wisdom development in adolescence from some scholars (e.g., Ferrari et al., 2011; Pasupathi et al., 2001; Webster, 2010). Pasupathi et al. (2001) found in their study of 14–37-year-olds, that wisdom-related knowledge increased from adolescence, through young adulthood up to the age of about 24 before stabilising. Similarly, Webster (2010) in a series of three studies, Study One (N = 61, M_{age} = 22, SD = 4.97; age range = 18–36 years), Study Two (N = 62, M_{age} = 21.7; age range = 17–34 years), and Study 3 (N = 62, M_{age} = 20.61, SD = 5.76; age range = 17–52 years), examined wisdom and positive psychological characteristics in this somewhat older sample. Findings demonstrated that, wisdom was positively related to ego-integrity, personal coherence, self/other-enhancing values and attributional complexity. However, wisdom was negatively correlated with hedonistic or pleasurable life values, attachment avoidance and attachment anxiety. The results were indicative of wisdom development. Due to small sample sizes, the studies lacked statistical power, which limited the representativeness of the research findings.

Further support for the early versus late adulthood for wisdom development comes from the Berlin wisdom model (Baltes & Staudinger, 2000; Kunzmann & Baltes, 2005; Staudinger & & Baltes, 1996; Staudinger et al., 1997). Staudinger et al. (1997) asserted that wisdom shows no growth between 20–75 years. In the Berlin wisdom model, the development of wisdom generally plateaus around age 24 or even earlier in one's 20s (Smith & Baltes, 1990; Smith et al., 1994; Staudinger et al., 1992).

Noticeably, when adults are asked to remember events from earlier in their lives, there is often a spike with respect to events of adolescence and very early adulthood (Rubin & Schulkind, 1997). The events of these periods are believed to be formative and provide a basis for the development of wisdom (Rubin & Schulkind, 1997). Overall, there seems to be some evidence to indicate the *seeds* or *building blocks* of wisdom emerge in late adolescence or young adulthood and encapsulate (a) increases in cognitive abilities (Damon, 2000), (b) Openness to new experiences, (c) personality growth, (d) development of abstract reasoning, (e) education achievement, and (f) accomplishment of maturation targets. Very few wisdom studies have included adolescents in their sample (e.g., Pasupathi et al., 2001) with many often focused on older adults (e.g., Ardelt, 2003; Mitchell, 2016). Richardson and Pasupathi (2005) note that, "Empirical work that directly addresses wisdom in adolescence is sparse" (p. 150).

In the current research the University of Southern Queensland (USQ) allows Australian Grade 12 students, who are in their final year of high school to sample psychology classes prior to any decision to enrol in a university course. The minimum age of these students is 15 years. The USQ admission process means that the current programme of research could include this important age group. It is hoped that the underrepresented group of adolescents will greatly enhance our understanding of the wisdom–intelligence–age trajectory.

Prior to discussing wisdom measurement, the next sections elaborate on the construct of intelligence. The discussion includes how intelligence has been conceptualised and its relationship with age, gender, and wisdom.

2.10 The Intelligence Construct

Within the psychological literature, intelligence is one of the most widely researched individual differences (Brody, 1992; Fancher, 1987). Like many individual difference constructs, such as wisdom, intelligence is now generally considered to be a multidimensional concept, encompassing multiple components (Carroll, 1993; Gardner, 1983, 1993, 2006; Gardner et al., 2018; Kaufman, 2009). The intelligence construct has been conceptualised in diverse and inconsistent ways (Fogarty, 1999; Gottfredson, 1997; Snyderman & Rothman, 1987; Sternberg, 1992), it was initially conceptualised as unidimensional (Spearman, 1904).

Spearman (1904) was the first to propose the concept of a unitary general intelligence factor (*g*) which is supported by several other modern intelligence scholars (e.g., Gottfredson, 2016; Jensen, 1998). Others have argued for multiple intelligences (e.g., Cattell, 1943; Gardner, 2011; Guilford, 1956, 1988; Salovey & Mayer, 1989–1990; Sternberg, 1997a, 1997b, 2005b, 2015; Sternberg & Gardner, 1982; Thurstone, 1924, 1938). Others still concede to an overarching general factor, but question Spearman's unitary intelligence, claiming a hierarchical structure with other factors beneath *g* (Bickley et al., 1995; Carroll, 1993; Cattell, 1971; Horn & Cattell, 1966; Johnson & Bouchard, 2005; Sternberg & Grigorenko, 2002).

A noteworthy symposium on intelligence and its measurement held in 1921 yielded 14 different definitions (Dearborn, 1921). Later still, 24 expert intelligence theorists produced 24 different definitions (Sternberg & Detterman, 1986). The definitions continue to multiply and to be controversial (Eysenck, 1982; Jensen, 1997). For example, Haier (2017) views intelligence as a biologically determined trait, contrasting to Berry's (1974) view that it is a culture bound invention. What is not disputed, is that intelligence involves adaptation to the environment (Binet & Simon, 1916; Sternberg, 2019a; Wechsler, 1939). There are two major consensus definitions of intelligence. The first is from the American Psychological Association (APA; Neisser et al., 1996), which is the definition referred to in this thesis:

> Individuals differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought. Although these individual differences can be substantial, they are never entirely consistent: a given person's intellectual performance will vary on different occasions, in different domains, as judged by different criteria. (p. 77)

The second definition of intelligence is supported by 52 intelligence researchers (Gottfredson, 1997) and asserts intelligence as:

> A very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly, and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather, it reflects a broader and deeper capability for comprehending our surroundings—"catching on," "making sense" of things, or "figuring out" what to do. (p. 13)

The common theme of intelligence and adaptation is not new and dates to the founders of intelligence testing (Binet & Simon, 1916; Wechsler, 1939, 1958).

Wechsler (1939) defined intelligence as, “The global capacity of a person to act purposefully, to think rationally, and to deal effectively with his/her environment” (p. 229). The notion of crystallised ability (*Gc*), is associated with learnt or acculturated knowledge and *Gf*, the capability to solve novel or abstract problems was proposed by Cattell (1943) and extended by Horn and Cattell (1966). *Gc* is generally evaluated by vocabulary tasks, while G*f* is usually assessed by inductive reasoning tasks such as, a letter series (Schaie, 1985). The *Gc*–*Gf* concept has helped to explain developmental cognitive abilities over the lifespan (Horn & Cattell, 1967; Kan et al., 2011; McGrew, 2009) and will be used in the current programme to examine intelligence, age, gender, and wisdom connections. The expression of intelligence by men and women of different ages continues to be controversial, as is the onset of cognitive decline. These issues are discussed in the following subsections.

2.10.1 Age of Cognitive Decline

Vigorous debate surrounds the topic of the relationship between intelligence, age, and gender. Clayton (1983) contended intelligence like wisdom increases with age, others (Kaufman & Horn, 1996; Schaie, 1994, 1996, 2005) argue that it declines with age. The view that cognitive ageing might start as early as during one’s 20s and 30s has been advocated by Salthouse (2005, 2009, 2018, 2019) from cross-sectional data. Support for Salthouse comes from early cross-sectional data by intelligence researchers (e.g., Jones & Conrad, 1933) and more recently from other intelligence scholars (Hartshorne & Germine, 2015; Kaufman et al., 2016; Thompson et al., 2014). Park et al. (2002) posited that age cognitive decrements from 20–80 years and beyond, follow an almost linear relationship, with declines noticeable with G*f* cognitive tests, particularly those involving inductive reasoning. G*c*, in the form of vocabulary knowledge, is reported to increase until the 60s or even 70s, before declining (Hartshorne & Germine, 2015; Salthouse, 1982, 2019).

The reported downward trend in cross-sectional cognitive results from early adulthood diverge significantly from longitudinal data. Longitudinal data often indicates increasing or a stable relationship between age and cognitive abilities in young and middle-aged adults before declining in older age (Aartsen et al., 2002; Albert & Heaton, 1988; Bielak et al., 2012; Cornelis et al., 2019; Ferrer et al., 2004; Rönnlund et al., 2005; Schaie, 2013; Schaie & Hertzog, 1986; Singh-Manoux et al., 2012). The outcome of the long running Seattle Longitudinal Study (SLS) on the cognitive performance of adults over the lifespan support this longitudinal data.

The SLS is a landmark study which has been tracking the long-term cognitive functioning of individuals in the United States from 1956 in seven-year cycles (Hülür et al., 2016; Schaie, 1958, 2005, 2013, 2016; Schaie & Willis, 2010; Schaie et al., 2004). Nearly 6,000 adults aged between 22–101 years have participated over a period of more than 50 years (Hülür et al., 2016; Schaie, 2016). The defining feature of the SLS is the cross-sequential design where several differently aged cohorts are followed over time.

Schaie (2016) reported adult intelligence develops differently across individuals. The SLS reported generational trends in intellectual performance, where earlier born cohorts performed on average worse than later born generations, irrespective of age-related changes in intelligence. Mean mental ability levels were observed to rise from the 20s and peak in the 50s for inductive reasoning (Schaie, 2016), a measure of *Gf* (Hülür et al., 2016) and in the 60s for verbal meaning (Schaie, 2016), a measure of *Gc* (Hülür et al., 2016). Cohort differences were attributed to variables such as improved social support and educational achievement (Schaie, 2011, 2013).

The generation-specific effects on intelligence are supported by the Flynn effect (Flynn, 1987), where younger generations perform better than older generations on intelligence tests. Earlier intelligence longitudinal research (Zelinski & Kennison, 2007) and more recent studies (Hughes et al., 2018; Singh-Manoux et al., 2012), including the large-scale cognitive decline Biobank study in the United Kingdom (UK; Cornelis et al., 2019), reported similar findings. The Biobank study employed both cross-sectional and longitudinal methods with > 100,000 participants aged between 38–73 years. Results revealed only small cognitive ability decreases in participants less than 65 years. The Biobank study is clearly another landmark research with a sample size nearing half a million (*N* = 100,352–468,534). It is regrettable that the age range of the participants did not include adolescents and younger adults considering Park et al. (2002) postulates a near linear cognitive decline from 20–80 years. Salthouse (2005, 2009, 2018, 2019) also advocates for cognitive decline from one's 20s and 30s. The validity of longitudinal findings has been questioned when compared to outcomes from cross-sectional data. Salthouse is probably the best-known critic of the longitudinal data reported on cognitive ageing.

Salthouse (2009, 2019) argues that inconsistencies between cross-sectional and longitudinal cognitive studies may be due to confounds arising from test-retest bias or practice effects, where the same subject is administered the same test several times in longitudinal research. He also points out that small sample sizes and experimental attrition or selective dropout, could compromise longitudinal findings.

Other intelligence scholars (Nilsson et al., 2009; Raz & Lindenberger, 2011; Schaie, 2009) have disputed the claims by Salthouse (2009, 2019); maintaining that the patterns of cognitive decline reported in cross-sectional research are due to cohort differences, participants of different ages might differ in other factors besides age. Such cohort influences could include, changes in social and cultural environments, such as years and quality of education, health care changes, socioeconomic status and social support.

Although longitudinal studies propose cognitive decline at mid-life, the pathway to cognitive deficits can differ by gender, the cognitive domain being assessed as well as the task (Cornelis et al., 2019; Hughes et al., 2018; Miller & Halpern, 2014; Rönnlund et al., 2005; Salthouse, 2009; Singh-Manoux et al., 2012). For example, in the Whitehall II, 10-year longitudinal study in the UK, Singh-Manoux et al. (2012) examined a sample of individuals (*N* = 7,390; age range = 45–70 years) for cognitive decline using five age categories. Both cross-sectional and longitudinal data were analysed. Vocabulary, a measure of G*c*, as expected (Holland & Rabbitt, 1991; Salthouse, 1982) was unaffected. Findings for other cognitive data indicated decrements in all the age categories from baseline. In men, the 10-year decline in reasoning, a measure of G*f*, was 3.60% for the baseline age of 45–49 and 9.60% for those aged 65–70. In women, the corresponding decline was 3.60%, and 7.40% respectively. Faster declines were reported in the older persons. When longitudinal and cross-sectional age effects were compared, findings showed that the cross-sectional data overestimated reasoning decline in women because of cohort differences in education. While the longitudinal analysis in women showed reasoning to have declined by 3.60% in those aged 45–49; the cross-sectional data showed a decline of 11.40%. The data appears to support the assertions of those intelligence scholars who maintain that cross-sectional data overestimates cognitive decline (Nilsson et al., 2009; Raz & Lindenberger, 2011; Schaie, 2009).

Considering cognitive decline has been documented in the 20s and 30s, the Singh-Manoux et al.'s (2012) paper would have been more relevant if they had included adolescents and younger adults below the age of 45. Since the authors found cognitive decline at age 45, it is likely that the decrements could have started earlier. Salthouse (2019) using a combination of cross-sectional and quasi-longitudinal design, found age trends in quasi-longitudinal comparisons closely resembled those in cross-sectional comparisons than those in longitudinal comparisons. Data from 5,000 participants indicated that, normal cognitive aging decrements were nearly linear from early adulthood in speed and accelerating declines in memory and reasoning.

Early detection of cognitive decline is important as some intelligence scholars (e.g., Saczinski et al., 2002; Schaie, 2013, 2016; Schaie & Willis, 1986) have shown age-related cognitive declines might be reversed through educational interventions. For example, 40% of those who had declined significantly were returned to their earlier pre-decline level of cognitive functioning (Saczinski et al., 2002; Schaie, 2013, 2016; Schaie & Willis, 1986).

Evidence from other cross-sectional data support that *Gc* and *Gf* can be predicted by age (Klein et al., 2015; Salthouse, 2009, 2018, 2019; Schaie, 1983, 2005, 2016; Schaie & Willis, 2010). Klein et al. (2015) conducted research on business executives (N = 3,232, M_{age} = 42.87, SD = 9.48; age range = 20–74 years). They Found older executives scored significantly lower than their younger colleagues on inductive reasoning tasks using a letter series test, a measure of G*f*. The older executives however, outperformed their younger associates on verbal ability, a measure of G*c.* The results were expected because older executives, with more years of life and work experience, should outscore the younger group in *Gc* tasks, supporting Holland and Rabbitt (1991) that G*c* is unaffected by age. The results by Klein et al. (2015) were found to generalisable to the adult community population.

One may suppose that another layer of complexity involved in cognitive decline later in life is due to health problems. Especially relevant is the possible inclusion of individuals with early stage, preclinical dementia in study samples. In a longitudinal study, Galvin et al. (2005) followed up a sample of older adults (N = 80; age range = 62–102 years) without preclinical dementia at baseline, until their autopsy. The authors discovered that those older adults who did not develop dementia displayed stable cognitive performance. However, older age, depression, reduced psychomotor performance, even minimal cognitive impairment and absence of dementia at baseline, pinpointed to individuals who would later develop dementia. Curiously, some of the older adults did not display practice effects during the repeated longitudinal cognitive testing. These individuals showed Alzheimer disease (AD) histopathology, although they had no dementia at death. The scholars speculated that the lack of practice effects was a predictor of a preclinical stage of AD. Since preclinical dementia individuals are not routinely screened and excluded from studies, the effects of age on measures of cognitive ability may be overestimated because such individuals still perform within normal limits (Sliwinski et al., 1996). The following subsection provides an additional brief overview of the relationship between intelligence and gender.

2.10.2 Intelligence and Gender

Some intelligence studies demonstrate gender differences in cognitive function in adulthood and ageing (Cornelis et al., 2019; Ingalhalikar et al., 2014; Li & Singh, 2014; Miller & Halpern, 2014). On average, men perform better on spatial tasks and women on verbal tasks (Li & Singh, 2014). Other research in *Gc–Gf* and gender, indicate differences in *Gc* defined as verbal ability are usually small and insignificant (Hyde, 1981, 2005). On measures of *Gf*, defined as performance on tests such as the Raven's matrices (Raven, 1941), a meta-analysis of 57 studies showed men performed significantly better than women (Irwing & Lynn, 2005; Lynn & Irwing, 2004a). Similar results have also been reported for other G*f* measures (Lynn & Irwing, 2004b, 2008; Lynn et al., 2001). Findings from combined cross-sectional and longitudinal studies on episodic memory, a measure of G*f* indicated women performed better than men, with a steeper age-related decline in males (Lundervold et al., 2014). Possible explanations for gender differences in intelligence tests have included identifiable biological factors, socialisation, developmental effects (Lynn, 1999), methodological design (Keith et al., 2008; Steinmayr et al., 2010), and biased test items (Steinmayr et al., 2015; Wechsler et al., 2014).

In summary, the age at which cognitive decline begins is controversial (Finch, 1991, 2009; Nilsson et al., 2009; Salthouse, 2009). Review of longitudinal literature suggests that, there is little cognitive decline before the age of 65 (Cornelis et al., 2019; Lundervold et al., 2014; Rönnlund et al., 2005); although the SLS indicated little cognitive decline by age 60. Cross-sectional research literature points to much earlier onset of cognitive decline (Cornelis, 2019; Salthouse, 2009, 2010, 2019). However, vocabulary is generally agreed to be unaffected by age (Holland & Rabbitt, 1991; Salthouse, 1982). Longitudinal data are known to underestimate the effect of age because of practice effects (Euser et al., 2008; Rabbitt et al., 2001; Zelinski & Burnight, 1997) and are subject to selective sample retention (Cornelis et al., 2019). Nevertheless, cross-sectional data reflects both the effects of chronological ageing and cohort effects. Cross-sectional data tends to overestimate cognitive decline among women but not in men, perhaps due to cohort differences in education (Cornelis et al., 2019). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO; 2000), gender specific cohort differences in educational attainment may reflect global trends in educational opportunities for men and women across the 20th century and beyond.

To conclude this section, the age of cognitive decline is important as pathophysiological processes may have started long before clinical symptoms (Sperling et al., 2011). Many large-scale studies examining the onset of cognitive decline do not sample younger adults, as in the large scale Whitehall II study (Singh-Manoux et al., 2012). Arguably, the researchers might have been able to isolate the age of onset of cognitive decline, which was the aim of their research, if they had included younger adults in their study protocol. Including younger age groups in cognitive studies would be advantageous as the need for early interventions would be apparent sooner and possibly reduce or delay overall decline.

In order to further investigate the complex relationship between wisdom, intelligence, age, and gender, it is necessary to understand how measurement affects the data. In the next sections we will examine how wisdom has been measured in the literature.

2.11 How do we Measure Wisdom?

The issue of an accurate wisdom measurement has received considerable critical attention (Ardelt, 2003; Baltes & Staudinger, 2000; Glück et al., 2013; Knight et al., 2016; Levenson et al., 2005; Mitchell, 2016; Thomas et al., 2017; Thomas et al; 2019; Webster, 2003, 2007). The uniqueness of the wisdom concept has propelled many wisdom scholars to investigate ways of assessing the construct.

A consensus as to what the basic components of wisdom might be is often either lacking or inconsistent, yet critical to establish an accurate measurement tool.

Wisdom is conceptualised either as a trait, that is, an individual difference characteristic of the self, or a performance model, where wisdom is evinced as a skill required to solve life's problems (Glück et al., 2013; Grossmann et al., 2019). The latter model has attracted performance measures whilst the trait model is assessed via self-report indicators (Glück, 2016, 2018). To begin, performance measures will be reviewed.

2.11.1 Performance Measures

The BWP exemplifies wisdom as a performance model. Performance measures assess wisdom characteristics by analysing participants' verbal responses to dilemmas, usually in the form of vignettes (Baltes & Smith, 2008; Baltes & Staudinger, 2000). For instance, when participants think-aloud about a difficult hypothetical, but common human problem their responses are qualitatively evaluated for themes of wisdom relating to a set of criteria proposed by the wisdom model. Evaluating wisdom in this manner has empirical support for reliability and validity (Baltes & Staudinger, 2000; Staudinger, 1999). The performance-based indicators have the advantage of not relying on the respondents' insight into their own wisdom or their willingness to broadcast that awareness. The qualitative responses have the potential for a rich source of data. However, such approaches to assessing wisdom may also be limiting.

The core of wisdom in the performance model focuses on wisdom as expertise or skills, the model neglects the non-cognitive and behavioural aspects of wisdom (Ardelt, 2004). Secondly, since the model is not measuring dimensions of those who are wise, but rather, the products of their evaluations (Webster, 2003); it may not reflect how they would respond to their own critical personal challenges (Blasi, 1980). A third limitation is procedures for coding the qualitative responses are often complex, expensive, require training, are time consuming and not amenable to large data collection (Ardelt, 2011a). Lastly, due to the complexity of using performance measures; such tools may preclude their incorporation in those interventions designed to increase clients' wisdom (Knight & Laidlaw, 2009). Alternatively, self-report tools come with their own pros and cons.

2.11.2 Self-Report Measures

A much-debated question in wisdom measurement, concerns which elements of wisdom can be captured, for example, by self-report instruments (Webster, 2003, 2019). Some wisdom researchers (e.g., Ardelt, 2003; Greene & Brown, 2009; Webster, 2003, 2007) theorise the construct can be indirectly gauged by assessing agreed upon attributes of the wise. Depending on how researchers conceptualise wisdom, most self-report measurement tools appear to incorporate cognitive, reflective, and affective or compassionate elements (Ardelt, 1997, 2003; Clayton, 1975; Clayton & Birren, 1980). Self-report measures frequently utilise Likert-type response scales where respondents are usually asked to assess their own characteristics. To symbolise the wisdom construct, such characteristics as attitudes, beliefs, behaviours or emotions have been identified from the literature. The self-report tools are advantageous for having standardised responses, flexible administration, brevity, unlimited data collection, and ease of data analysis. Nevertheless, this measurement style has attracted several criticisms.

Staudinger and Glück (2011a) raised concerns about whether individuals can effectively rate their own levels of wisdom on self-report measures. An important concern considering Redzanowski and Glück (2013) indicated that people are not good at judging their own competencies. Many scholars (Glück et al., 2013; Jeste et al, 2010; Lelkes et al., 2012; Staudinger & Glück, 2011a) have argued that self-report indicators are susceptible to misrepresentation by individuals. For example, certain individuals with low self-esteem problems may score low and some truly wise persons may underscore due to humility as they are unlikely to proclaim their wisdom (Aldwin, 2009; Assmann, 1994; Redzanowski & Glück, 2013). However, some Western wisdom scholars (e.g., Webster, 2019) have countered that wise individuals scoring low might be interpreted as "false humility". Despite such refutation, many Asian cultures class humility as an important component of wisdom (Kung & Grossmann, 2018; Yang, 2001). Since unwise individuals lack self-reflection, they can rate themselves wiser than they are (Redzanowski & Glück, 2013). Self-report measures are often criticised for encouraging socially desirable responding (SDR; Jeste et al., 2010; Staudinger & Glück, 2011a) as wisdom is a highly sought after and revered human virtue (Assmann, 1994; Dahlsgaard et al., 2005), individuals might wish to appear wise. Including an SDR measure with self-report indicators can help to partially alleviate this bias (Lelkes et al., 2012). Finally, self-report measures are also restricted to questions assumed to be the best representation of wisdom dimensions and all individuals must respond to rigid items.

In spite of self-report measure concerns, many wisdom scholars (e.g., Ardelt, 2003; Brienza et al., 2018; Brown & Greene, 2006; Glück et al., 2013; Jason et al., 2001; Levenson et al., 20005; Moraitou & Efklides, 2011; Thomas et al., 2019; Webster, 2003, 2007) have developed such measures in an attempt to portray wisdom's crucial elements. Webster (2019) reviewed nine self-report wisdom measures: (1) SAWS, (2) ASTI, (3) FVS, (4) 3D-SW, (5) Brief Wisdom Screening Scale (BWSS; Glück et al., 2013), (6) San Diego Wisdom Scale (SD-WISE; Thomas et al., 2019), (7) Wise Thinking and Acting Questionnaire (WITHAQ; Moraitou & Efklides, 2011), (8) Wise Reasoning Scale (WRS; Brienza et al., 2018), and (9) Wisdom Development Scale (WDS; Brown & Greene, 2006). The SAWS and the 3D-WS are the most cited self-report measures of wisdom. Both measures have been included in 20 or more empirical studies, whilst the rest have featured in relatively few researches. Baltes and Smith (1990) observed that researchers' measurement tools frequently display uncertain content validity.

Central to wisdom measurement is the importance of developing tools which measure the construct accurately (Glück et al., 2013; Greene & Brown, 2009; Koller et al., 2017; Webster, 2003, 2007). Webster (2003, 2007) indicated, many instruments have not been verified with large enough sample sizes or in different cultural settings to adequately establish their construct validity. Furthermore, Thomas et al. (2017) suggested that the current lengthy wisdom measurement tools might prohibit their use in research, and proposed the need to develop brief self-report wisdom indicators. Given the complexity of the wisdom concept, Webster (2019) proposed that, "Future studies should continue to provide evidence for the validity of the specific questionnaires employed" (p. 312). Since Webster's (2007) SAWS is one of the two most popular self-report wisdom measures, the current thesis sought to provide further evidence for its validity, prior to employing the indicator in helping to extricate the relationships between wisdom, intelligence, age and gender within the Australian context. In 2003, both Webster and Ardelt developed their self-report wisdom indicators which were opportune and less expensive compared to the performance model measures and up to now they are the most popular in the self-report wisdom field.

2.11.2.1 The SAWS. Due to the popular use of the SAWS, an understanding of its development is assessed. During the SAWS development, Webster (2003) reported that he used a heterogeneous Canadian sample, encompassing the adult lifespan and including diverse ethnicities. As an example, for his first study in 2003, the sample of individuals (*N* = 266; age range = 18–74 years) included Chinese Canadians (40.1%), White Canadians (36.4%), Others (13.8%), Japanese, East-Indian, and First Nations (all at 2.6%), and Black Canadians (1.9%).

The SAWS has been translated and used successfully in different cultural settings, such as: Arabic (Alquraan et al., 2010), Dutch (Webster et al., 2014), German (Glück et al., 2013), Pakistani–Urdu (Arzeen et al., 2013; Hayat et al., 2016), and Portuguese (Alves et al., 2014). The SAWS has been employed extensively in wisdom research (Mitchell, 2016; Thomas et al., 2019; Tylor et al., 2011; Webster et al., 2014; Weststrate et al., 2018). Other wisdom researchers (e.g., Glück et al., 2013), have demonstrated convergent validity between the SAWS and other wisdom tools such as the self-report 3D-WS and the ASTI and also with performance measures such as the BWP, as well as with nominated wisdom exemplars (e.g., Krafcik, 2015). Although self-report instruments have often been criticised for encouraging SDR (Jeste et al, 2010; Staudinger & Glück, 2011a), evidence from Taylor et al. (2011) demonstrated the SAWS was not impacted by social desirability bias ($r = .14$, $p = .068$) according to the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1984, 1991). Thomas et al. supported Taylor et al.'s findings by a study in 2019, they found a non-significant association ($r = .17$) between the SAWS and the Balanced Inventory of Desirable Responding short form (BIDR-16; Hart et al., 2015). Finally, SAWS provides a parsimonious method for researching large samples using a standardised questionnaire. For these reasons, the

SAWS warrants further exploration of its validity prior to using the questionnaire as the main representation of current self-report wisdom scales. Some researchers have studied the psychometric properties of the SAWS and the 3D-WS, their findings are summarised in Table 2.4. On closer examination, the correlations with social desirability measures are similar in size for both instruments. Differences between them may depend on sample size or random variation within a confidence interval.

2.12 Development of the SAWS

Webster (2003, 2007) developed the SAWS after an extensive search of the literature. Webster (2007) defined wisdom as, "The c*ompetence* in*, intention* to, and *application* of *critical* life experiences to facilitate the *optimal development* of *self* and *others"* (p. 164; italics by original author). The conceptualisation of wisdom incorporates cognitive, motivational, and behavioural components. The definition attempted to describe historical aspects of wisdom, such as living an honest and well-examined life. Webster (2003, 2007) also intended to capture cultural properties seen as critical in both modern and ancient wisdom conceptualisations. In his first attempt to measure wisdom, Webster (2003) developed a 30-item scale.

The 30-item SAWS includes five dimensions which integrate to typify characteristics of those who are wise: Experience, Emotional Regulation, Reminiscence/Reflection, Humour, and Openness, as illustrated in Figure 2.1. Each dimension or facet has six items and represents a subscale within the SAWS, resulting in the initial 30-item scale. The presentation of the 30-item SAWS was in the form of a questionnaire, which explored respondents' self-perceptions, relative to their life experiences and determined whether such perceptions changed with age. Each statement was rated on a 6-point Likert-type scale (1 = *strongly disagree* to 6 = *strongly agree*).

Table 2.4

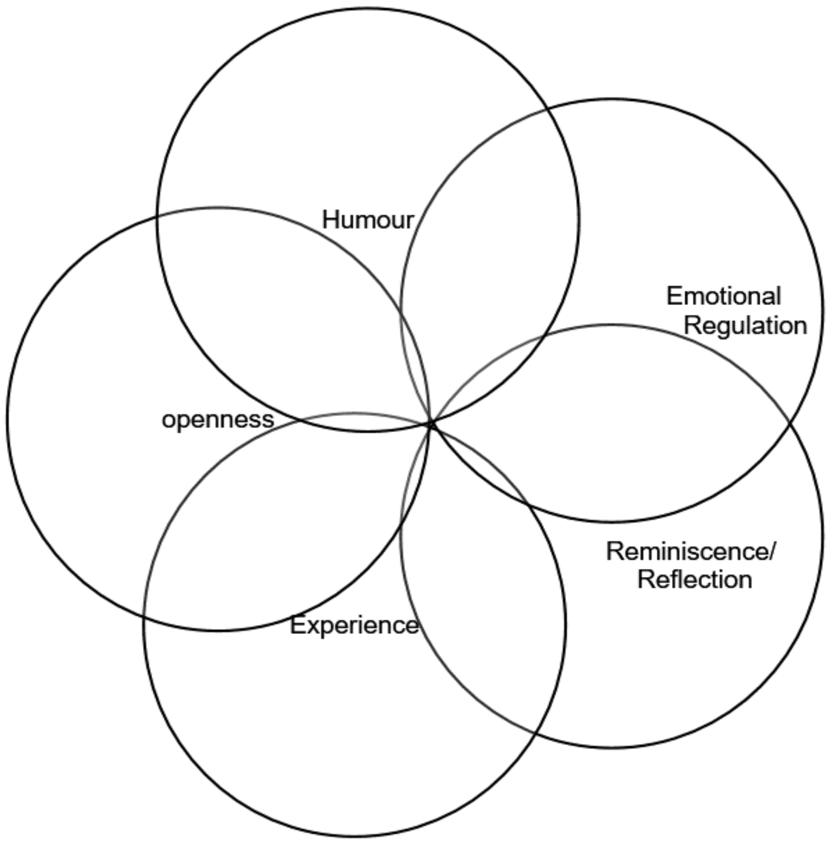
Comparative Characteristics Between the SAWS and the 3D-WS

	Wisdom Measure	
Criteria	SAWS	3D-WS
Internal Consistency	• α = .90	• ∝ =.74–.78
Test-Retest	• 2-week retest α = .84	• 10-months retest α = .85
Structure Replication	• PCA (Taylor et al., 2011): Replicated • 4 items failed to load on any factor • PCA (Webster, 2007): Replicated	• PCA (Taylor et al., 2011): Not replicated • 15 items failed to load on any factor
BIDR or BIDR-16	• Taylor et al. (2011), *r* = .14, *ns* • Brienza et al. (2018), *r* = .22, *sig* • Thomas et al. (2019), *r* = .17, *ns*	• Ardelt (2003), *r* = .22, *ns* • Taylor et al. (2011), *r* = .27, *sig* • Brienza et al. (2018), *r* = .40, *sig*

Note. SAWS = Self-Assessed Wisdom Scale; 3D-WS = Three-Dimensional Wisdom Scale; BIDR = Balanced Inventory of Desirable Responding; BIDR-16 = Balanced Inventory of Desirable Responding, short form; PCA = Principal Component Analysis; *ns* = non-significant; sig = significant.

Figure 2.1

The Factor Structure of the SAWS



2.12.1 Experience

This subscale relates to wisdom development from critical life experiences, where outcomes are often unknown and generate uncertainty (Webster, 2003). Critical experiences involve wise deliberation and behaviours, such as, psychological distress and moral dilemmas and appear to be the hallmark for developing wisdom. The idea is strongly supported by Noam (1996) and other wisdom scholars (e.g., Glück & Bluck, 2013; Glück et al., 2018; Weststrate et al., 2018; Weststrate & Glück, 2017). Indubitably, we all go through life experiences, yet not everyone is wise.

Weststrate et al. (2018) examined the kind of life experiences that promote wisdom in a sample of middle-aged adults in the USA (N = 482; age range = 40–65 years). The scholars found wisdom-fostering life events are those that are highly crucial or fundamental in nature and disrupt normal life. As an example, the sudden unexpected death of a spouse, serious illness, retrenchment, a bitter divorce, domestic violence, surviving a bushfire, being robbed or a serious accident. The events were found to be negatively charged and invoked intense emotions. Wisdom fostering events were found to be culturally non-normative, as such, they were unrelated to normal developmental milestones, such as going to school, work, marriage, or retirement. Mastering fundamental, emotionally charged, non-normative life experiences were likely to foster wisdom, through self-reflection, and trying to derive meaning from such events (Weststrate et al., 2018).

According to Webster's (2007) wisdom definition, reflecting upon such fundamental real-life matters, facilitates the wise to set goals in multiple life undertakings which contribute to *optimal development*, for the *self* and *others*. The MORE Life Experience Model of wisdom development, supports that critical life experiences promote individual wisdom attainment (Glück & Bluck, 2013; Glück et al., 2018). Reflecting on one's critical life experiences may arouse difficult responses, the wise use Emotional Regulation, to avoid becoming emotionally overwhelmed (Webster, 2003, 2007).

2.12.2 Emotional Regulation

Emotional Regulation includes the ability to identify and adaptively manage a variety of emotional states, both positive and negative (Webster, 2003, 2007). This dimension has been linked to emotional intelligence (Salovey & Grewal, 2005), where wise individuals can experience a wide range of complex emotions without being overwhelmed by them. According to other wisdom researchers (e.g. Ardelt, 1997; Clayton & Birren, 1980; Holliday & Chandler, 1986), Emotional Regulation is seen as a key element of wisdom. However, Glück and Bluck (2013) and Glück et al. (2018) have argued that Emotional Regulation works in a similar manner to the other personal resources in the MORE Life Experience Model (i.e., Mastery, Openness, Reflectivity and Empathy) which are all antecedent to wisdom development. Wise persons avoid chronic self-defeating anxieties and fears, as evidenced by the negative correlation between the SAWS and the personality trait of neuroticism (Webster et al., 2014). According to Webster's (2007) model of wisdom, wise individuals are therefore *competent* at managing their emotions. Consistent with other wisdom models such as the BWP (e.g., Baltes & Smith, 1990; Baltes & Staudinger, 2000) wise individuals show expertise in dealing with the fundamental and important matters of life.

2.12.3 Reminiscence/Reflection

The Reminiscence/Reflection facet is closely linked to the Experience dimension. Webster (2003, 2007, 2014) posited that the Reminiscence/Reflection facet pertains to one's personal past, using memories to maintain identity and connect the past with the present to gain perspective. The subscale is related to ideas that one knows about "the self", which Staudinger (2001) considered crucial for wisdom development. Reflecting on past and current behaviours facilitates awareness and understanding of personal strengths and limitations, motivation and goals and has been linked to life review (Randall & Kenyon, 2002; Staudinger, 2001). Webster (2003, 2007, 2014) indicated the Reminiscence/Reflection dimension also exemplifies the ability of the wise to learn from their experiences, and is not an ongoing rumination about unpleasant past events, but the ability to gain an understanding from the past to help one cope with the present and the future.

Weststrate and Glück (2017) examined the relationship between wisdom and self-on one's past important life experiences. The authors assessed wisdom using self-report, performance and nomination protocols. Data for the research came from a lifespan sample of German adults (*N* = 94; age range = 26–92 years), collected by Glück et al. in 2013. The sample consisted of an equal number of wisdom nominees and a matched control group. The authors discovered that self-reflection, or reminiscence on difficult life experiences, are pivotal to the acquisition of wisdom from the past. Wisdom enhancing reflection was usually directed towards deriving meaning from those challenging or crucial life experiences. Compared to controls, the wise were not averse to exploring challenging life events even if the process was uncomfortable and they did it in a way that accentuated meaning and personal growth. The scholars showed that the level of wisdom was not a function of how often individuals reflected, but on why and how they reflected. It remains unclear whether finding meaning on positive life events would also lead to wisdom in the same way as negative life events.

Glück and Bluck (2013) and Glück et al. (2018) argued that self-reflection, like the other personal resources in the MORE Life Experience Model, is antecedent to wisdom. Not everyone has the capacity or the resources to develop wisdom despite critical life experiences. According to Webster's (2007) definition of wisdom and empirical support (e.g., Glück & Bluck, 2013; Glück et al., 2018; Weststrate & Glück, 2017) Reminiscence/Reflection upon one's *critical* life experiences is an important conduit towards the continued development of wisdom and the *optimal development* of the *self*.

2.12.4 Humour

The inclusion of Humour in SAWS is considered to stem from the importance of Humour as an element of wisdom (Glück et al., 2013; Taranto, 1989). Beermann and Ruch (2009) found in layperson's concept of wisdom, Humour and wisdom are positively related. The Humour facet of the SAWS taps into not taking oneself too seriously, developing an ironic stance towards life, showing compassion and respect towards humanity and is clearly contrary to sarcasm and other forms of cruel Humour (Randall, 1987). Humour is also employed to put others at ease and cope with difficult stressors from one's life (Webster, 2007, 2019). The use of Humour to cope with life's vagaries, could arguably denote the *competence* element in Webster's (2007) definition of wisdom, with the *intention* and *application* to use such competencies for the *optimal developmen*t of the *self* and *others*. Since the wise understand human nature, they are skilful at using self-deprecating Humour.

Torres-Marín et al. (2017) assessed the use of Humour in a sample of Spanish adults (*N* = 1,068; age range = 18–65 years) across five different studies. Findings indicated that, the use of self-deprecating Humour does not have negative connotation but is associated with high scores in psychological wellbeing dimensions such as happiness. Vaillant (2002, 2012), in his longitudinal study of male Harvard graduates, which later included community men and women, found that Humour is beneficial as an adult form of an adaptive defence mechanism and is employed and enjoyed by the wise in different contexts. Webster (2007) posited that using Humour non-defensively encourages greater Openness to experiences.

2.12.5 Openness

Openness to experience is considered a hallmark trait of wisdom, which often manifests as tolerance for different belief systems, values and customs of others

(Webster, 2007, 2019). Wise persons were found to have a strong sense of who they are (Webster, 2003), coupled with a sound philosophical and moral base (Kekes, 1995; Tiberius, 2008). They are also more likely to celebrate diversity and are adept at exploring both their inner and outer worlds. Staudinger (2013) observed that, the wise tend to consider contextual influences whenever offering guidance or advice to others. Being open to experiences is a powerful predictor of wisdom (Staudinger et al., 1997, 1998) and considered a wisdom resource (Glück & Bluck, 2013; Glück et al., 2018). Openness to Experience is one of the "Big Five" personality factors (Digman, 1990). In Webster's (2007) definition of wisdom, Openness is more than a personality characteristic or wisdom resource, it is a core component of wisdom. For a wise individual the SAWS Openness facet is a measure of the *competence* they use to facilitate the *optimal development* of the *self* and *others*.

To conclude, according to Webster's (2007) wisdom conceptualisation as measured by the SAWS, people who are competent in decision making processes and possess problem solving capabilities, akin to the BWP expertise in the fundamental matters of life are considered wise (e.g., Baltes & Smith, 1990; Baltes & Staudinger, 2000). The actions of the wise are considered and intentional and the application of such actions facilitates an expansion of wisdom. Crucially, wisdom is developed by wise individuals through reflecting on fundamental, non-normative and emotionally negative life experiences that allows them to set a variety of goals for the future, promoting optimal growth of the self and others. It is essential to understand the psychometric properties of the SAWS before utilising the measure in the current research.

2.13 Psychometric Properties of the 30-Item SAWS

Webster (2003) initially investigated the psychometric properties of the 30-item SAWS in three studies. The first study (*N* = 266; age range = 18–74 years) researched the reliability of the measure. The data were submitted to a principal component analysis (PCA) with Promax rotation because the SAWS dimensions were deemed interrelated. The factors were set an a priori to five, and results from factor loadings supported the five-dimensional structure. Since Webster conceptualised wisdom as a combination of the five dimensions, the total SAWS score designated the strength of wisdom. Findings from Webster's first study indicated support for the scale's psychometric properties. The reliability for the total scale was satisfactory ($\alpha = .78$). Nevertheless, Nunnally and Bernstein (1994) cautions that, computing an alpha value for an entire scale, composed of two or more subscales, results in inflated alphas. However, there is often confusion between terminology within empirical research. For instance, PCA and exploratory factor analysis (EFA) are considered synonymous as forms of the common factor analysis by some researchers, when in fact, PCA and EFA are used for different purposes. The EFA is designed to test the number of common factors that influence measures and tests the strength and relationship between each common factor to the corresponding measure (DeCoster, 1998). PCA is a method of factor extraction used by researchers to reduce the number of variables while retaining as much of the original variance as possible (Conway & Huffcutt, 2003).

Webster (2003) reported that the Humour and Openness dimensions had some overlap and weaker factor loadings. Literature defining the most common subcomponents of wisdom pointed to conflicting findings regarding the SAWS Humour and Openness facets. For example, the earliest review by Meeks and Jeste

(2009) of the commonly listed subcomponents of wisdom did not include Humour or Openness. Jeste et al. (2010) and Bangen et al. (2013) reported Humour and Openness as common wisdom components; although Bangen and colleagues stressed that the two subcomponents only appeared in less than half of the 24 wisdom definitions they reviewed. Openness and Humour failed to make the most current list of core wisdom components by Grossmann and Kung (2019), an exclusion supported by other wisdom scholars (e.g., Ardelt, 2011b; Brown & Greene, 2006; Glück & Bluck, 2013; Glück et al., 2019). Ardelt (2011b) argued that the wise possess a sense of Humour due to being less self-centred than others, more Humour is not an essential component of wisdom. This idea is supported by Jason et al. (2001) who consider that the wise use Humour because of their kindness and compassion for others. Even though the scholarship of Taranto (1989), Damon (2000) and Perry et al. (2002) acknowledge Humour in their work, they excluded it as a component of wisdom. Collectively, Humour and Openness do not have compelling evidence to qualify as common subcomponents of wisdom; a point discussed later in this literature review.

While in the first study, Webster (2003) was concerned with the reliability of the 30-item SAWS, the second study focused on demonstrating the measure's divergent or discriminant validity. Half of the study participants (N = 89) were instructed to complete the SAWS items as they thought a "foolish" individual would, whilst the other half were instructed to complete the SAWS items as they thought a "wise" person should. To avoid ambiguity, responders were given explicit instructions to follow, and the word "wise" was replaced with "foolish" for half of the participants. Findings reported statistically significant differences between the wise and foolish answers. The wise group scored significantly higher (t = 9.40, p <

.001) compared to the foolish group. Nevertheless, it could be argued that the significant findings reflected more a measure of whether participants could “fake” their responses.

In the third study (*N* = 85), Webster (2003) proposed to assess the construct validity of the scale using explicit theories of wisdom, drawing on Erikson’s (1963) psychosocial theory which focuses on generativity and ego integrity. Noticeably, positive correlations were found between the 30-item SAWS, generativity and ego integrity. The 30-item SAWS posted good reliability ($\alpha = .87$). The above three studies indicate that the 30-item SAWS had good internal consistency, with coefficient alpha for the total scale average ($\alpha = .83$) across the three studies. However, limitations were noted in this study.

Webster indicated that the third study demonstrated construct validity of the SAWS by comparing it with other instruments assessing generativity and ego integrity. Arguably, the study did not measure the essence of wisdom per se, as generativity and ego integrity are not measures of wisdom. Using another personal wisdom measure, such as the 3D-WS (Ardelt, 2003), may have demonstrated a better comparison.

Webster’s (2003) future direction for the 30-item SAWS stressed the necessity to continue refining the instrument by eliminating those items, which explained little overall variance. He strove to increase the reliability and extend the validity of the measure by exploring suitable items for inclusion as dimensions of wisdom. Webster (2007) added two new items per factor to create the current 40-item tool, henceforth referred to as the SAWS.

2.13.1 The SAWS

Using confirmatory factor analysis (CFA) methodology and a new sample (N = 171, M_{age} = 42.77; age range = 17–92 years), Webster (2007) conducted a follow-up study of the 30-item SAWS. The study was aimed at increasing content validity and reliability, to replicate and extend earlier research of the 30-item scale by creating a 40-item tool through the addition of new items. Using the same sample, Webster employed a PCA followed by a CFA to confirm the five hypothesized dimensions of the SAWS. The SAWS, much like its 30-item predecessor, rates responses on a 6-point Likert-type scale (1 = *strongly disagree* to 6 = *strongly agree*). CFA results indicated that the total SAWS internal consistency was good (α =.90), and an improvement from the 30-item tool (α = .83), with a 2-week test-retest reliability alpha value of .84. The total SAWS score correlated in predicted directions with generativity and attachment avoidance scales demonstrating construct validity. Appendix A provides the 40-items of the SAWS inventory.

Several limitations have been observed within Webster's (2007) research. It was noted that he conducted an initial PCA followed by CFA. Given that common factor analyses include both EFA and CFA (Jennrich & Bentler, 2011), CFA ordinarily follows EFA and validates the extent to which the statistical model fits the data (Waltz et al., 2016). Although the PCA findings supported the five factors with a good alpha, reliability estimates produced with PCA are inherently unstable (Flora & Flake, 2017; Tabachnick & Fidell, 2019). Furthermore, Webster (2007) replicated the PCA model in a CFA using the same sample. Nonetheless, a factor structure derived from PCA will almost always fit well in a CFA using the same sample, as the technique capitalises on chance factors in the data (Flora & Flake, 2017). Preferably, with a large sample, splitting the data randomly into two, PCA can be conducted on one half, and CFA on the other. Of note is that in PCA the components are based on shared, unique and error variances whereas in EFA the unique and error variances are estimated and factored out and not used to create the factors (Tabachnick & Fidell, 2019). PCA therefore, benefits from the error variance in the matrix of loadings to estimate components, which EFA eliminates.

During the CFA, Webster (2007) entered the SAWS subscales as manifest variables rather than as latent indicators. In CFA, the error terms in the model are specifically estimated. When factors (i.e., latent variables) are entered as manifest variables, the error unique to individual items is aggregated into a single error term, which may obscure problems in measurement related to error variance.

Regarding sample size, Webster (2007) acknowledges that, 171 participants were inadequate for his analyses. He warns that the CFA results must be interpreted cautiously given the number of parameters to number of participants' ratio and some weak and non-supportive fit indices, such as a significant χ^2 (5) = 14.77, p = .011. For our consideration is the fact that the χ^2 statistic is usually sensitive to sample size. Still, for models with about 75–200 cases, the χ^2 test is usually a realistic measure of fit (Kenny, 2015). When the χ^2 statistic is not significant, the model is regarded as acceptable. Noteworthy is also that Webster's CFA results posted a Root Mean Square Error of Approximation (RMSEA) value of .11. According to Hu and Bentler's (1999) criteria for good model fit, a RMSEA value > .10 is indicative of a bad model fit. Even so, Webster (2007) and other researchers (e.g. Krafcik, 2015; Glück et al., 2013; Taylor et al., 2011) have reported various data to substantiate the psychometric robustness of the SAWS measurement tool. Prior to examining such evidence, which is presented in Table 2.5, a brief overview follows to explain the terms used concerning the reliability and validity of a measurement tool.

Many scholars (e.g., Anastasi & Urbina, 2009; DeVellis, 2017; P. Kline, 2016) propose that the most acceptable criteria for assessing the usefulness of an instrument is through reliability and validity measurements. Yet, because researchers often use different terminology when reporting the reliability and validity of their measurement instruments (Mokkink et al., 2010), interpretations of their findings are often ambiguous.

2.14 Validation Terminology of Measurement Tools

Within the discipline of psychology, a scale is valid if it demonstrates good psychometric properties and measures what it is intended to measure (Haynes et al., 1995; DeVon et al., 2007; Rossiter, 2008). The overarching definition of validity is related to authenticity. Regarding the wisdom construct, the issue of authenticity is to determine: Does this wisdom tool measure wisdom? Due to the subjective nature of the answer and the question, the validity of the definition of wisdom becomes problems for standardisation.

A joint committee of the American Educational Research Association (AERA), the American Psychological Association (APA) and the National Council on Measurement in Education (NCME) developed a standard for educational and psychological testing (AERA, 2014). To standardise the meanings associated with the measurements, AERA (2014) stated that measures should demonstrate, reliability, construct, and criterion-related validities. These standards serve broadly to guide the current definitions; explained in the following subsections.

2.15 Types of Reliabilities

In terms of reliability, a valid instrument needs to be reliable in its measurements (AERA, 2014). Reliability has traditionally been considered necessary, but not a sufficient condition for validity (Carmines & Zeller, 1979;

Pedhazur & Schmelkin, 1991). For instance, a faulty scale that always over-reports measurement results may be consistent, but not valid. Reliability then refers to the ability of an instrument to measure an attribute consistently, is a measure of true scores and includes an examination of stability and equivalence (DeVon et al., 2007).

2.15.1 Internal Consistency

Internal consistency indicates how well items on a tool fit together conceptually and uses the coefficient of test scores that have been obtained from a single test or survey (Cronbach, 1951). Cronbach's (1951) alpha coefficient statistic is a popular research measure as it is the only reliability index that can be performed with one test administration, thus requiring much less effort than retest methods (Ferketich, 1990). Nonetheless, because coefficient alpha is a measure of the internal consistency for the test responses from the current participants, the alpha coefficients must be computed each time the test is administered (Waltz et al., 2016). A coefficient alpha of .70 is deemed acceptable for new scales (DeVellis, 2017) and is the protocol that the current research programme will adopt.

2.15.2 Test-Retest

Test-retest reliability is estimated by administering the same test to the same group of respondents at different times. The correlation between the two scores and often between individual questions, indicates the stability of the instrument. Although controversy surrounds time intervals between the original test and the retest, usually 2-weeks to 1-month is the generally accepted time interval for retesting (Waltz et al., 2016).

2.16 Types of Validities

In this study, validity is defined as the ability of an instrument to measure the attributes of the construct being researched (Cronbach & Meehl, 1955; DeVon et al., 2007) in the context in which it is to be applied (Nunnally & Bernstein, 1994), and is expressed as construct validity (Crocker & Algina, 2008). For instance, an instrument intended to measure wisdom shows construct validity if all its scale items exclusively measure concepts that are theoretically and structurally related to wisdom. If the instrument is also capable of measuring other closely related concept/s such as intelligence, then such a tool might not have adequate construct validity as a measure of wisdom. Construct validity is a prerequisite in measurement and theory.

There are several facets of validity that come under the banner of construct validity including face validity and criterion validity which incorporates concurrent, convergent, discriminant and predictive validities (Trochim, 2001). The validity of measurement tools has often been gauged by examining the above types of validities (DeVon et al., 2007), which will be described next.

2.16.1 Face Validity

This is a subjective assessment of the tool items to gauge whether the instrument appears to measure the construct of interest. For instance, does a wisdom questionnaire “appear” to be measuring wisdom? Do questionnaires about wisdom have the words “wise” or “wisdom” in them? Since this is the easiest method to claim support for construct validity, it is frequently reported in the literature. Face validity is not an objective assessment and is regarded as the weakest form of validity.

2.16.2 Concurrent and Convergent Validity

Concurrent validity also referred to as criterion validity, describes the degree to which a test correlates with external criteria that is measured at the same time (Trochim, 2001). Concurrent validity is therefore determined by comparing the score on the instrument of interest, such as the SAWS. Considering up to now, there is no such "gold standard" for the measurement of the wisdom construct, the comparison measure could be that of a well-established self-report wisdom indicator (Carmines & Zeller, 1979). Concurrent validity evidence forecasts how well a test predicts current similar outcomes in the present. The notion of concurrent validity is closely linked to convergent validity and is assessed by comparing the indicator in question with another instrument that measures a related, but different, construct (Campbell & Fiske, 1959; Schwab, 1980).

2.16.3 Discriminant Validity

Often referred to as divergent validity, discriminant validity describes the instrument's ability to differentiate between conceptually related constructs (Campbell & Fiske, 1959; Netemeyer et al., 2003). For example, if discriminant validity is high, scores on a test designed to assess wisdom should not be correlated highly with a conceptually related construct such as intelligence. The empirical test is the correlation between measures where the correlation should be low, demonstrating that the summated scale is sufficiently different from those of similar concepts.

2.16.4 Predictive Validity

This type of validity indicates the degree to which test scores predict or correlate with performance on some future criterion (Shultz et al., 2014). In this case one measure occurs earlier and is meant to predict some later measure (McIntire &

Miller, 2007). Now to examine the current evidence for SAWS reliability and validity.

2.17 Evidence of SAWS Validity and Reliability

To validate a measuring tool, it is necessary for the researcher to obtain empirical evidence that the instrument's items are measuring the construct that it set out to measure (Byrne, 2016). For a multidimensional concept, such as wisdom, the associated subscales must demonstrate a well-defined factor structure that is consistent with the underlying theory (Byrne, 2016). Table 2.5 summarises SAWS reliability and validity gleaned from Webster's (2003, 2007) data.

Lastly, because scale validation is an ongoing process (Zumbo, 2006), correlations in the expected direction, from multiple studies, serve as evidence of construct validity (Peter, 1981). Construct validity can be evaluated statistically through methods such as structural equation modelling (SEM, Westen & Rosenthal, 2003).

Different forms of factor analysis, such as exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) can be used for assessing homogeneity of an instrument (Westen & Rosenthal, 2003). In the following section, EFA and CFA will be discussed.

Table 2.5

Summary of Current SAWS Validity and Reliability

Validity / Reliability	SAWS	Evidence
Internal consistency	Yes	Webster (2003, 2007) computed alphas for the total SAWS for both 30-item (α =.83) and 40-item (α =.90). Taylor et al. (2011) computed alphas for the individual subscales (α = .68–.88).
Test-retest reliability	Yes	Webster (2007) reported a 2-week retest (α =.84) for the 40-item SAWS.
Face validity	Yes	The SAWS items appear to measure wisdom content.
Concurrent / Convergent validity	Yes	Taylor et al. (2011) used the SAWS with the 3D-WS. When Thomas et al. (2019) tested their San Diego Wisdom Scale (SD-WISE) for convergent validity, they employed the SAWS, and the brief Three-Dimensional Wisdom Scale-12 (3D-WS-12; Thomas et al., 2017).
Predictive validity	Yes	SAWS showed the ability to predict theoretically relevant relationships such as, forgiveness and psychological well-being in the desired direction.
Discriminant/Divergent validity	Yes	Krafcik (2015) and Glück et al. (2013) using the SAWS and other wisdom tools found wisdom nominees scored significantly higher than less wise persons on all the wisdom measures.

2.18 Factor Analysis: EFA and CFA

EFA is used to identify the greatest variance in scores with the smallest number of factors, expressed statistically as an eigenvalue >1 (Kaiser, 1960) and factor loadings ≥ .40 (Hinkin, 1995, 1998; Stevens, 2009). Typically, factors are extracted if the eigenvalues are > 1 or a scree-test visually indicates how many factors to extract. Although the most frequently used cut off for factor loading is .40, there is no statistical justification for such a cut-off (Gorsuch, 2014), however factor loadings < .40 are considered weak whilst loadings ≥ .60 are considered strong (Field, 2017). EFA can assist researchers identify the various factors that define the construct. The argument for an instrument's validity is stronger when the statistical analysis is confirmatory (DeVellis, 2017) because CFA is more rigorous and is used to verify the factor structure of the observed variables.

To avoid chance relations specific to one particular sample that are unlikely to replicate in other samples, CFA is carried out using a different sample (Flora & Flake, 2017). Some researchers often consider that principal components analysis (PCA) is a type of EFA, when in fact they are two distinct statistical methods designed to achieve different objectives. If the goal is to arrive at a parsimonious representation of the associations among measured variables, then EFA is appropriate, but when the goal is data reduction, PCA is more apt (Bentler & Kano, 1990).

Measurement invariance (MI) or equivalence is an important indication of validity of a measure when different groups are compared. MI is crucial in the current research programme where the constructs of wisdom and intelligence are examined in men and women of diverse age groups.

2.19 Testing for Measurement Invariance (MI)

In the intelligence field, such as IQ testing, and in the mental health literature, many measurement tools have undergone rigorous tests of MI and are normed across age (e.g., Binet & Simon, 1916; Bowden et al., 2006; Wechsler, 1939, 1944, 1958), gender (Byrne et al., 1993) and culture (Runyan et al., 2012). In wisdom research MI is a rarity, to our knowledge, none of the studies presented in the literature review had conducted MI in their research. To produce more comprehensive and broadly applicable results in research, MI is crucial.

MI confirms whether the psychometric properties of a questionnaire, in multigroup analysis are similar to ensure confidence that results are an unbiased comparison of factor means (Bialosiewicz et al., 2013; Byrne & van de Vijver, 2010; Kim et al., 2012; Meredith, 1993; Millsap, 2011). MI is therefore considered a prerequisite when studying differences across groups and is usually evaluated using multigroup CFA (Milfont & Fischer, 2010). MI is often undertaken through a sequence of χ^2 and χ^2 difference tests (Horn et al., 1983; Sörbom, 1974); with progressively restrictive models. A nonsignificant χ^2 difference test would indicate MI. Due to the sensitivity of χ^2 to sample size and non-normality, some researchers (e.g., Cheung & Rensvold, 2002) recommend using a change in goodness-of-fit indices (ΔGFIs). For instance, a ΔCFI $\leq$ .01 between two nested models would support measurement invariance. Strong MI is useful for providing evidence of construct validity, especially in a new measure (Greene & Brown, 2009). There are different categories of MI.

2.19.1 Configural Invariance

To establish MI, a base model or configural invariance (Horn & McArdle, 1992) is computed to determine an overall fit for the unconstrained multigroup CFA model. Since the configural invariance requires that the same number of factors and their loading pattern be identical across groups no equality constraints are imposed on any of the parameters (Byrne, 2016). Model fit is then compared across all groups. A good multigroup model fit would indicate that participants from different categories conceptualise the constructs in the same way.

2.19.2 Metric Invariance

Metric invariance model, tests whether respondents across groups respond to the items in a measure in the same way, indicating they attribute the same meaning to the latent construct under study (Milfont & Fischer, 2010). Metric invariance is tested by constraining the factor loadings to be equal across the groups. A good multigroup model fit indicates metric invariance has been met as the factor loadings are similar between the groups.

2.19.3 Scalar Invariance

The scalar invariance model is computed to determine whether the item intercepts are equivalent between groups. The item intercepts are therefore constrained to be equivalent across all groups, but the factor loadings can differ between groups. This tests whether the meaning of the levels of the underlying items (intercepts) are equal in each group. Scalar invariance is considered necessary for the interpretation of latent means across groups. Determining scalar invariance allows for multigroup comparisons of factor means such as, in t-tests, and analysis of variance (ANOVA; Milfont & Fischer, 2010).

2.19.4. Full Uniqueness MI

Full uniqueness MI model is computed where the residual variances are also fixed to be equal across groups as an indication that the latent construct is measured similarly across all the groups. Full uniqueness MI is the most stringent criterion and is usually not considered necessary for comparing means between groups. For full uniqueness MI to be met, the latent construct must be measured identically across all the groups. Social desirability responding (SDR) can influence a measure's validity, and needs to be accounted for in any wisdom measurement to avoid bias results.

2.20 Socially Desirable Responding in Wisdom Measurement

Although self-presentation bias is not confined to self-report wisdom measures (Paulhus, 1991; Tan & Grace, 2008); self-report wisdom measures have been criticised for encouraging socially desirable responding (Jeste et al, 2010; Staudinger & Glück, 2011a). Since wisdom is a desirable and highly sought-after quality that is considered the highest of human achievements (Baltes & Staudinger, 2000; Erikson, 1959, 1963, 1964), some individuals may wish to appear wise. SDR therefore, can pose serious threat to the validity and interpretation of research findings (Tan & Grace, 2008). Conceptually, some researchers (e.g., Aldwin, 2009; Assmann, 1994; Redzanowski & Glück, 2013; Takahashi & Overton, 2005) question whether the truly wise would report themselves as being so. In Western societies, an individual with obvious core wisdom traits may choose to under-score on a wisdom measure, could be interpreted as expressing misplaced modesty or humility, rather than wisdom (Webster, 2019). Alternatively, in many Asian cultures, humility, unobtrusiveness and modesty are treasured hallmarks of the wise (Kung & Grossmann, 2018; Takahashi & Overton, 2005; Yang, 2001).

Self-report wisdom measures can be contaminated by SDR with some scales more prone to biased responding than others (Brienza et al., 2018; Taylor et al., 2011). Those few wisdom scholars who have integrated an SDR in their wisdom assessment, often report conflicting findings. The two most popular self-report wisdom scales, the SAWS and the 3D-WS, have been shown to either display SDR or not. Briefly to recap, Ardelt (2003) indicated the 3D-WS was free from SDR, although as reported in Table 2.4 the claim was unsubstantiated by other scholars using the same SDR measure (e.g., Brienza et al., 2018; Taylor et al., 2011). Additionally, Taylor et al. (2011) demonstrated that the SAWS was uncontaminated by SDR, although Brienza et al. (2018) showed otherwise. Perhaps noteworthy is that Nederhof (1985) reported SDR could range from 10-75% of the total variance in participants' responses. Most wisdom research does not include an SDR tool. A social desirability scale can be useful for studies that do not control for SDR through overall design, or to provide extra evidence that SDR was not a large factor in the results obtained (Lelkes et al., 2012). How cultural differences influence SAWS results will now be investigated.

2.21 The SAWS in non-Western Cultural Research

Once Webster (2003, 2007) constructed the SAWS, other wisdom scholars (e.g., Alquraan et al., 2010; Alves et al., 2014; N. Arzeen et al., 2013; Dortaj et al., 2018; Fung et al., 2020; Glück et al., 2013; Hayat et al., 2016; Mitchell, 2016; Taylor et al., 2011) took the opportunity to incorporate the measure in their research. Some non-Western scholars were eager to validate and utilise the SAWS in their own emerging wisdom studies.

Alquraan et al. (2010) sought to validate the SAWS for wisdom studies in Jordan. They translated the SAWS into Arabic and used the measure in a Jordanian sample of university students (N = 465, M_{age} = 20.85, SD = 3.29; age range = 18–49 years). Findings from Differential Item Functioning (DIF) analysis indicated that the SAWS did not have any biased items based on gender and place of residence, whether urban or rural. Although the total SAWS showed strong reliability (α = .86), individual subscales demonstrated poor internal consistency (α = .51–.65). The study's sample was of highly educated university students, which poses limitations when applying the generalisations of findings to the wider Jordanian population. Considering the study aimed to validate and adapt the SAWS for wisdom research in Jordanian society, the sample age range was narrow (18–49) and would have benefitted from inclusion of older adults. Likewise, this SAWS validation study did not investigate the relationship between wisdom and relevant variables such as, age and gender, which are crucial in explicating the complex and often inconsistent relationship reported between wisdom in men and women of diverse age categories.

Hayat et al. (2016) used an Urdu version of the SAWS translated by N. Arzeen et al. (2013) in a sample of older persons (N = 212, M = 61.93, SD = 9.85; age range = 50–90 years). The authors compared variables such as, wisdom, life satisfaction, and resilience in older adults who were either living with their families or in old-age shelters in a major city in Pakistan. Findings demonstrated that resilience and wisdom were positively related to life satisfaction among the study population. However, wisdom and life satisfaction were significantly higher for individuals living with their families compared to the nursing home residents. Study limitations include an impaired sample derived from one metropolitan area, therefore results cannot be generalised to the larger Pakistani older age population, given that contextual factors might differ. The study did not investigate the relationship between wisdom and age or gender, even though they are invaluable for the understanding of wisdom's developmental trajectory over the lifespan. Perhaps the research might have benefited from the inclusion of a brief dementia screening tool, given the research was conducted with older persons, with some living in nursing homes. The reason is that some wisdom researchers (Jeste & Harris, 2010) have flagged certain pathological changes in some forms of dementia resulting in inappropriate behaviours that are clearly contrary to wise actions. Screening for dementia would have been particularly useful as early diagnosis can identify individuals at risk of complications, considering health care professionals commonly miss the diagnosis of dementia until the cognitive impairment has advanced to the moderate or severe stages (Lin et al., 2013).

While some non-Western researchers attempted to validate the SAWS five factor structure in their own cultural setting, others were dedicated to constructing a more coherent brief version of the measure which specifically accounted for the cultural differences. A relevant consideration, given that most wisdom tools have been developed and validated with samples from Anglo-Saxon countries. Intrinsically, cultural values have been attributed, by some authors, to influence wisdom conceptualisation (Takahashi & Overton, 2005). Many scholars (e.g., Fung et al., 2020; Thomas et al., 2017; Urrutia et al., 2016) have indicated that existing scales are conceivably too long (around 40 items for the shortest) and lengthy wisdom tools are challenging to include in large studies especially those evaluating many constructs. It is unrealistic to apply long tools to population samples not used to answering questionnaires.

Urrutia et al. (2016) developed and validated the Brief Scale of Self-Assessed Wisdom (EBAS; Escala breve de autoevaluación de la sabiduría) in Argentinian older adults. The EBAS is a brief Spanish measure of wisdom constructed from a combination of SAWS items and other measures. The scholars conducted a series of three studies. Study 1 (N = 505, M_{age} = 66.26, SD = 7.25; age range = 50–89 years), Study 2 (N = 290, M_{age} = 67.50, SD = 8.31; age range = 51–91 years), and Study 3 (N = 409, M_{age} = 67.42, SD = 8.71; age range = 50–91 years). They generated an item bank of 125 items from several wisdom measures which included the 40-item

SAWS, the 79-item Wisdom Developmental Scale (WDS; Brown & Greene, 2006) and the 39-item 3D-WS. The scholars also incorporated new items from other theoretical contributions (e.g., Baltes, 2004; Erikson, 1982; Glück & Bluck, 2013; Stemberg,1998). The items were then analysed by wisdom experts and reduced to 45. In the first study, the participants completed a questionnaire that included the 45 items. PCA yielded a 20-item, three factor solution with a satisfactory internal consistency (α = .85). Study 2 validated the structure of the EBAS via CFA. Results indicated the three-dimensional factor structure of the EBAS displayed mostly poor fit indices according to Hu and Bentler's (1995) criteria for a good model fit, including AGFI = .86, CFI = .83, NNFI = .81, RMR = .07, RMSEA = .06. Study 3 examined concurrent validity and the stability of the scale scores. The EBAS scores were moderately related to scores on the 3D-WS which is a conceptually related scale (r = .45). The correlation between EBAS and 3D-WS appears higher than generally reported for correlations between self-report wisdom scales. Since the 20 items of the EBAS included some 3D-WS items, it is unclear whether the stated Pearson correlation corrected for item overlap as this information is not reported in the article. Communication with the authors have so far remained unsuccessful. The correlation between the EBAS and the S. Eysenck and Eysenck (1964) Scale of Sincerity, indicated that SDR was low (r = .26), as was the relationship between the EBAS and age (r = .18).

The Urrutia et al. (2016) research, the authors strictly adhered to the recognised scale development and validation principles and avoided the potential problem of overfitting by using a different sample for the EFA and CFA procedures. Further, they employed adequate sample sizes for their studies. It is discouraging that even with this carefully designed research, the brief EBAS still displayed poor model fit indices through the CFA, bringing into question the usefulness of this brief wisdom measure. It is unclear whether the amalgamation of items from tools with different theoretical backgrounds contributed to the EBAS poor model fit. Similarly, since the samples were sourced from one centre where educational activities for the elderly were organized and made up of people from a relatively high socioeconomic status, these findings cannot be generalised to the wider community.

Dortaj et al. (2018) evaluated the psychometric characteristics of the 40-item SAWS, to determine if the SAWS was impacted by age and gender in a sample of Iranians (*N* = 395), composed of high school, university, and community respondents. The sample was selected through a combination of randomized cluster and convenience sampling techniques. Using PCA, the authors extracted four factors which included Experience, Emotional Regulation, Reminiscence/Reflection and Humour but not Openness. After finding four factors, it remains unclear why the authors reverted back to Webster's (2007) original five factors to perform their t-test comparisons even though they acknowledged that cultural differences might influence the SAWS factor structure in their Iranian sample. Still, Dortaj and colleagues showed that women scored significantly higher than males on the Experience and Emotional Regulation facets of the SAWS. Age had a significant positive relationship with total wisdom, Experience and Emotional Regulation scores, but not with Reflection, Humour, and Openness scores. Arguably, findings might have been more relevant if the authors had used their own shorter SAWS to determine the wisdom differences between Iranian men and women.

In a short longitudinal repeated measures design, Fung et al. (2020) constructed and validated an abbreviated wisdom measure, the Brief Self-Assessed Wisdom Scale (BSAWS), in a series of four studies. The sample consisted of community-dwelling older Chinese adults in Hong Kong (M_{age} = 72.8, *SD* = 8.55). In Study 1 (*n* = 157) the authors examined the factor structure and dimensionality of the 40-item SAWS through CFA. Results showed that the SAWS failed to replicate its five factors (χ^2 (510) = 1570.70, $p < .001$, CFI = .89, RMSEA = .13, SRMR = .12, TLI = .88).

Using the same sample, Fung et al. (2020) submitted the 40-item SAWS to PCA. Results supported a unidimensional 9-item brief BSAWS, with good reliability (α = .81). Then, respondents again completed the SAWS questionnaire, the BSAWS and other variables of interest after three-time intervals; one (Study 2; *n* = 136), two (Study 3; *n* = 135) and eight (Study 4; *n* = 98) months. For each of these three studies, the 9-item BSAWS was submitted to CFA. Overall, the CFA findings indicated a good model fit for the BSAWS, particularly the combined results across studies, two, three, and four with (χ^2 (51.28) / 27 = 1.90, $p < .001$, CFI = 1.00, RMSEA = .05, SRMR = .04, TLI = 1.00). Neither the SAWS nor the BSAWS showed any significant gender differences in wisdom. There were weak significant correlations between the respondents' educational level ($r = .29$, $p < .001$; $r = -.33$, $p < .001$) and age ($r = .29$, $p < .001$; $r = -.27$, $p < .001$) in BSAWS and SAWS scores, respectively.

A strength of Fung et al.'s (2020) research is that it was longitudinal in design, which is uncommon in the field of wisdom. Longitudinal methods provide invaluable opportunity to examine the direction of potential cause and effect relationships between wisdom and its correlates, such as age, education, or intelligence. Nevertheless, there were substantial limitations associated with Fung et al.'s (2020) study.

Despite the lack of accord on what the components of wisdom might be, there is consensus from different theoretical orientations that wisdom is a multidimensional psychological concept (Ardelt, 2004; Takahashi & Overton, 2002; Taranto, 1989). Yet, Fung et al. (2020) constructed a unidimensional BSAWS to measure the complex wisdom construct. The one factor BSAWS does not appear to be in line with the theoretical background of the multifactor wisdom model conceptualised by Webster (2003, 2007) and other wisdom scholars (e.g., Ardelt, 1997, 2003; Brown & Greene, 2006). Although Fung et al.'s (2020) study was longitudinal, given the design was a repeated measure, using the same sample at four different points, the samples are not independent for CFA replication purposes. Scholars such as Fokkema and Greiff (2017) strongly suggest that, performing either PCA or EFA and CFA on the same data is problematic, specifically in relation to model overfitting (Babyak, 2004; Yarkoni & Westfall, 2017).

Furthermore, the initial sample size of 157 was underpowered for PCA or CFA according to Terwee et al. (2017) and was also accompanied by significant participant attrition (Sample 1, N = 157, Sample 2, N =136, Sample 3, N = 135, Sample 4, N = 98). To obtain a definitive psychometric appraisal, Terwee et al. proposed a minimum of seven times the number of items in the measure, in the case of Fung et al.'s (2020) 40-item SAWS analysis would equate to a sample size of 280. Findings would have been more persuasive if the authors had included a social desirability (SDR) measure as SDR is a known contaminant in many self-report measures (Lelkes et al., 2012; Nederhof, 1985). Taken together, until the BSAWS is validated in the greater Chinese community, it is difficult to determine the practical usefulness of the measure. Although non-Western wisdom scholars evaluated the factor structure of the SAWS, within Western wisdom research, and certainly in the Australian context, the validation of the SAWS is a rarity.

2.22 Scarcity of Western Research Validating the SAWS

A growing body of literature recognises the importance of developing wisdom tools which have been verified in different cultures (Greene & Brown, 2009; Kim & Knight, 2015), across the adult lifespan (Webster, 2003, 2007), and accurately measures the construct (Ardelt, 2011b; Koller et al., 2017). This is crucial because wisdom measurement requires tools with scores that show strong reliability (Mokkink et al., 2010) and validity (Cronbach & Meehl, 1955; DeVellis, 2017; DeVon et al., 2007; P. Kline, 2016; R. Kline, 2016). Even with the extensive use of the SAWS in wisdom research (e.g., Daniels et al., 2015; Mitchell, 2016; Thomas et al., 2019; Weststrate et al., 2018), studies verifying SAWS factor structure are rare in Western societies, particularly in English-speaking countries. To the best of our knowledge, apart from Webster's (2007) study updating and replicating his own measure, the only other research within the Western context was Alves et al.'s (2014) Portuguese study and that by Taylor et al. (2011) in Australia, an English-speaking nation.

Alves et al. (2014) administered a Portuguese translation of the SAWS to a student and professional sample (N = 578; age range = 18–90 years). The study focused on validating and adapting the SAWS for the Portuguese population. Alves et al. (2014) refers to Webster's (2003, 2007) SAWS dimensions of, Experience, Emotional Regulation, Reminiscence/Reflection, Humour, and Openness as: Experience, Emotional Self-Regulation, Reflection, Mood, and Open Mindedness. Alves et al. (2014) reported that, during the PCA of the 40 items of the SAWS, 11 items were outside the originally predicted components with some items significantly loading in more than one factor. Using different rotation methods and trialling the extraction of four factors, Alves et al. (2014) failed to arrive at a clean solution, deciding to revert back to Webster's original five-factor model. Although Webster (2007) designed each of the five factors of the SAWS to contain eight items, Alves et al. found that the Portuguese version of the SAWS was best described by: Experience (8 items), Emotional Regulation (6 items), Reflection (9 items), Humour (9 items) and Openness (8 items).

Alves et al.'s (2014) study demonstrated that, the SAWS Emotional Regulation facet is composed of, "Items oriented to the identification of emotions [which] are clearly separated from those connected with the inner experience of emotions" (p. 53). This study revealed that the SAWS Emotional Regulation dimension is arguably more complex than was originally conceptualised by Webster (2003, 2007). Perhaps, as many wisdom scholars have consistently pointed to cross-cultural differences in the conceptualisation of wisdom (e.g., Cheraghi et al., 2015; Ferrari et al., 2011; Grossmann & Kung, 2019; Kim & Knight, 2015; Kung & Grossmann, 2018; Takahashi & Overton, 2002; Yang, 2001; Yang & Intezari, 2019); cultural differences may account for studies not being able to replicate the original factor structure of the SAWS. Nevertheless, committing Alves et al.'s PCA structure to a CFA might help to highlight further the SAWS factor structure.

Using an internet sample (N = 176, M_{age} = 36.60, SD = 12.07; age range = 18–68 years) of predominantly Australians (71%), Taylor et al. (2011) sought to (a) replicate the dimensional structure of both the 40-item SAWS and the 39-item 3D-WS using principal component analysis (PCA), and then (b) directly compare the two instruments in relation to a measure of social desirability (SDR), the personality trait of forgiveness, and psychological well-being (PWB). Applying PCA, Taylor et al. set the factors an a priori to five. Results demonstrated that the factor structure of the SAWS was replicable, although four of the 40 items cross-loaded onto other factors and three items failed to load on any factor. Notably, Webster's (2007) SAWS research and Alves et al.'s (2014) validation study of the SAWS, both reported significant cross loadings. The significant cross loadings could indicate that the items measure several factors or concepts and may represent a more complex factor structure than that proposed by Webster.

Taylor et al. (2011) reported good internal consistency for the total SAWS ($\alpha = .90$). For the SAWS subscales, with the exception of the Openness facet, the reliabilities were acceptable: Experience ($\alpha = .78$), Emotional Regulation ($\alpha = .78$), Reminiscence/Reflection ($\alpha = .88$), Humour ($\alpha = .85$), and Openness ($\alpha = .68$). Comparing the SAWS with the 3D-WS, the two measures were significantly, but moderately correlated ($r = .33$, $p < .001$). Both measures were positively correlated with PWB and forgiveness, and neither significantly correlated with age. Referring to Table 2.4, during the PCA, Taylor et al. (2011) replicated the SAWS five factor structure but was unable to replicate the factor structure of the 3D-WS. They also reported that, the 3D-WS was significantly contaminated by SDR ($r = .27$, $p < .001$), but not the SAWS ($r = .14$, $p = .068$).

The results from Taylor et al.'s (2011) Australian study, provide some indication of the SAWS's cross-cultural relevance, considering the original measure was created and verified by Webster (2003, 2007) in a Canadian population. For the first time, Taylor et al.'s research compared the two most popular self-report wisdom tools, the SAWS and the 3D-WS, in terms of the replication of psychometric properties and the ability of the measures to predict theoretically relevant variables. Another strength of the Taylor et al.'s study was the use of a lifespan sample.

Although Taylor et al. (2011) correlated the SAWS responses with age, the study did not report whether there was measurement invariance (MI) between men and women of different age groups. It remains unclear whether the SAWS questionnaire means the same thing for men and women of the younger, midlife, and older age groups. There is no single position on the gender–wisdom relationship that is conclusively empirically supported. Taylor et al.'s study would have benefitted from including gender analysis in their research. Given that Webster (2003) found gender to correlate weakly with the 30-item SAWS ($r = 0.29$) with women scoring higher, but not with the 40-item version.

Perhaps importantly, Taylor et al. (2011) did not confirm the structure through CFA. The argument for the validity of a measurement tool is stronger when the statistical analysis is confirmatory, rather than exploratory (DeVellis, 2017), given that CFA is more robust and is used to verify the EFA or PCA findings.

Sample size is known to affect research results, Taylor et al.'s (2011) sample of 176 was possibly underpowered. For factor analysis, the common rule of thumb is 300 respondents (Comfrey & Lee, 2016; Worthington & Whittaker, 2006). Schönbrodt and Perugini (2013) suggest a sample of around 250 is necessary to attain stable correlation estimates. Nevertheless, even if the true factor structure of the SAWS was composed of five factors, random sampling error might mean that not all studies would be expected to replicate this factor structure.

Although some scholars (e.g., Taylor et al., 2011) have replicated the SAWS five dimensional structure using PCA, others such as Alves et al. (2014) and Dortaj et al. (2018), applying the same methodology, failed to arrive at a clean solution. Employing the more rigorous CFA methodology, Fung et al. (2020) demonstrated that the SAWS five factor structure conceptualised by Webster (2003, 2007) was untenable. Still, as posited by Schmidt (2009), in the sciences, replication is considered one of the most important tools for verification. Therefore, validation, and if necessary, refinement of the SAWS factor structure in the Australian setting will go some way in establishing the SAWS as a reliable measure of wisdom. Despite the SAWS widespread use in wisdom research, its conceptual basis as a valid measure of wisdom has been further questioned by other Western wisdom scholars. Attention has been focused especially on the Openness and Humour facets of the SAWS.

2.23 SAWS Measurement Issues

Ardelt (2011b) raised concerns whether the SAWS was a valid measure of wisdom as Webster (2003) mainly focused on the noncognitive aspects of wisdom. Ardelt (1997, 2003), conceptualised wisdom as an integration of cognitive, affective and reflective personal characteristic, the presence of all three elements allowing wisdom to manifest. To Ardelt (2011b) the SAWS lacked a crucial cognitive wisdom component and she argued that the SAWS, "Contains a reflective wisdom component (Emotional Regulation), a wisdom predictor (Openness to experiences), a consequence of wisdom (Humor), and two necessary but not sufficient components of wisdom (critical life Experiences and Reminiscence)." (p. 252). Although Ardelt characterised Emotional Regulation as a reflective component of wisdom, given that Emotional Regulation deals with emotions or feelings, the element would arguably best be considered an affective wisdom component. According to Webster et al. (2014) measures of Emotional Regulation assess respondents' feelings. Ardelt's (2011b) work suggests personality traits such as Openness are predictors of wisdom, given that it is highly unlikely that all persons who are open to new experiences are also wise.

Openness to Experience is a trait that has been of interest to both wisdom scholars (Ardelt, 2011b; Glück & Bluck, 2013; Glück et al., 2018; Webster, 2003, 2007) and personality researchers (Costa & McCrae, 1992; McCrae et al., 2000). Intelligence scholars such as Costa and McCrae (1992) and McCrae et al. (2000) regard Openness to experience as a basic dimension of personality, which, according to the current dominant view in the field of personality psychology, postulates that personality traits emerge early in life (Roberts et al., 2006). Glück and Bluck (2013) and Glück, et al. (2018) consider Openness to experience as one of four essential resources required for wisdom to develop in their MORE Life Experience Model. Glück and Bluck as well as Glück et al. have argued that Openness and Emotional Regulation, like the other personal resources in their MORE Life Experience Model, are antecedent to wisdom and exist long before wisdom manifests. Yet, the Delphi-based expert findings on definitions of wisdom by Jeste et al. (2010) identified four of the five dimensions of the SAWS (Experience, Emotional Regulation, Openness, and Humour) as wisdom components distinct from intelligence and spirituality. Let us now move on to synthesise what we know about the SAWS.

2.23.1 Summary of the SAWS

Despite the extensive use of the SAWS, few studies have managed to fully replicate its original factor structure which is inconclusive and subject to limitations. With the exception of the study by Fung et al. (2020), to our knowledge, no studies have used the robust CFA methodology to validate the 40-item five factor structure of the measure. Even so Fung and colleagues failed to replicate the SAWS original factor structure, (χ^2 (1510.70) / 510 = 3.08, p < .001, SRMR = .12, CFI = .89, TLI = .88, RMSEA = .13). Webster (2007) originally used CFA to analyse the five subscales of his SAWS used to predict the latent construct of wisdom, rather than analysing all the 40 items. Although Webster reported some good fit indices, χ^2 (5) = 14.77, *p* = .011, CFI = .95, GFI = .97, IFI = .95, RMSEA = .11, the RMSEA value was marginal and the χ^2 statistic was significant despite the low sample size (Kenny, 2015). Some of the SAWS items have a complex factor structure as Webster's (2003) work indicated that the "Humor and Openness dimensions have some overlap and weaker loadings" (p.16). Scrutinising Webster's (2007) PCA findings also point to other items of the SAWS sharing significant loadings with other factors. Some of the Emotional Regulation facet items share attributes with the Reminiscence/Reflection dimension, and the Humour subscale. Openness also shares some attributes with the Humour subscale.

Let us now recap and conclude this section. Previously in the current chapter, the literature indicates that the most common subcomponents of wisdom have been comprehensively reviewed three times. The reviews started with Meeks and Jeste (2009), were updated by Bangen et al. (2013) and most recently updated by Grossmann and Kung (2019). The common subcomponents of wisdom in each update point to important information regarding the SAWS.

The three reviews flagged emotional homeostasis or Emotional Regulation which is one component of SAWS five factor structure as a common subcomponent of wisdom. Bangen et al. (2013) indicated that the SAWS Openness and Humour facets were crucial wisdom subcomponents, although the facets of Openness and Humour were included in less than half of the wisdom definitions reviewed by the authors. In the most recent review of the common subcomponents of wisdom by Grossmann and Kung (2019), the SAWS Openness and Humour subcomponents are not included. Although some wisdom scholars (e.g., Damon, 2000; Jason et al., 2001; Taranto, 1989) acknowledge the role of Humour in wisdom, they consider

Humour as a lesser element of the wisdom construct rather than a core component. While there is considerable lack of clarity about the key components of wisdom, the SAWS subscales of Humour and Openness have been challenged more often than the other components. Thus, one conceptual question underpinning this research of the SAWS is whether the contested factors of Humour and Openness belong in the measure.

Of relevance is that Webster (2003, 2007) constructed the SAWS prior to the latest consensus on the most common subcomponents of wisdom (Grossmann & Kung, 2019). It remains unclear whether Webster would have included Openness and Humour as subscales of the SAWS. Perhaps fortuitously, Webster (2003) commenting on the 30-item SAWS stated:

> Continued refinement of specific scale items may eliminate those which explain little overall variance. Once such consolidation of factor scores is achieved, future research can examine which of the five (or more) factors explains most of the variance in dependent variables. (p. 21)

Webster (2007) was forward thinking when he proposed that, “Future research should re-evaluate the SAWS with a more adequate sample size and compare the current five-factor model to other theoretical models” (p. 178). Commenting on Webster’s (2007) CFA findings on the SAWS, Greene and Brown (2009) caution, “Webster’s findings do not meet the criteria recommended by Hu and Bentler (1999), suggesting that the instrument requires revision before being used as a measure of wisdom” (p. 292). What appears clear is that some refinement of the SAWS is inevitable and appropriate, whereas comparison of the SAWS with another measure of wisdom from a different theoretical model is a sound scientific research.

From what has been discussed up to now, the indication is that any SAWS refinements point to a briefer measure. Since one of the initial purposes of the current thesis was to find a decent factor structure for the SAWS, findings from literature review seem to confirm several an a priori reasons why the structure of the SAWS uncovered by this thesis would be a briefer and better tool. One such reason is that the current consensus for the major subcomponents of wisdom from Grossmann and Kung's (2019) list failed to include Openness and Humour. Indeed, some wisdom scholars (e.g., Ardelt, 2011b; Glück & Bluck, 2013; Glück et al., 2018) consider Openness to be a wisdom resource, manifesting long before wisdom. Additionally, Ardelt (2011b) believes humour is a consequence of wisdom, indicating that those who are already wise display humour, which Webster (2003, 2007) theorised is utilised by the wise in social interactions to reduce stress.

A second consideration is that authors who have attempted to replicate the five factor structure of the SAWS (e.g., Alves et al., 2014; Dortaj et al., 2018; Taylor et al., 2011; Webster, 2007) have reported items significantly cross loading on other factors, with some failing to load at all. Elimination of items which do not load points to a briefer SAWS. Howard (2016) suggests that items should demonstrate a difference of .20 between their primary and alternative factor loading. If items with high cross-factor loadings are also eliminated, then, this refined SAWS would also be a shorter measure than the original version. An abbreviated SAWS tool for wisdom studies in Australia and other English-speaking societies is currently lacking and sorely needed.

2.24 Paucity of Brief Self-Assessed Wisdom Scales

The current plethora of full-length, self-report wisdom measures does not reflect that there is a scarcity of abbreviated wisdom tools. A major obstacle to wisdom measurement is researchers often want to assess a wide range of psychological constructs, but are frequently disadvantaged by lengthy scales (Gosling et al., 2003; Thomas et al., 2017; Urrutia et al., 2016). Shorter measures are easier and faster to administer and are beneficial for researching vulnerable population groups who fatigue easily due to medical conditions, or groups with shorter attention spans (Thomas et al., 2017; Urrutia et al., 2016). Longitudinal research typically involves large sets of variables, so there is pressure to minimise the number of items per scale. Short instruments are also useful in pre-screening procedures and experience-sampling studies (Robins, Hendin, & Trzesniewski, 2001; Robins, Tracy et al., 2001). A search of the literature revealed less than a handful of studies have constructed brief self-report wisdom scales for the wisdom scholarship in Western society, and as far as could be ascertained, none within the Australian context. The most pertinent question is whether such a complex, multifaceted construct as wisdom, can conceivably fit into a brief scale.

In general, it is often accepted that long instruments tend to have better psychometric properties compared to short tools (Gosling et al., 2003). Burisch (1984a, 1997) showed that short and simple scales can be just as valid as long and sophisticated ones. In relation to depression measurement, self and peer reports converged just as strongly for a brief 9-item depression tool (r = .54) compared to a full 50-item measure (r = .51). Burisch (1984a, 1997) found that the believed psychometric superiority of longer scales does not always translate into practice. Such encouraging findings would indicate that a shorter SAWS might be equally effective in capturing the complexities inherent in the wisdom construct.

Although there is a dearth of brief wisdom instruments, some attempts have been made to generate such tools. For example, the Three-Dimensional Wisdom

Scale-12 (3D-WS-12; Thomas et al., 2017) is the brief form of Ardelt's (2003) 39-item 3D-WS. There is also a one factor 21-item Brief Wisdom Screening Scale (BWSS; Glück et al., 2013) which reflects a very broad conception of wisdom. The BWSS draws items from the SAWS, the 3D-WS, and a 35-item revised version of the Adult Self-Transcendence Inventory (ASTI; Levenson et al., 2005). The three parent measures of the BWSS are derived from different theoretical orientations, and as such, come with their own strengths and weaknesses. The sample sizes used in the initial factor analysis (N = 88), and for validation purposes (N = 82) of the BWSS, were sub-optimal. However, the BWSS still posted good reliability (α = .89) and significant correlations in the expected direction with validation measures, including the three parent scales, and measures of Openness, self-efficacy and wisdom nominations. Of concern is that, the BWSS attempts to assess the wisdom multidimensional construct with a unidimensional measure. Arguably, several factors each with multiple indicators, might be better suited to capture underlying nuances of a multidimensional concept such as wisdom, compared to a single factor model assessment tool, even with multiple items. Glück et al. (2013) concurs, the BWSS does not allow for an analysis of facets of wisdom.

Recently, Anderson (2020) applied CFA and EFA to the BWSS in a series of validation studies. The CFA analyses showed poor model fit indices (CFI = .80 to .83, RMSEA = .07 to .08, TLI = .78 to .81). From the EFA analyses Anderson demonstrated that the BWSS is best represented by two factors with 20 items instead of the original 21 items. Although the EFA solutions consistently supported two factors, the item loadings at each study were inconsistent, which calls into question the replicability of the factor structure of the BWSS. Perhaps the measure might have been weakened by an amalgamation of items from theoretically disparate wisdom concepts. To our knowledge, literature search for this thesis found no evidence of a brief wisdom scale solely constructed from the 40-item SAWS for researchers within the English-speaking Western societies. Such a measure is indeed possible, considering the research by Fung et al. (2020) who constructed the Brief Self-Assessed Wisdom Scale (BSAWS), a Chinese abbreviated version of the SAWS, for researching older adults in Hong Kong.

2.25 Mediation and Moderation

According to some scholars (Hayes, 2018; Preacher & Hayes, 2008) mediation attempts to respond to the question, of "how" or "by what mechanism" one variable exerts an effect over another. Since a mediator is an intervening variable which is thought to account for the relationship between the predictor variable and outcome variable (Hayes, 2018), then conceptually, in mediator models the assumption is that the predictor variable causes changes in the mediator variable which then initiates change in the outcome variable. As an example, regarding age and wisdom, wisdom judgement is understood to entail the use of both crystallised (G*c*) and fluid (G*f*) intelligence (Mickler & Staudinger, 2008). As such, intelligence might be mediating the relationship between age and wisdom. To our knowledge, review of the literature showed no research into the role of either G*c* or G*f* as possible mediators between an individuals' age and wisdom.

In contrast, moderators specify conditions under which a given predictor is related to an outcome, that is, they try to explain "when" or under "what" circumstances an independent variable affects a dependent variable (Field, 2017). Potentially, several variables can influence when intelligence affects the acquisition of wisdom. Such variables include those that change gradually over time, such as age or those that are fixed such as sex. The relationship between both G*c* and G*f* with wisdom, might depend on the sex or the age of an individual.

Regarding gender as a moderator, differences in wisdom have been reported in empirical studies by gender (e.g., Cheraghi et al., 2015). In many cultures, gender-specific socialisation practices promote autonomy and independence for men, and relatedness and interdependence for women. In general, cross-culturally men have been considered wiser than women (Orwoll & Perlmutter, 1990). Indeed, the stereotypical image of a wise older man persists. For instance, when respondents were asked to nominate persons whom they thought were wise, often older men aged 55–60+, such as Aristotle, Confucius, Gandhi, and the like, were generally rated as being wise (Sternberg, 2005a). However, in the past half century gender disparities have become less pronounced, particularly in Western societies. With less perceived constraints, it may be that men and women now have opportunities to invest in intellectual and psychological pursuits.

There are noted gendered differences on measures of wisdom, for instance, the 3D-WS, men have a slight advantage on the cognitive dimension and women on the compassionate or interpersonal facet (Ardelt, 2009; Cheraghi et al., 2015). On intelligence measures, differences in *Gc* such as verbal ability are usually small and insignificant (Hyde, 1981, 2005) for men and women. However, on measures for *Gf* performance on tests such as Raven's matrices tests (Raven, 1941), men perform significantly better than women (Lynn & Irwing, 2004). Possible explanations for gender differences in intelligence tests have included, identifiable biological factors, socialisation, developmental effects (Lynn, 1999), methodological design (Keith et al., 2008) and biased test items (Steinmayr et al., 2015; Wechsler et al., 2014).

Regarding age as a possible moderator on the relationship between intelligence and wisdom, cohort changes in cognitive functioning have been widely documented, with later-born generations outperforming earlier generations on a wide variety of intelligence measures (Flynn, 1999; Gerstorf et al., 2015). However, historical improvements in education, better physical heath and higher overall living standards (Schaie et al., 2005), have led people to perceive fewer constraints over their lives compared to same-aged people several decades ago. Moderation analysis will therefore be another tool in our arsenal for explicating the relationship between wisdom–intelligence–age–gender conundrum. The relationship is worthy of investigation as moderators help explain whether issues such as gender and cohort-specific socialisation practices, as suggested by Orwoll and Achenbaum (1993) might affect men and women differently. Prior to formulating the hypotheses for the current research programme, we will first synthesise and conclude this literature review.

2.26 Synthesis and Conclusion

Chapters 1 and 2 sought to increase our understanding of the relationships between wisdom, intelligence, age, and gender and highlighted gaps in the literature. In Chapter 1, it was argued that wisdom and intelligence are distinct constructs which share some common features and both are necessary for human development and flourishing (Clayton & Birren, 1980). Overall, it was evident that the scientific study of the relationship between wisdom, intelligence, age, and gender presented more questions than answers.

Regarding wisdom, the empirical research is still in its infancy (Baltes, 2005; Sternberg, 1990) and the multifaceted nature of the construct (Ardelt & Oh, 2010; Glück & Bluck, 2011; Knight et al., 2016), has proven difficult to define and measure (Webster, 2003, 2007, 2019). Moreover, most of the operationalisations of wisdom have been based on disparate meanings (Glück et al., 2013), although Grossmann and Kung (2019) presented a list of the most commonly agreed subcomponents of wisdom. The list incorporates both Eastern and Western concepts of wisdom and goes some way towards a consensus definition of the wisdom construct.

There is still no “gold standard” tool to measure wisdom. Many wisdom scholars have attempted to define, operationalise, and measure the construct in men and women of different age groups. Webster’s SAWS (2007) and Ardelt’s (2003) 3D-WS are the two most cited self-report wisdom scales. The SAWS was extensively analysed in the current literature review, with the aim of including the scale in this research programme. Findings pointed to controversies surrounding the five factors of the SAWS. The SAWS was constructed long before Grossmann and Kung’s (2019) list of the current consensus on the most relevant subcomponents of wisdom.

The indication is that the SAWS would benefit from some refinements and the final measure appears very likely to be a shorter version than the five factors conceptualised by Webster (2003, 2007, 2019). A brief version of the SAWS could encourage and stimulate future wisdom research as short valid measures of the wisdom construct are in short supply. Incorporating such a measure in the current research with the brief 3D-WS-12 is hoped to contribute to elucidating the wisdom–intelligence, developmental trajectories of men and women of different ages. Such an endeavour is valuable, as the literature suggests strengthening the individual capacity for wisdom is a desired lifespan developmental goal that is beneficial to humankind (Glück, 2016; Kim & Knight, 2017; Knight et al., 2016). Moreover, wisdom is advocated to confer a sense of well-being to the individual (Glück, 2016) to help create a better world (Sternberg, 2019b) and to position persons favourably to cope with important and difficult matters of life (Jeste et al., 2010).

Since studies of wisdom have often focused on older adults (e.g., Ardelt, 2003; Fung et al., 2020; Mitchell, 2016), a main challenge for wisdom researchers is to critically assess the quality and length of measures used in studying this complex construct, whilst advancing our knowledge on the wisdom–age trajectory. It was therefore, argued that the inclusion of adolescents in wisdom research is essential. Although wisdom research has attracted many high-quality studies, adolescents appear underrepresented, despite the age group representing a crucial component in the puzzle leading to our understanding of the wisdom–age–developmental trajectory. Many authors (e.g., Pasupathi et al., 2001; Richardson & Pasupathi, 2005; Staudinger & Pasupathi, 2003) have advanced the notion that wisdom development starts in adolescence.

How wisdom develops with age remains unclear. Currently, there is no universally accepted view of the relationship between wisdom and age. Our understanding of this relationship is chaotic, going from wisdom decreasing with age, increasing with age, to maintaining stability after reaching the age of 25. In late old age, the consensus is that a decline in mental health is accompanied by declines in wisdom. Since wisdom's trajectory is an individual difference, such individual differences partly help to explain the incongruent empirical findings (Sternberg, 2005a).

While most researchers are in agreement that wisdom is positively linked to a successful life and a useful virtue to cultivate (Ardelt, 1997; P. Baltes & Baltes, 1990; Blanchard-Fields & Norris, 1995), not all adults have been found to grow wiser with increasing age (Knight & Laidlaw, 2009) or consider this a priority. It might be that people are not aware of what wisdom is, or its benefits, and therefore do not prioritise its growth. The current study raises the possibility of identifying those older adults who "lack wisdom", in the hope that psychological interventions might assist them attain such a beneficial virtue. The idea of targeting psychotherapy with adults of all ages to assist in the attainment of wisdom is consistent with the concepts of Knight and Laidlaw (2009), where therapy for individuals lacking wisdom could assist their progression into ageing well.

In regards to intelligence, empirical research dates to well over a century, yet it is still unclear how the construct is expressed in men and women of different ages. The age of onset of cognitive decline is controversial (Finch, 2009; Nilsson et al., 2009; Salthouse, 2009). Longitudinal data suggests later life onset, at least from age 60–65 (Cornelis et al., 2019; Lundervold et al., 2014; Rönnlund et al., 2005; Schaie, 2016) compared to as early as one's 20s or 30s, in cross-sectional studies (Salthouse, 2009, 2010, 2019). Reasons for the disparity between longitudinal and cross-sectional data, might include later age cognitive onset due to practice effects in longitudinal studies and selective attrition (Euser et al., 2008; Rabbitt et al., 2001; Zelinski & Burnight, 1997). Cross-sectional data tend to overestimate cognitive decline among women but not in men (Cornelis et al., 2019).

It was argued that the age of cognitive decline is important given that pathophysiological processes may have started, long before clinical symptoms (Sperling et al., 2011). Singh-Manoux et al. (2012) reported cognitive decrements in their baseline sample age at 45; conceivably cognitive decrements could have begun earlier. Given that early intervention aimed to treat or delay cognitive decline might only become apparent at older age, including younger age groups in cognitive studies appears advantageous.

In conclusion, even though wisdom and intelligence share some attributes, distinction between the constructs is vital to ensure the tools that researchers employ to measure wisdom, do not inadvertently also assess intelligence. This is important because, while intelligence helps us engage in our environment (Sternberg, 2019a), wisdom helps us face the important challenges in life (Ardelt, 2000a; Jeste et al., 2010). Both wisdom and intelligence are important to the individual and all of humanity and the need to delineate the differences is still ongoing.

2.27 Research Hypotheses

Following an extensive literature review, this study tested several hypotheses. Webster (2007) proposed that the SAWS is a valid and reliable measure of the wisdom construct. Many studies in both non-Western and Western societies applying the SAWS in their research, were comprehensively scrutinised. Findings indicated that despite the widespread application of the SAWS in wisdom research, few studies have managed to fully replicate its original factor structure. Even though the SAWS possesses good internal consistency and convergent validity (Taylor et al., 2011; Webster, 2007; Webster et al., 2014), its factor structure and dimensionality are inconclusive and subject to several limitations (see Ardelt, 2011b; Fung et al., 2020). For example, to date, apart from the study by Fung et al. (2020), no studies have used CFA to validate the 40-item five latent factor structure of the SAWS. Using the five sub-scales of the SAWS as manifest variables, Webster (2007) submitted the SAWS to a CFA rather than analysing all the 40 items. Some of the SAWS items have a complicated factor structure. Webster (2003) reported that the

"Humor and Openness dimensions have some overlap and weaker loadings" (p. 16). Seven items were observed to significantly cross-load onto other factors.

2.27.1 Research Hypotheses for Part 1–Study One

Study One of this research programme proposed five hypotheses. Given such controversies surrounding the factor structure of the SAWS, the first hypothesis was proposed.

Hypothesis 1: It was hypothesised that, the 40-item five-dimensional factor structure of the SAWS would not be expected to replicate in the current study, using a CFA.

The current list of the consensus on the most common subcomponents of wisdom reviewed by Grossmann and Kung (2019) does not include the SAWS dimensions of either Humour or Openness. Other wisdom scholars (e.g., Ardelt, 2011b; Jason et al., 2001) have argued that the SAWS factor of Humour is not a basic wisdom component but a consequence of being wise. Some scholars (e.g., Damon, 2000; Perry et al., 2001; Taranto, 1989) who acknowledge Humour in their work do not include it as a component of wisdom. However, the position of Openness in wisdom is complex.

Openness appears in some wisdom conceptualisations (e.g., Jason et al., 2001) as part of their Harmony factor. Similarly, Yang (2001) includes Openness in her wisdom measure as part of the Openness and Profundity component. When Dortaj et al. (2018) attempted to replicate the five factors of the SAWS in their study, Openness failed to appear as a facet of the SAWS. Thus, using an independent sample to apply EFA to the 40-items of the SAWS, the second hypothesis was put forward.

Hypothesis 2: It was hypothesised that, an EFA of the SAWS 40-items in a new sample without setting the factors an a priori, would not produce a five factor solution and would not be anticipated to include the Humour or Openness facets.

A third hypothesis was devised following the work of Glück and Bluck (2013) and Glück et al. (2018) who in their MORE Life Experience wisdom model, proposed that Openness is but one of four crucial resources required for wisdom development, together with Ardelt's (2011b) work who suggested that personality traits such as Openness are predictors of wisdom. Extensive published data (e.g., Costa & McCrae, 1992; McCrae et al., 2000; Roberts et al., 2006) considers personality traits such as Openness to be distal and a stable individual difference. Since no research could be found that has been conducted regarding the association of SAWS Openness as a distal wisdom indicator, the following hypothesis was advanced.

Hypothesis 3: It was hypothesised that, the Openness facet of the SAWS would be antecedent to wisdom and not a core wisdom component as proposed by Webster (2003, 2007, 2019).

Expanding on the prospects of a revised SAWS, a fourth hypothesis was proposed. Alves et al. (2014) and Fung et al. (2020) demonstrated that, the five factor structure of SAWS was untenable. We reasoned that, given the current consensus of what constitutes the most common subcomponents of wisdom (Grossman & Kung, 2019), the exclusion of Humour and Openness from the list points to EFA findings returning a shorter version of the SAWS. Although an EFA of the SAWS does not determine what the true dimensions of wisdom might be, the EFA is expected to highlight the specific factors that the SAWS assess. The briefer revision of the SAWS henceforth will be referred to as SAWS-R and is predicted to evince better fit indices for the data compared to its parent SAWS, through CFA. Better psychometric characteristics for an abbreviated SAWS-R bears precedence from the very recent short BSAWS, constructed by Fung et al. using only 9-items from the original SAWS. Despite the limitations observed and described earlier during the review of the construction of the BSAWS, Fung et al. still managed to demonstrate excellent model fit indices through CFA, χ^2 (51.28) /. 27 = 1.90, SRMR = .04, CFI = 1.00, TLI = 1.00, RMSEA = .05). Even though in general, shorter instruments are considered psychometrically inferior to their parent scales (Gosling et al., 2003), Burisch (1984a, 1997) showed that short and simple scales can be just as valid as long and sophisticated ones. In relation to depression measurement, self and peer reports converged just as strongly for a brief 9-item depression tool (r = .54) compared to a full 50-item measure (r = .51). The findings by Burisch (1984a, 1997) suggest, that the believed psychometric superiority of longer scales does not always translate into practice. Taken together, the following hypothesis was developed.

Hypothesis 4: It was hypothesised that, SAWS-R would demonstrate good fit indices for the data using Hu and Bentler's (1999) criteria for model fit.

To further supporting evidence for the SAWS-R, a fifth hypothesis was proposed. Reliable and valid measurement tools are crucial for researchers to study their constructs of interest, such as wisdom. Literature indicated that measurement invariance (MI) is a precondition when investigating differences across groups (Kim et al., 2012; Meredith, 1993; Millsap, 2011). MI would indicate that measurement in different groups are comparable. Without conducting MI, interpretation of group mean comparisons may be confounded, specifically, for a new measurement tool, as MI contributes to the construct validity of the measure (Greene & Brown, 2009). It was expected the SAWS revised SAWS-R would display MI across age groups and gender. Furthermore, current wisdom scholarship does not endorse gender differences in wisdom (Aldwin, 2009; Glück, 2019; Glück et al., 2013). The following hypothesis was formulated.

Hypothesis 5: It was hypothesised that the refined SAWS-R would show measurement invariance across different age groups and gender and display significant mean wisdom differences across age groups but not across gender.

2.27.2 Research Hypotheses for Part II–Study Two

It is emphasised that, Study Two, is not merely a replication of Study One in a different population sample. Nonetheless, as posited by Schmidt (2009), replication is considered one of the most important tools for verification in the sciences and is especially powerful across different populations. Hence, replication was conducted as just one of the analyses undertaken in Part 11 of the current research programme. Replication was designed to establish the robustness of the refined SAWS-R, before the measure could be confidently applied to explicate the complex relationships between wisdom, intelligence, age, and gender uncovered during the literature review and the major research question for the current thesis.

Some important studies engaged in the construction of abbreviated wisdom tools have not validated their results in a new sample. For instance, Thomas et al. (2017) constructed the brief 3D-WS-12 from Ardelt’s (2003) 39-item 3D-WS. As far as could be ascertained, the authors have not validated their findings in a new sample to confirm the reliability of their 3D-WS-12. The authors’ selection of items for their measure was based on confirmation of an existing theory, that of Ardelt’s conceptualisation of wisdom as encompassing cognitive, reflective, and affective or compassionate dimensions. The three- dimensional wisdom model was not directly tested against alternate models of wisdom, such as Webster's (2003, 2007) five dimensional model of wisdom. Therefore, the replications in Study Two are designed to confirm SAWS-R as a reliable measure of the wisdom construct. SAWS-R will be compared "one-on-one" with the 3D-WS-12 in relation to Study Two variables. Consequently, seven hypotheses were proposed for Study 2 sequentially numbered from those in Study 1.

The sixth hypothesis for the current research (First in Study Two) was put forward to advance reliability and validity for the SAWS-R. Reliability and validity of a measurement tool is closely associated with scores obtained from a specific sample at a given time. Reliability would therefore include administration of the questionnaire to a different population, that the results are replicable. It was anticipated when the refined SAWS-R from Study One was administered to a different population it would display good reliability and different types of validities. CFA of SAWS-R was expected to evidence a good model fit by the criteria set by Hu and Bentler (1999). Furthermore, the predominant question for this thesis is, "How does age and gender influence wisdom and intelligence?" To further examine and attempt to answer this research question, it is necessary to determine whether the SAWS-R in this new independent population, as well as the 3D-WS-12 comparison measure, are measurement invariant across age groups and gender. Accordingly, the following hypothesis was generated.

Hypothesis 6: It was hypothesised that the revised SAWS-R would demonstrate good model fit, reliability and different kinds of validity and that, both the derived SAWS-R and the 3D-WS-12 would show measurement invariance across age groups and gender.

A seventh hypothesis was put forward to differentiate wisdom scores between age groups and gender. Current wisdom scholarship does not endorse gender differences in wisdom (Aldwin, 2009; Glück, 2019; Glück et al., 2013). As noted in the literature review, the relationship between wisdom and age is complex, with empirical studies demonstrating either no wisdom changes with ageing (Taylor et al., 2011; Webster, 2007), increasing (Bang, 2015), declining (Ardelt, 2003) or midlife group scoring well above that of young and older persons (Ardelt et al., 2018; Thomas et al., 2017; Webster et al., 2014). The overarching expectation is for age differences in wisdom. By applying the age and gender views to both the revised SAWS-R and the 3D-WS-12 the following hypothesis was prompted.

Hypothesis 7: There would be significant mean wisdom differences across age groups but not gender on both the SAWS-R and the 3D-WS-12.

To obtain greater clarity between wisdom and intelligence, the eighth hypothesis explores the relationship between crystallised (G*c*) and fluid (G*f*) intelligence with age and gender to allow comparison with results of hypothesis seven. Previous literature suggests that for men and women G*c* might increase with age (Cornelis et al., 2019; Klein et al., 2015; Schaie, 2016) only declining closer to death due to cognitive changes and onset of physical debilities (Kaufman, 2001). However, G*f* is generally anticipated to decline across the adult life-course as ageing is detrimental to G*f* (e.g., Kievit et al., 2016; Park et al., 2002; Salthouse, 2019; Schaie, 2016). Even though on measures of G*c* there are generally no gender differences (Hartshorne & Germine, 2015; Hyde, 1981, 2005; Salthouse, 1982; Schaie, 2016), on measures of G*f*, men usually perform significantly better than women (Irwing & Lynn, 2005; Lynn & Irwing, 2002, 2004a, 2004b, 2008; Lynn et al., 2001), although this is not always the case (Lundervold et al., 2014). Taken together, we advanced the following hypothesis:

Hypothesis 8: It was hypothesised that, there would be significant mean intelligence differences across age groups but not gender, for both G*c* and G*f*.

The ninth hypothesis was proposed to understand the impact of age on fluid reasoning. Longitudinal data has been crucial in our current understanding of cognitive changes with age. This data often indicates increasing or stable relationships between age and cognitive abilities in young and middle-aged adults, before declining in older age (Aartsen et al., 2002; Albert & Heaton, 1988; Bielak et al., 2012; Cornelis et al., 2019; Ferrer et al., 2004; Rönnlund et al., 2005; Schaie, 2013; Schaie & Hertzog, 1986; Singh-Manoux et al., 2012). Furthermore, literature indicates that G*f* increases with age, attaining a peak around midlife before declining (Kievit et al., 2016; Klein et al., 2015) prompting the following hypothesis:

Hypothesis 9: It was hypothesised that the relationship between fluid reasoning and age is curvilinear with a peak at midlife, as such, midlife adults will generally score higher than either younger persons or older persons on inductive reasoning.

A tenth hypothesis was proposed to enquire into the work of Sternberg (2005a) who described one theoretical view of the wisdom and age relationship, to follow a combined "fluid and crystallised intelligence" trajectory. In this combination, wisdom inclines to midlife before declining. Some research into the relationship between wisdom and age have shown the trajectory to be curvilinear, with lower wisdom scores early and later in life with wisdom peaking at middle age (Ardelt et al., 2018; Thomas et al., 2017; Webster et al., 2014). Taken together, the next hypothesis was advanced.

Hypothesis 10: It was hypothesised that the relationship between wisdom and age as measured by the total SAWS-R and total 3D-WS-12 scores would follow a curvilinear trend from adolescence to older age with the zenith at midlife.

An eleventh hypothesis to examine the relationship between highest wisdom scorers with age and education was proposed. Although the relationship between wisdom and ageing might be quadratic, it is still expected that the wisest individuals would be older than the rest. Several scholars (Glück & Bluck, 2013; Kekes, 1983; Staudinger, 1999) contend that, a wise person is usually old due to the time required to attain such growth. Educational achievement is considered to influence wisdom (Ardelt et al., 2018), therefore the top wisdom scorers are also expected to be better educated compared to the rest.

Hypothesis 11: It was hypothesised that, the wisest individuals on the SAWS-R and the 3D-WS-12 would be older and better educated than the rest.

A twelfth hypothesis was proposed to utilise mediation and moderation analyses to facilitate a better understanding of the relationship between wisdom, intelligence, age, and gender. A review of the literature indicated that there has been no research, to our knowledge, into the role of intelligence as a possible mediator between age and wisdom. Since moderation investigates the unique conditions under which two variables are related, it helps answer *when* or *under which condition* intelligence is related to wisdom. Orwoll and Achenbaum (1993) indicated that gender and cohort-specific socialisation practices, could affect men and women differently in their route to acquiring wisdom. The effect of intelligence on wisdom might be moderated by age or gender, so that individuals possessing higher crystallised or fluid reasoning skills would become wiser than those with lower intelligence. Therefore, the following hypothesis was proposed:

Hypothesis 12: It was hypothesised that, whereas intelligence would be expected to mediate the relationship between age and wisdom, age and gender would moderate the relationship between intelligence and wisdom.

Chapter 3 Part I

Methods–Study One

3.1 Introduction

Valid measures of wisdom are a pre-requisite to studying the complex multidimensional concept that is wisdom. As previously discussed in the literature review, there is a paucity of studies that have validated the 40-item SAWS factor structure through confirmatory factor analysis (CFA), and likewise a scarcity of studies incorporating adolescents in their research protocol. The current chapter presents the methodology used in Part 1, Study One. The following sections detail the process followed including (a) justification for the methodology, (b) study design, (c) participants' demographics and recruitment procedure, (d) measure(s) used as well as background variables, (e) data analysis strategy, including (f) factors to retain in exploratory factor analysis (EFA), and (g) sample size. Finally, a conclusion of the chapter is presented together with an introduction to Chapter 4 where the results for Study One will be presented.

3.2 Justification for Methodology

The cross-sectional survey methodology was used mainly due to time constraints imposed in finishing the PhD programme in a timely manner. Without the time constraints, two possible methodological alternatives considered were longitudinal studies, meta-analyses, or a combination of both. Meta-analysis would incorporate all published and unpublished wisdom studies (e.g., Honours, Masters, and PhD theses) which have used the SAWS. Effect sizes from such a meta-analysis would then inform data collection.

Nevertheless, the current cross-sectional methodology and factor analysis were considered appropriate for the current research for several reasons. First, one of the aims of Study One, was to validate and if necessary, refine the factor structure of the SAWS. To refine the measure, items can quickly be chosen during EFA, based on their indicator strength (i.e., factor loadings). Second, the combination of a cross-sectional approach and use of factor analysis, as opposed to using item response theory (IRT) procedures, was invaluable for our analysis given the complex nature of the measurement model. Third, IRT is better suited for testing equivalence of item parameters whereas EFA is more conducive to multidimensional model testing (Meade & Lautenschlager, 2004). Finally, fourth, the cross-sectional design using online survey data collection methodology allowed us to collect a large sample which can then be randomly split into two; one for EFA, and the second for an in-depth analysis and confirmation of the factor structure of the derived scale from the EFA by applying a CFA.

3.3 Study Design

Study One employed a cross-sectional survey design in an Australian setting. Items measuring wisdom were self-assessed. All the measurements were incorporated into an online electronic survey format.

Although online data collection is employed by many researchers, the method presents some advantages and limitations. For example, since the interviewer is absent, the researcher has less control over certain factors, such as providing clarity to questions if responses on the inventories may have been misunderstood, or interpreted in different ways by different participants. Additionally, online surveys which require specialised respondents, such as older persons who lack internet access or those from remote areas may be excluded from the study. Perhaps a greater concern is when respondents are reimbursed financially for their time, where identity fraud may apply.

However, online surveys allow for a faster way of collecting large amounts of data compared to other survey methods, such as lab-based pen and paper and personal interviews including telephone data collection. Traditional survey methods are often expensive to administer, whereas studies show that conducting an online survey facilitates low-cost data collection from the target population (Rice et al., 2017). Sending online questionnaires are more affordable than the face-to-face method and allows for automatic storage of surveys in a database, with less human data handling errors. Furthermore, response rates are high, given respondents can conveniently access the survey and respond to the questionnaire at a convenient time and work at their own pace. Lastly, online surveys offer flexibility, even complex surveys can be designed for the online platform. Nonetheless, although convenience would be compromised, the above concerns and limitations could be overcome by way of utilising pen and paper inventories with the researcher present. With the current research programme, to reach our potential population and obtain a large enough sample calculated an a priori, the online survey method was determined to be timely and appropriate.

3.4 Participants

The total sample consisted of 709 participants aged between 15–92 years (M_{age} = 35.67) of whom 22% were male and 78% female. Data were split randomly into (N = 356) and (N = 353) for the SAWS validation process (see Table 3.1). According to Erikson's (1959) psychosocial stages of human development, the sample included: Adolescents (n = 81; age range = 15–18 years), young adults (n = 396; age range = 19–40 years), midlife adults (n = 190; age range = 41–65 years), and older persons (n = 42; age range = 66–92 years).

Table 3.1

Participant Characteristics

	N = 356		*N* = 353	
Characteristics	Frequency	Percentage	Frequency	Percentage
Age				
15-18	46	12.92	35	9.92
19-40	200	56.18	196	55.52
41-65	89	25.00	101	28.61
66-92	21	5.90	21	5.95
Gender				
Men	80	22.50	74	21.00
Women	276	77.50	279	79.00
First Language				
English	332	93.30	333	94.30
Other	24	6.70	20	5.70
Education level completed				
0-10 years	12	3.40	14	4.00
11-12 years	61	17.10	55	15.60
13-14 years	110	30.90	95	26.90
15-16 years	104	29.20	118	33.40
17-18 years	35	9.80	36	10.20
19-20 years	21	5.90	23	6.50
21+	13	3.70	12	3.40
Retired				
Yes	24	6.70	30	8.50
No	332	93.30	323	91.50

Note. In Australia, completion of year 12 = 12 years of education.

Of the respondents 80.10% were White Australians, 3.40% Aboriginal and Pacific Islanders, 10.40% reported other ethnicities and 6.10% did not specify their ethnicity. English as a first language was spoken by 93.80% of the sample. Participants were well educated according to the Australian education system, having completed at least 12 years of schooling or more (M = 14.79 years; range = 2–36 years), with good self-reported health (M = 7.53; range 1–10).

3.5 Procedure

3.5.1 Ethical Considerations

Ethics approval (H15REA186[B]) was granted by the University of Southern Queensland (USQ) Human Research Ethics Committee prior to participant recruitment. Data were collected from a convenience sample. Potential respondents were sourced through newspaper advertisements, social media, local community groups (e.g., senior citizen clubs), posted brochures and word of mouth at the USQ School of Psychology courses. Although some student participants were awarded minimal course credit for psychology-related courses, all the rest, including the community sample, were not offered any incentives. Participation was voluntary. Whereas USQ students could be as young as 15 years, all other participants were required to be 18 years or older. Participants were recruited over 11 months.

Participants were given a web link where they could access the survey at a time and place of their choosing. The first page of the questionnaire contained information about the survey including risks, privacy and confidentiality, consent, withdrawing and contact details for complaints or inquiries. Participants were informed that the questionnaire would take about 45-60 minutes to complete. Consent was tacit, respondents could access the “survey proper” only once they had agreed to the information they had just read. Participants worked through the survey at their own pace. Identification numbers (ID) were not used to track participants' data. Hard copy questionnaires were posted in the mail with a stamped, addressed return envelope included. The posted surveys included a consent form which had to be signed and returned with the completed questionnaire.

3.6 Measures

3.6.1 Demographics

Participants were administered a survey questionnaire to collect general demographic data. Respondents were asked their date of birth, age, gender, educational level, ethnicity and occupation. They were also asked to provide place of birth, country of residence, whether they were retired or not and main language spoken at home. Respondents also rated their own general health on a scale of 1–10 (1 = poor, 10 = excellent). Although other measures were administered, the SAWS was the relevant instrument for Study One.

3.6.2 Wisdom

Wisdom was assessed with Webster's (2007) 40-item SAWS. It is a self-report measure that has been used to assess personal wisdom. The SAWS is a multidimensional measure, with five dimensions: Experience, Emotional Regulation, Reminiscence/Reflection, Humour and Openness. Each subscale is made up of eight positively phrased statements and responses are rated on a 6-point Likert-type scale (1 = *strongly disagree* to 6 = *strongly agree*). Raw scores are summed up to produce a total wisdom score. Total scores for the inventory can range from 40 to 240. Total scores can also be determined for each of the five subscales and range from 8 to 48. These subscales measure one's ability to use and integrate critical life experiences, regulate one's emotions, reminisce and reflect, be open to new experiences and to be skilful at using Humour in a wisdom fostering manner. Higher total scores on the

SAWS measure, as well as on each subscale, indicate higher levels of wisdom. The SAWS has been reported to have good psychometric properties, including good convergent, discriminant and incremental validities (Taylor et al., 2011; Webster, 2007). Principal component analysis (PCA) supported a five-factor structure (Taylor et al., 2011; Webster, 2007). The SAWS has been employed in assessing wisdom in a wide range of populations, indicating good cultural validity. The SAWS is unrelated to age, or gender (Moberg, 2008; Taylor, 2011; Webster, 2007). Webster reported high reliability for the total scale (α = .90), with a two-week test-retest reliability of (α = .84). In the current study, the estimated SAWS reliability was (α = .90). Appendix A presents the SAWS five dimensions, and their corresponding items.

The first subscale, Experience, consists of items (1, 6, 11, 16, 21, 26, 31 and 39). The Experience subscale measures individuals' ability to be involved in varied experiences in interpersonal contexts especially those requiring resolution of difficult life choices. Such experiences are fundamentally important to life, are non-normative, and are usually emotionally negative (Weststrate et al., 2018). An example of item I, "*I have overcome many painful events in my life*". Taylor et al. (2011) reported reliability for the Experience subscale (α =.78). For the current analysis, Experience α =.76.

The second subscale of the SAWS, Emotional Regulation, contains items (2, 7, 12, 17, 22, 27, 32 and 37). This subscale assesses the level to which participants can regulate their emotions such as, "*Emotions do not overwhelm me when I make personal decisions"*. This subscale also shows acceptable internal consistency (α =.78; Taylor et al., 2011). For the current analysis the Emotional Regulation subscale, α = .81.

Reminiscence/Reflection, the third subscale, consists of items (3, 8, 13, 18, 23, 28, 33 and 38). The subscale measures one's ability to reminisce and reflect, using memories to maintain identity and connect the past with the present to gain perspective. The dimension includes items such as, "*Recalling my earlier days helps me gain insight into important life matters*". The subscale also shows good internal consistency (α = .88; Taylor et al., 2011) and for the current study (α = .84).

The Humour subscale of the SAWS is made up of items (4, 9, 14, 19, 24, 29, 34 and 39). The Humour dimension measures the level to which people can use Humour to put others at ease and to help cope with life stressors. An example item, "*I can make fun of myself to comfort others*". The Humour subscale shows good internal consistency (α = .85; Taylor et al., 2011), and α = .82 from the current research.

The final SAWS subscale, Openness, contains items (5, 10, 15, 20, 25, 30, 35 and 40). Openness refers to individuals' ability to be open to diverse ideas, values and experiences, particularly those which may be different from one's own, and tolerance of others. A sample item includes, "*I often look for new things to try*". The reliability for the Openness facet reported by Taylor et al. (2011) was the lowest of any of the SAWS dimensions, α = .68. For the current research, Openness also displayed the lowest subscale reliability, α = .69.

3.7 Data Analysis Strategy

Existing wisdom research recognises the critical role played by valid and reliable measures for studying this complex construct (Glück, 2019; Webster, 2019). To begin, the SAWS will be validated through a CFA. Maximum Likelihood (ML) will be employed as the model for parameter estimation. We note that in large samples, variables with statistically significant skewness often do not deviate enough from normality to make a meaningful difference in the analysis (Tabachnick & Fidell, 2019). Also, when variables are not expected to be normally distributed, Hoyle (1995) recommended using the ML estimation method when conducting CFAs, as ML has been found to be robust to violations of multivariate normality. To assess overall goodness of fit, multiple criteria will be used as described next.

CFA researchers have used “goodness of fit” indicators, to assess model fit (Bentler, 2007; Hu & Bentler, 1995, 1999; Marsh et al., 2004). Fit indices try to answer the question, how well does the model fit the data? If the model is acceptable, researchers then establish whether specific paths are significant. However, acceptable fit indices do not imply the relationships are strong because fit indices come with their own limitations (Byrne, 2016; Kenny, 2015). Therefore, some scholars (Bentler, 2007; Marsh et al., 2004), recommend that researchers utilize a range of fit indices, and using indices from different classes because such a strategy overcomes the limitations of each index.

To begin, Hu and Bentler (1999) evaluated the adequacy of the “rule of thumb” conventional cut-off criteria and other alternative criteria for various fit indices. The authors proposed that a two-index presentation strategy should be supplemented with the ML-based CFI or RMSEA to distinguish good models from poor ones, such as those with mis-specified factor covariance(s), factor loading(s), or both. Hu and Bentler’s (1999) criteria for acceptable model fit will be followed (see Table 3.2). Additionally, the χ^2 statistic for model fit will be reported, although it is not considered adequate, due to sensitivity to large samples (Hu & Bentler, 1999; Kahn, 2006). The χ^2/df ratio which considers sample size, is also reported with values of ≤ 3 considered acceptable (Byrne, 2016).

Table 3.2

Cut-off Criteria for Fit Indices in Covariance Structural Analysis

Measure	Threshold
CFI	≥ .95 = Well-fitting models
GFI	≥ .95 = Well-fitting models
TLI	≥ .95 = Well-fitting models
SRMR	≤ .08 = Good- fitting
RMSEA	≤ .06 = Good Models
	.06 to.10 = Satisfactory fit
	≥ .10 = Poor models

Note. CFI = Comparative Fit Index; GFI = Goodness of Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardised Root Mean-square Residual; RMSEA = Root Mean Square Error of Approximation.

Second, as argued in the literature review, there were some prominent and valid reasons to indicate that the CFA would not replicate the SAWS original factor structure with good model fit indices according to the criteria set by Hu and Bentler (1999). Therefore, given an inadequate SAWS model, the 40 items of the SAWS will be applied to an EFA using a different subsample to see what structure emerges. Third, the SAWS-R structure from EFA will be confirmed in the first subsample using CFA. Fourth, structural equation modelling (SEM) and CFA will be applied to examine the relationship between the SAWS Openness facet and wisdom.

Fifth, because, age and gender relationships with wisdom form an integral part of the current study, group mean differences will be computed for the SAWS-R. Measurement invariance (MI) which includes configural, metric, scalar, and full uniqueness MI will be tested across age groups and gender. Sixth, analysis of variance (ANOVA) will test the differences between age groups and gender.

Seventh, reliability estimate of the SAWS-R using items as indicators, will be determined. Eighth, to determine how well the SAWS-R approximates the 40-item SAWS, Pearson correlation coefficient will be computed between the SAWS-R and the SAWS. During EFA, the number of factors to be retained will be guided by several considerations as elaborated in Subsection *3.7.1* below, and appropriate computer software programs will be used, as necessary. For example, parallel analysis (PA) will be performed using the Monte Carlo PCA for parallel analysis program developed by Watkins (2000) and Velicer's (1976) minimum average partial (MAP) test will be conducted using syntax from O'Connor (2000).

3.7.1 Factors to Retain During EFA

Different methods can be used to specify the number of factors to retain during factor analysis, but they often lead to different solutions. Retaining all factors with eigenvalues ≥ 1.00 criterion (KI; Kaiser, 1960) is one of the most used factor retention methods (Costello & Osborne, 2005; Goretzko et al., 2019; Osborne & Costello, 2009). Velicer and Jackson (1990) believe KI may also be one of the least accurate and is prone to over-extraction of factors. For example, in a Monte Carlo simulation, Osborne and Costello (2009) found 36% of their samples retained too many factors using the KI method. Some authors (Fabrigar et al., 1999; Velicer & Fava, 1998; Velicer & Jackson, 1990) advocate using different criteria for factor retention. Velicer and Jackson recommended alternate tests for factor retention to include the Scree test (Cattell, 1966), parallel analysis (PA; Horn, 1965) and the minimum average partial test (MAP; Velicer, 1976).

In the current analysis, several methods will be used to decide on factor retention, and will include, the Scree test, KI criterion, PA, and MAP. PA is touted as the "gold standard" method for factor retention (Goretzko et al., 2019). However, Buja and Eyüboğlu (1992) cautions that, PA, produces more factors to be retained than warranted. Although in PA the eigenvalues can be used to determine the real data eigenvalues that are beyond chance, researchers still need to examine all the factor retention results before deciding on the number of factors to be retained.

3.7.2 Sample Size for CFA and EFA

To perform the validation study of the SAWS, a sizeable dataset was calculated an a priori. Collecting a well-powered sample was an important step in the current methodology. Determining sample size requirements for SEM is a challenge often faced by researchers. Nevertheless, adequate statistical power contributes to observing true relationships in a dataset and is crucial for CFA, EFA, and SEM study (Cohen, 1988; Westland, 2010; Wolf et al., 2013). Using an a priori sample size calculator for structural equation models (Soper, 2020) estimated to achieve $\beta = .20$, at $\alpha = .05$ and detect a medium effect size (.30) with five latent variables, and 40 indicators, would require an absolute minimum sample size of 150 for each of the CFA and EFA analyses.

The process of data collection continued well past $N = 300$ due to expectations that some cases could be deleted during data screening, for example, due to incomplete data protocol. Erikson’s (1959) psychosocial stages of human development were used to subdivide the data into appropriate age categories. The age group categorisation was relevant in the present study, since the current research was interested in age differences as assessed by the refined SAWS-R. Using Erikson’s psychosocial stages, each age category is developmentally expected to navigate through age appropriate crisis; successful accomplishment of which leads to the next age group.

3.7.3 Stability of Correlations and Suitability of Data for Factor Analysis

Issues to consider whether the dataset is suitable for factor analysis are related to sample size and the strength of the relationship among the items (Pallant, 2016). Although there is little agreement among scholars on the sample size, with small samples < 150 cases, the correlation coefficients among items are less reliable, with variability across samples (Pallant, 2016). Schönbrodt and Perugini (2013) demonstrated that at a sample size of 250, correlation coefficients among items are stabilised. Taken together, for the present factor analytic procedure (*N* =356) for CFA and (*N* = 353) for EFA were judged adequate to factor analyse SAWS 40 items.

3.8 Sample Size and Statistical Power for Two–Way Factorial ANOVA

As a prerequisite for adequate statistical power for the 2 (gender) x 4 (age groups) comparison of means, a power analysis (α = .05, β = .20) to detect a medium effect size (.25) was conducted with G*Power 3.1.9.2 (Faul et al., 2009). An (*N* = 179) was recommended. The (*N* = 709) was adequate for the factorial ANOVA.

To conclude, Study One cross-sectional methodology as presented was considered appropriate for conducting a robust validation and if necessary, refinement of the SAWS. The sample sizes were adequate for the proposed analyses of CFA, EFA, factorial ANOVA, and MI. Although online data collection comes with pros and cons, to reach our potential population, and obtain a large enough sample for the proposed analyses in a timely manner, the online survey methodology was considered apt. Furthermore, EFA was fitting as the method is more conducive to multidimensional model testing, which offers a fast way of choosing items for a measure depending on indicator strength. Chapter 4 will present detailed findings from Study One, which involves the validation of the factor structure of the 40-item SAWS.

Chapter 4 Part I

Results–Study One

4.1 Introduction

This chapter reports on the results from Study One. Since the SAWS (Webster, 2007) was utilised as the main measure of wisdom, an investigation of its internal consistency and factor structure was conducted. This was deemed important as the SAWS is one of the two most popular self-report wisdom measures, though with limited research on its validity.

To our knowledge, this was the first study in an English-speaking society to (a) conduct confirmatory factor analysis (CFA) and (b) exploratory factor analysis (EFA) on all the 40-items of the SAWS, utilising two independent samples. The aim was (a) to find an internally coherent and reliable factor structure for the SAWS, (b) determine whether the contested Humour and Openness factors belonged in the measure, (c) investigate whether the SAWS Openness dimension which is often considered a personality trait (Costa & McCrae, 1992; McCrae et al., 2000; Roberts et al., 2006) or a resource for wisdom development (Glück & Bluck, 2013; Glück et al., 2018) might be antecedent to wisdom, (d) examine whether the refined and revised measure demonstrated good fit indices, and (e) conduct measurement invariance (MI) with the aim to gain greater understanding of whether the questionnaire items are interpreted similarly by men and women of different age groups, and also examine if men and women of different age categories including adolescents vary in wisdom. The following sections describe (a) statistical analysis, (b) data screening, and (c) detailed findings from Study One. A brief discussion and conclusion, as well as an introduction to Chapter 5 is then presented.

4.2 Statistical Analysis

The IBM Statistical Package for Social Sciences (SPSS) version 26 software program was utilized for data screening and EFA. Analysis of Moment Structures (AMOS; Arbuckle, 2020; Arbuckle & Wothke, 1999) version 26 software, using the robust Maximum Likelihood (ML; Schermelleh-Engel et al., 2003) parameter estimation method, was employed for the CFA and modelling Openness procedures.

4.3 Data Screening

Data screening revealed one out of range score which was corrected manually. Analysis of missing data indicated Little's (1988) Missing Completely At Random (MCAR) test was not significant (p = .120). Missing values represented 2.54% of the data. We note, that with large samples that have been coupled with relatively small percentages of missing values, Leong and Austin (2005) consider the mean replacement to give similar results to lengthier and more intricate multiple imputation methods. Therefore, taken together, mean replacement was used to impute MCAR values, with item level imputation in the SAWS.

4.4 CFA Findings for the SAWS

Hypothesis 1, that the 40-item, five-dimensional factor structure of the SAWS would not be expected to replicate in the current study, using a CFA was supported. CFA was applied to the first subsample (N = 356). The factors could covary but not the error terms. Model fit indices showed (χ^2 (730) = 2133.83, p < .001, χ^2/df = 2.92, CFI = .72, GFI = .74, TLI = .70, SRMR = .08, RMSEA = .07, 90% CI [0.07, 0.08]). Although the RMSEA suggested a satisfactory model fit according to Hu and Bentler's (1999) criteria, the hypothesized model was a poor fit, given the very low values of CFI, GFI and TLI.

We also tested the current CFA findings with alternative SAWS factor structures reported in the literature. Table 4.1 compares the current CFA results (Model 1) with that of Model 2 after the application of CFA to Alves et al.'s (2014) PCA solution of the SAWS which consisted of (a) 8-item Experience, (b) 6-item Emotional Regulation, (c) 9-item Reminiscence and Reflection, (d) 9-item Humour and (e) 8-item Openness. Model 3 reports on Fung et al.'s (2020) CFA findings on the 40-item SAWS. As shown in Table 4.1, all the three models failed to fulfil the cut-off criteria for good model fit, demonstrating that the SAWS original five factor structure does not replicate.

Table 4.1

Comparative CFA Results for SAWS

CFA Model	χ^2	Df	χ^2/df	RMSEA [90% CI]	CFI	GFI	TLI	SRMR
Model 1	2133.83	730	2.92	.07 [0.07, 0.08]	.72	.74	.70	.08
Model 2	2341.13	730	3.21	.08 [0.08, 0.08]	.68	.72	.66	.09
Model 3	1570.70	510	3.08	.13 [0.12, 0.13]	.89	-	.88	.12

Note. RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; GFI = Goodness of Fit Index; TLI = Tucker–Lewis Index; SRMR = Standardised Root Mean Residual.

Since the SAWS failed to replicate in a CFA, an EFA was conducted on the second subsample (N = 353) to determine what factor structure emerged empirically. The subsamples were changed to reduce the potential influence of unique error variance when extracting the EFA factors in the second subsample for comparison against the CFA results from the first subsample. As discussed in Subsection *3.7.1* of

Chapter 3 (Methods), several criteria were considered to determine the number of factors to retain during EFA.

4.5 EFA Findings

4.5.1 The EFA Results for the SAWS

Hypothesis 2, that an EFA of the SAWS 40-items in a new sample, without setting the factors an a priori, would not produce a five factor solution and would not be anticipated to include the Humour or Openness facets. EFA was performed on all the 40 items of the SAWS utilizing the ML extraction method with oblique Promax rotation, as the factors were deemed to be correlated (Webster, 2003, 2007, 2019), without setting the factors an a priori. The Kaiser-Meyer-Olkin (KMO) value was .87. All KMO values for individual items were greater than .74, exceeding Field's (2017) recommended value of .50. Bartlett's test of sphericity reached statistical significance, supporting factorability of the correlation matrix.

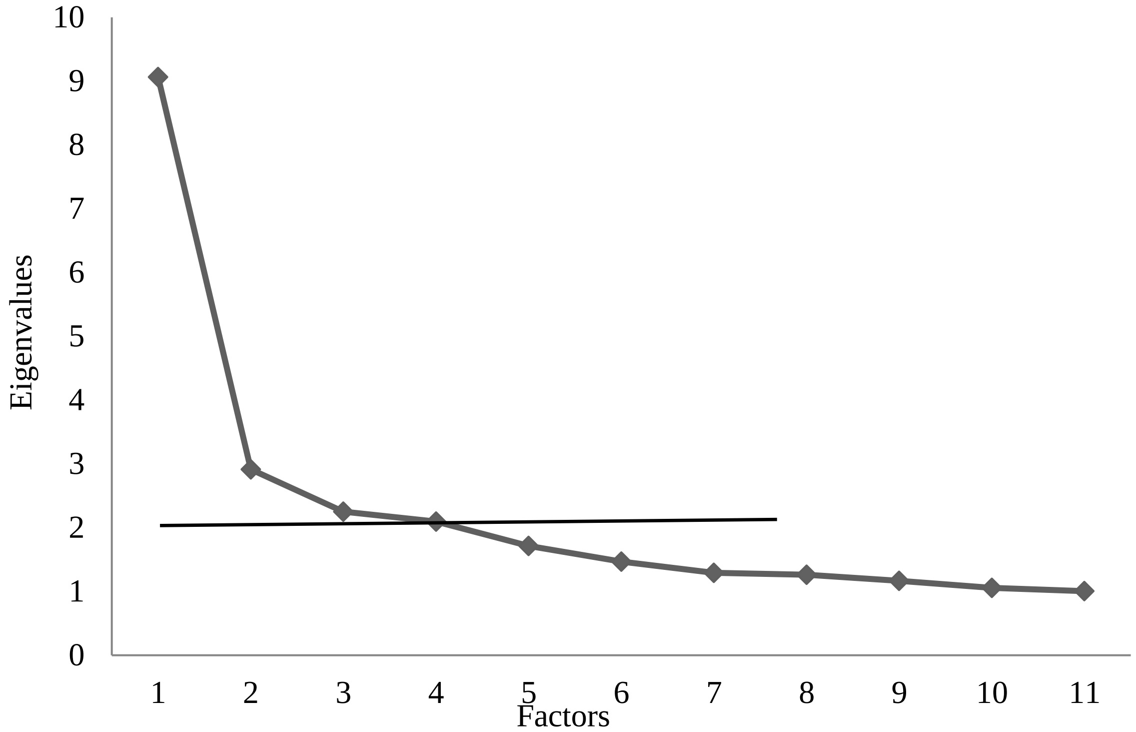
The initial analysis was run to obtain eigenvalues for each factor in the dataset. Howard's (2016) rule, was applied, that variables should (a) "load onto their primary factor above 0.40, (b) load onto alternate factors below 0.30, and (c) demonstrate a difference of 0.20 between their primary and alternative loading" (p. 55). As shown in Chapter 3, several factor retention methods were computed and analysed to garner the best factors for the data.

Firstly, eleven factors had eigenvalues over Kaiser's criterion of 1.00 (KI). Secondly, findings from parallel analysis (PA) and Velicer's minimum average partial (MAP) test suggested retaining six factors. Thirdly, the Scree plot (see Figure 4.1) showed a clear drop in eigenvalues occurred after the fourth factor. Careful consideration was given to each factor retention method. According to Velicer and Jackson (1990), KI is prone to overestimating factor retention. Likewise, Buja and

Eyüboğlu (1992) cautions that PA results in trivial factors, and thus must be trimmed. KI recommendations for factors to be retained were more than twice the SAWS five factors conceptualised by Webster (2003, 2007). Scree plot combined with eigenvalue ≥ 2.00 justified retaining four factors which excluded Humour, but retained Openness. The four factors in combination explained 40.79% of the common variance.

Figure 4.1

Scree Plot with Eigenvalues for SAWS Factors



Note. The figure was graphed by SPSS.

As can be seen from the data in Table 4.2, Factor 1 was composed of six items (3, 18, 23, 28, 33, 38) from the SAWS Reminiscence/Reflection factor. Items 8 and 13 significantly loaded outside the four factors onto an unretained factor (Factor 9) and were not analysed further. Factor 2 was composed of five items (1, 6, 16, 21, 26) from the Experience factor. Items 11 and 31 failed to significantly load on either retained or unretained factors. Item 36 significantly loaded onto an unretained factor (Factor 8) and was discarded.

Table 4.2

Pattern Matrix for SAWS with Factor Loadings (N = 353)

	Factor Loadings										
SAWS Factors with Items	1	2	3	4	5	6	7	8	8	10	11
Experience											
1	. 02	**.70**	-.07	-.13	-.04	. 13	-.00	.05	-.10	-.16	.39
6	-.09	**.62**	. 12	. 06	. 03	-.13	. 01	. 07	. 03	-.01	. 23
11	-.14	.31	. 13	.15	. 09	-.02	-.00	. 13	. 16	.11	-.02
16	. 06	**.54**	-.04	.14	. 03	-.06	. 02	-.02	-.03	. 04	-.04
21	. 08	**.59**	. 02	-.06	-.01	. 21	-.18	. 00	. 08	-.04	-.02
26	. 04	**.91**	. 00	-.04	-.06	-.07	. 08	-.07	-.04	-.10	. 02
31	-.06	.04	. 11	. 02	-.12	. 14	-.11	. 30	-.02	. 06	.05
36	. 09	.05	-.16	. 20	. 10	. 02	-.15	**. 59**	-.05	. 10	. 01
Emotional Regulation											
2	. 11	-.05	. 01	.09	**.82**	. 01	-.01	-.24	. 03	. 02	**. 45**
7	-.05	-.01	. 04	.08	**.54**	-.01	-.02	-.20	-.11	. 18	. 01
12	-.07	-.03	**. 70**	-.11	-.03	-.12	. 13	.17	. 03	. 11.	. 13
17	-.03	.01	**. 85**	.07	.09	-.05	-.04	-.13	-.02	. 10	. 03
22	. 08	-.09	. 25	-.11	.16	. 04	. 30	. 24	-.04	-.18	-.05
27	. 07	. 05	**. 86**	.04	-.03	. 08	-.01	-.13	-.06	-.13	-.05
32	. 02	.02	.03	-.16	**.73**	. 01	-.14	. 30	-.05	. 03	-.12
37	. 13	. 05	**. 51**	.07	.03	. 08	-.04	. 04	. 00.	-.09	. 01
Reminiscence/Reflection											
3	**. 45**	. 04	-.06	-.04	-.12	. 01	-.06	-.07	. 28	. 20	.21
8	.22	. 05	-.13	-.05	-.01	-.11	-.08	. 08	**. 73**	. 20	-.01
13	. 27	-.10	. 12	-.06	-.09	. 15	-.08	. 03	**. 59**	-.04	-.10
18	**.54**	.01	. 06	-.02	. 07	-.19	. 10	. 19	. 07	. 13	. 05

	Factor Loadings										
SAWS Factors with Items	1	2	3	4	5	6	7	8	8	10	11
23	**.68**	. 01	. 18	. 02	-.04	. 01	-.01	-.17	. 15	-.02	-.02
28	**. 80**	. 12	-.04	. 00	. 00	-.04	.04	. 05	-.08	. 00	. 07
33	**. 60**	-.05	-.08	. 09	. 09	. 10	. 05	-.05	. 08	-.07	. 00
38	**. 54**	-.05	. 01	-.01	. 09	. 04	. 12.	. 12	. 04	-.18	. 09
Openness											
5	. 07	. 06	. 12	. 38	-.10	.09	-.12	.10	-.19	.10	.28
10	-.19	-.06	-.05	. 27	-.13	. 05	.11	**.43**	.22	-.05	-.04
15	-.14	.03	. 02	**. 59**	.08	-.02	-.04	.11	.05	.06	.07
20	-.05	.11	-.01	**. 51**	.13	-.01	.21	.05	.07	-.13	.14
25	. 14	-.04	.08	**. 42**	-.19	-.00	.16	.04	-.07	. 14	-.15
30	.10	. 02	-.22	. 21	.07	.12	.16	-.02	-.02	-.08	.03
35	.20	-.13	. 07	**.54**	-.01	-.00	-.22	.20	-.12	.04	.01
40	.10	-.00	-.04	.11	-.12	-.05	.06	**.44**	.12	-.22	-.05
Humour											
4	.01	-.01	-.05	-.08	-.05	.16	**.57**	.04	-.13	.16	.19
9	-.03	-.15	-.02	.10	.09	.10	.04	-.05	.11	**.62**	.02
14	-.08	.08	.03	-.10	.12	.27	.22	-.02	.08	**.50**	-.02
19	.02	-.04	.11	.04	-.02	**.42**	.01	.18	.08	-.01	.23
24	.09	-.01	.04	.01	-.09	-.05	**.96**	-.12	-.04	.05	-.09
29	-.02	.07	.02	.00	.03	**.78**	-.05	.00	.03	.08	.09
34	.03	.18	-.02	.12	.09	.07	.26	.06	.05	.17	-.10
39	.05	-.08	-.07	.04	-.04	**.51**	.13	.04	-.10	.23	.01

Note. Factor loadings ≥ .40 are in boldface.

Factor 3 was composed of four items (12, 17, 27, 37) from part of the Emotional Regulation factor which was named, "Awareness of Own Emotions" (AOE). Three other items with Emotional Regulation content (2, 7, 32) loaded onto an unretained factor (Factor 5) which we called, "Regulating Emotions in Situations" (RES). The other SAWS item for Emotional Regulation (22) failed to load on any retained or unretained factor. The four AOE items were observed to be significantly different in meaning from the three RES items. The AOE items referred to abilities involved in identifying emotions within the self and in others, such as (a) *I am "tuned" in to my own emotions,* or (b) *I am very good at reading my emotional states,* or (c) *I am good at identifying subtle emotions within myself* and (d) *It seems I have a talent for reading other people's emotions.* Conversely, the RES items appear to involve proficiencies related to controlling emotions in different situations. For instance (a) *It is easy for me to adjust my emotions to the situation at hand*, or (b) *Emotions do not overwhelm me when I make personal decisions,* and (c) *I can regulate my emotions when the situation calls for it.*

4.5.1.1 Retention of Openness. Contrary to expectations, Openness was shown to be a viable factor. Factor 4 included four items from the Openness factor (15, 20, 25, 35), with items 5 and 30 eliminated as they did not load significantly on any retained or unretained factor. Similarly, items 10 and 40 significantly cross-loaded onto another factor (Factor 8) outside the four factors and were discarded.

4.5.1.2 Exclusion of Humour. Several considerations were made regarding the exclusion of Humour. The first was associated with item loading outside Webster's (2007) conceptualised five factor solution for the SAWS. The second related to the retention of factors with eigenvalues ≥ 2. Eigenvalue for Factor 6 was below the cut-off criteria at 1.47. Third, Table 4.2 shows the Humour factor is fragmented. Items 19, 29 and 39 loaded significantly on Factor 6, whereas items 4 and 24 significantly cross loaded on Factor 7. Item 24 showed a very high affinity for Factor 7, loading at .96, which was the highest loading of any of the 40 SAWS items on any factor. Humour items 9 and 14 significantly cross loaded on Factor 10, but item 34 failed to load anywhere. Although three of the items could have formed a factor, arguably, these results showed the Humour items significantly loaded, or cross loaded on factors excluded by Webster as legitimate SAWS factors. Hence, Humour was not considered a viable factor of the revised and refined SAWS.

4.5.2 Items for the Revised and Refined SAWS (SAWS-12)

There is no precise rule for the retention of items within an EFA (Meyers et al., 2016). In general, items should load as highly as possible, with no significant loadings on multiple factors. The reliability of items within a factor structure, seem to be significantly compromised when loadings are below .30, with items loading around .40 being marginal (Gorsuch, 2014; Stevens, 2009). Loadings above .50 are desirable and are considered desirable for the replicability and utility of scales (Comfrey & Lee, 2016; Meyers et al., 2016). Using this cut off criteria (see Table 4.3), it was observed that there were three items loading above .50 for the Openness factor and four above .50 for the Awareness factor. For the Reminiscence/Reflection, and Experience factors there were five items at .50 or greater for each factor. Of note is that Webster (2003, 2007) had an equal number of items for each factor. DeVellis (2017) posited that questionnaires should possess the simplest structure.

An attempt was made to retain Webster’s (2003, 2007) scale structure of an equal number of items for each subscale. In order to not privilege any subscale in the total score by having unequal number of items between subscales and to maximize the internal consistency and maintain simplicity, the three highest loading items on each of the four factors were selected for inclusion in a 12-item version of the SAWS. The revised and refined SAWS-R will be henceforth known as SAWS-12 and comprised an equal number of items per factor, with a loading of at least .50 for each item. The Cronbach alphas for the four factors were: Reminiscence/Reflection (α = .75), Experience (α = .78), Awareness of Own Emotions (α = .84), Openness (α = .60) and α = .80 for the total SAWS-12 scale. The coefficient alpha for the total SAWS-12 is better than the value of .70 which is deemed acceptable for new scales (DeVellis, 2017), and is similar to the values ranging from .78 to .90 reported by Webster (2003, 2007) in the original SAWS researches. The SAWS-12 and the parent SAWS demonstrated significant and strong positive correlations ($r = .89$, $p < .001$). The model fit for the SAWS-12 was determined by next applying CFA to the measure.

Table 4.3

SAWS-12 Factor Loadings with Promax Rotation (N = 353)

Item	R	EX	AOE	O
3. I often think about connections between my past and present.	**.45**	.05	-.06	-.04
8. I often think about my personal past.	.22	.05	-.13	-.05
13. I reminisce quite frequently.	.27	-.10	.12	-.06
18. Reviewing my past helps me gain perspective on current concerns.	**.54**	.01	.06	-.02
23. I often recall earlier times in my life to see how I’ve changed since then.	**.68**	.01	.18	.02
28. Recalling my earlier days helps me gain insight into important life matters.	**.80**	.12	-.04	.00
33. I often find memories of my past can be important coping resources.	**.60**	-.05	-.08	.09
38. Reliving past accomplishments in memory increases my confidence for today.	**.54**	-.05	.01	-.01

SAWS-12 Factor Loadings with Promax Rotation (N = 353)

Item	R	EX	AOE	O
1. I have overcome many painful life events in my life.	.02	**.70**	-.07	-.13
6. I have had to make many important life decisions.	-.09	**.62**	.12	.06
11. I have dealt with a great many different kinds of people during my lifetime.	-.14	.31	.13	.15
16. I have experienced many moral dilemmas.	.06	**.54**	-.04	.14
21. I have seen much of the negative side of life (e.g., dishonesty, hypocrisy).	.08	**.59**	.02	-.06
26. I have lived through many difficult life transitions.	.04	**.91**	.00	-.04
31. I've personally discovered that "you can't always tell a book from its cover".	-.06	.04	.12	.02
36. I've learned valuable life lessons from others.	.09	.05	-.16	.20
2. It is easy for me to adjust my emotions to the situations at hand.	.11	-.05	.01	.09
7. Emotions do not overwhelm me when I make personal decisions.	-.05	-.01	.04	.08
12. I am "tuned" in to my own emotions.	-.07	-.03	**.70**	-.11
17. I am very good at reading my emotional states.	-.03	.01	**.85**	.07
22. I can freely express my emotions without feeling like I might lose control.	.08	-.09	.25	-.11
27. I am good at identifying subtle emotions within myself.	.07	.05	**.86**	.04
32. I can regulate my emotions when the situation calls for it.	.02	.02	.03	-.16

SAWS-12 Factor Loadings with Promax Rotation (N = 353)

Item	R	EX	AOE	O
37. It seems I have a talent for reading other people's emotions.	.13	.05	**.51**	.07
5. I like to read books which challenge me to think differently about issues.	.07	.06	.12	.38
10. I enjoy listening to a variety of musical styles besides my favourite kind.	-.19	-.06	-.05	.27
15. I enjoy sampling a wide variety of different ethnic food.	-.14	.03	.02	**.59**
20. I often look for new things to try.	-.05	.11	-.01	**.51**
25. Controversial works of art play an important and valuable role in society.	.14	-.04	.08	**.42**
30. I like being around persons whose views are strongly different from mine.	.10	.02	-.22	.21
35. I'm very curious about other religious and/or philosophical belief systems.	.20	-.13	.07	**.54**
40. I've often wondered about life and what lies beyond.	.10	-.00	-.04	.11
Eigenvalues	9.06	2.91	2.25	2.10
% Variance	22.66	7.28	5.63	5.24
Cronbach Alpha	.82	.79	.83	.67

Note. Factor loadings >.40 are in boldface. R = Reminiscence/Reflection, EX = Experience, AOE = Awareness of Own Emotions, and O = Openness dimensions.

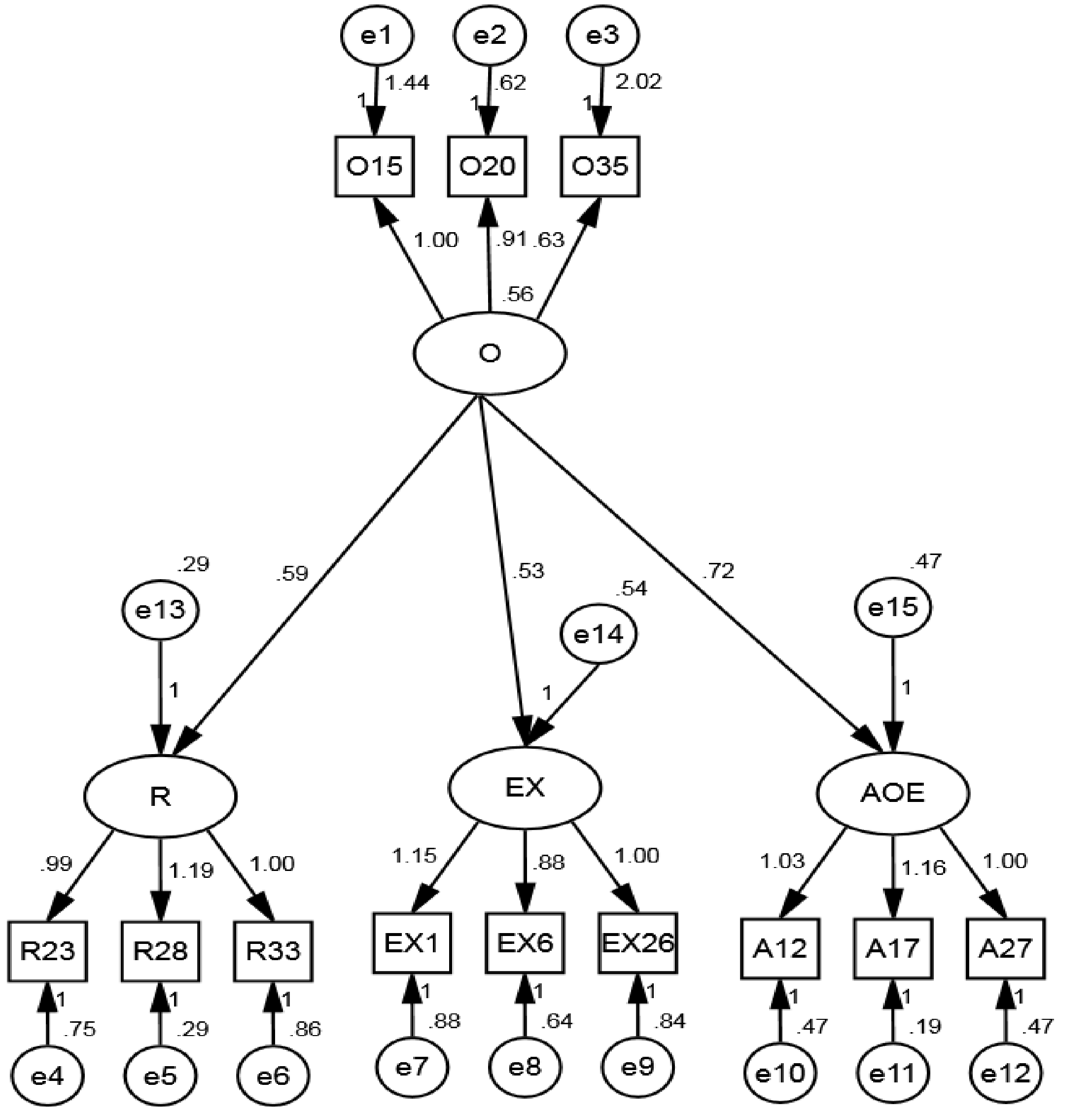
4.6 SAWS-12 CFA Findings with Openness as Antecedent Wisdom Factor

Hypothesis 3, that the Openness facet of the SAWS would be antecedent to wisdom and not a core wisdom component, as proposed by Webster (2003, 2007, 2019), was not supported. Structural equation modelling (SEM) with directional paths from Openness to the three other factors was modelled (N = 356) to test the hypothesis associated with variation in the three other factors of the SAWS-12 (as shown in Figure 4.2). Results demonstrated moderate fit χ^2 (51) = 152.17, p < .001,

χ^2/df = 2.98, CFI = .93, GFI = .93, TLI = .90, SRMR = .06, RMSEA = .08, 90% CI [0.06, 0.09]. Although this model indicates a moderate fit to the data, the CFA model with Openness as a core component of the SAWS-12 is a better fit for the observed data with a smaller χ^2 ($\Delta \chi^2_{(3)} = 29.60$, $p < .001$). This is also supported by a lower Expected Cross-Validation Index (ECVI), between the Openness component model CFA having an ECVI of .51, 90% CI [0.43, 0.62] and that for the Openness antecedent model SEM, with an ECVI of .58, 90% CI [0.49, 0.70].

Figure 4.2

Openness Distal to Wisdom with Unstandardised Estimates



Note: Squares represent observed variables, ovals represent latent variables, and circles represent error terms. O = Openness with items O15, O20, O35; R = Reminiscence/Reflection with items R23, R28, R33; EX = Experience with items EX1, EX6, EX26, and AOE = Awareness of Own Emotions with items A12, A17, A27.

4.7 CFA Findings for the Refined Four Factor SAWS-R (SAWS-12)

Hypothesis 4, that SAWS-R would demonstrate good fit indices for the data using Hu and Bentler's (1999) criteria for model fit, was supported. CFA was performed on Sample 1 (*N* = 356) to replicate the alternative four factor, 12-item SAWS model derived from Sample 2, and comprising Reminiscence/Reflection (items 23, 28, 33), Experience (items 1, 6, 26), Awareness of Own Emotions (items 12, 17, 27) and Openness (items 15, 20, 35). The variance-covariance matrices were used, where we allowed the factors to covary but we did not permit the error terms to covary. This was done because we met the assumptions of independence of error terms. Figure 4.3 presents the CFA four factor structure of the SAWS-12.

CFA results for SAWS-12 in this independent sample is presented in Table 4.4, where the findings are compared with CFA results for the parent 40-item SAWS. The SAWS-12 model explained 67.35% of the total variance, with Openness as an integral component. What was apparent from the SAWS-12 CFA findings is that the shorter model provided a better fit to the data compared to the parent 40-item measure. As recommended by DeVellis (2017), the SAWS-12 self-report questionnaire possessed the most parsimonious factor structure, and was briefer than its parent scale.

Table 4.4

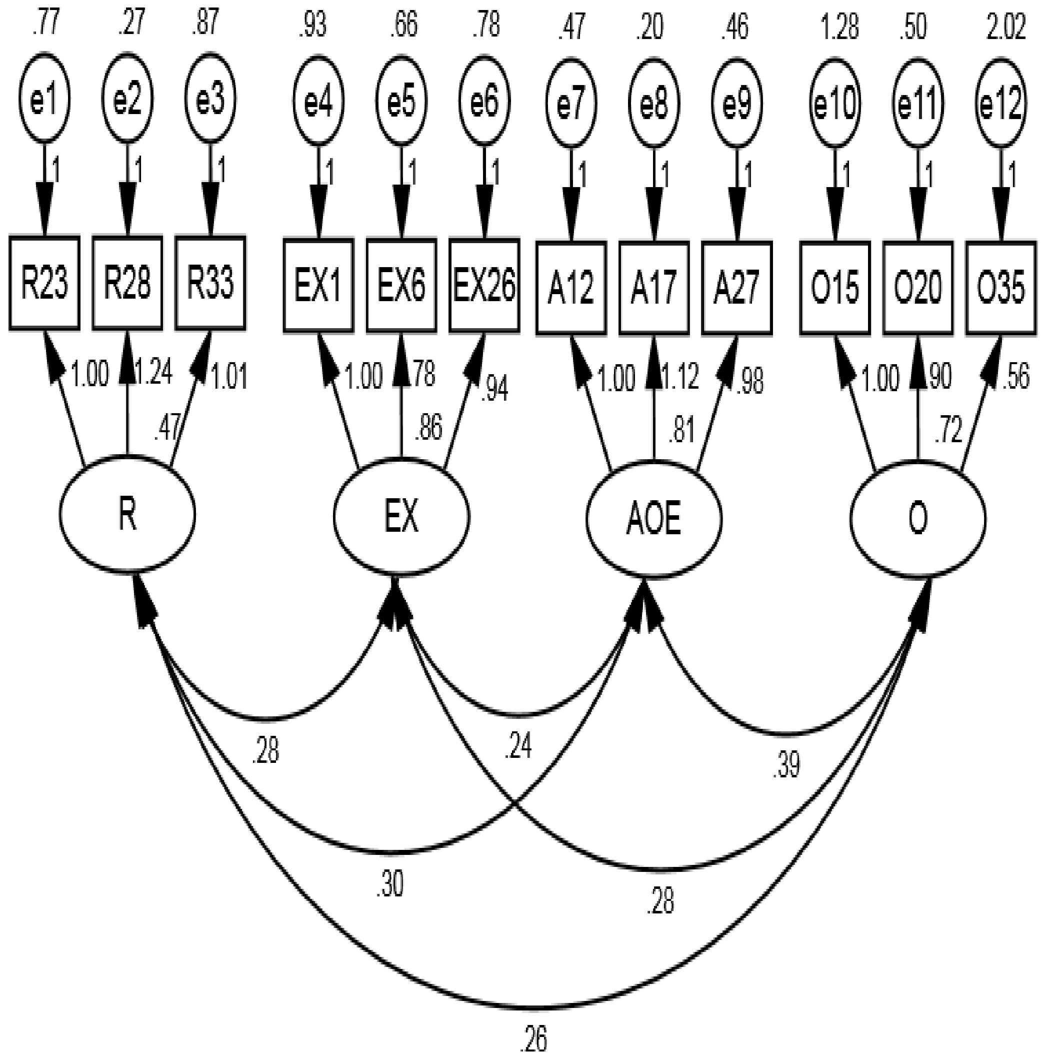
Comparative CFA for SAWS-12 and 40-Item SAWS (N = 356)

Model	χ^2	df	χ^2/df	RMSEA [90% CI]	CFI	GFI	TLI	SRMR
SAWS-12	122.57	48	2.55	.07 [0.05, 0.08]	.94	.95	.92	.05
SAWS	2133.83	730	2.92	.07 [0.07, 0.08]	.72	.74	.70	.08

Note. SAWS-12 = 12-item Self-Assessed Wisdom Scale; SAWS = 40-item Self-Assessed Wisdom Scale; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; GFI = Goodness of Fit Index; TLI = Tucker–Lewis Index; SRMR = Standardised Root Mean Residual.

Figure 4.3

SAWS-12 Four Factors with Unstandardised Parameter Estimates



Note. Ovals represent latent variables, circles represent error terms, and rectangles represent observed variables. R = Reminiscence/Reflection with items R23, R28, R33; EX = Experience with items EX1, EX6, EX26; AOE = Awareness of Own Emotions with items A12, A17, A27, and O = Openness with items O15, O20, O35.

4.8 Multigroup Measurement Invariance (MI) and Mean Wisdom Scores

The following analyses were performed on the whole sample of *N* = 709. As indicated in Chapter 3, Section 3.4, the sample was subdivided according to Erikson's (1959) psychosocial stages, as each stage is synonymous with the accomplishment of a different developmental task. To recap, the groups represented: Adolescents (15-18 years, n = 81), young adults (19-40 years, n = 396), midlife adults (41-65 years, n = 190) and older persons (66-92 years, n = 42). Gender was dichotomous (males = 1, and females = 2). *Hypothesis 5*, that the refined SAWS-R (SAWS-12) would show measurement invariance across different age groups and gender and display significant mean wisdom differences across age groups but not across gender, was partially supported.

4.8.1 The SAWS-12 Invariance Test for Age Groups

MI across age groups was supported. The fit of progressively restrictive models was compared. Model 1 tested if the baseline configural or unconstrained model was invariant across the age groups. Fit indices χ^2 (192) = 334.87, p < .001, CFI = .95, SRMR = .07, RMSEA = .03, 90% CI [0.03, 0.04] supported configural invariance, indicating suitability for metric invariance testing (Byrne, 2016).

Model 2 tested metric invariance by constraining the factor loadings across the age groups to be equal. Findings indicated good data-model fit χ^2 (216) = 358.28, p <.001, CFI = .95, SRMR = .08, RMSEA = .03, 90% CI [0.03, 0.04]. Due to the sensitivity of χ^2 to sample size and non-normality, Cheung and Rensvold (2002) recommend a ΔCFI $\leq$ .01 between two nested models would support measurement invariance. The non-significant $\Delta\chi^2$ (24) = 23.41, p = .496, and the ΔCFI =< .01 both supported metric equivalence at path coefficient level.

Model 3 tested scalar invariance by constraining item intercepts across age groups to be equal. Results indicated good model fit, χ^2 (246) = 393.29, p <.001, CFI = .94, SRMR = .08, RMSEA = .03, 90% CI [0.02, 0.03]. The $\Delta\chi^2$ (30) = 35.01, p = .242 and the ΔCFI = < .01 between Model 2 and 3 indicated that differences in factor variances and covariances are not due to age group-based differences.

Finally, in the very restrictive Model 4, full uniqueness MI was assessed. All residual variances were fixed to be equal across age groups, namely, the explained variance for every item is the same across the four age groups. Findings indicated that invariance of the residuals was not met, χ^2 (282) = 486.44, *p* <.001, CFI = .92, SRMR = .09, RMSEA = .03, 90% CI [0.03, 0.04]. The $\Delta\chi^2$ (36) = 93.15, *p* < .001 and the ΔCFI = .02. However, full uniqueness MI is not necessary when comparing group means as long as configural, metric, and scalar invariances have been established (Bialosiewicz et al., 2013; Milfont & Fischer, 2010).

4.8.2 SAWS-12 Invariance Test for Gender

MI across gender was also supported. Model 1 tested if the baseline unconstrained configural model was invariant across gender. The fit indices χ^2 (96) = 208.38, *p* < .001, CFI = .96, SRMR = .06, RMSEA = .04, 90% CI [0.03, 0.05] supported configural invariance.

Model 2 tested metric invariance by constraining the factor loadings across gender to be equal. Findings indicated good data-model fit χ^2 (104) = 217.03, *p* <.001, CFI = .96, SRMR = .06, RMSEA = .04, 90% CI [0.03, 0.05]. The non-significant $\Delta\ \chi^2$ (8) = 8.64, *p* = .373, and the ΔCFI < .01 both supported metric equivalence at path coefficients level.

Model 3 tested scalar invariance by constraining intercepts across gender to be equal. Results showed good model fit χ^2 (114) = 236.66, *p* <.001, CFI = .95, SRMR = .07, RMSEA = .04, 90% CI [0.03, 0.05]. The $\Delta\chi^2$ (18) = 28.27, *p* = .058. The ΔCFI = .01 between Model 2 and 3 showed differences in factor variances and covariances are not due to gender differences.

Finally, in the very restrictive Model 4, full uniqueness MI was assessed. All residual variances were fixed to be equal across gender, meaning, the explained variance for every item is the same across gender. The model fit was still good, χ^2 (126) = 264.02, *p* <.001, CFI = .95, SRMR = .08, RMSEA = .04, 90% CI [0.03, 0.05]. The $\Delta\chi^2$ (30) 55.69, *p* = .003 and the ΔCFI = .00, between Model 3 and 4. These results demonstrated that on the SAWS-12 item loadings are similar for both males and females.

4.8.3 Assumption Testing for ANOVA

Prior to conducting the factorial ANOVA, assumptions were tested. The assumptions for ANOVA are (a) normality in relation to the distribution of residuals, (b) equality or homogeneity of variances (i.e., homoscedasticity), (c) independence of observations, and (d) absence of outliers.

4.8.3.1 Normality, Homogeneity of Variance, Independence of Measurement, and Outliers. Normality of study variables was assessed by stem-and-leaf plots, normal Q-Q plots, Detrended normal Q-Q plots and non-significant Shapiro-Wilk test ($p \geq .05$). Results indicated that the SAWS-12 scores for (a) males, and females in the 15-18 and 66-92 age groups and (b) males in age groups 19-40 and 41-65 followed a normal distribution. Regarding normality of group data, ANOVA is robust and tolerates data that is non-normal (Tabachnick & Fidell, 2019).

Homogeneity of variances was achieved, with a non-significant Levene's test (*p* = .869). In the post hoc test, Hochberg's GT2 test was employed to account for the disparity in the sample sizes between the age groups, as suggested by Field (2017). Independence of observations was assumed, since the study design did not involve participants interacting with each other (Pallant, 2016).

Outliers were assessed by inspection of boxplots. Twelve univariate outliers were identified across the four female age groups, and none in any of the male age categories. Visual inspection of the raw data showed that the responses were legitimate, with no discernible “simplistic” or “careless” responses to the questionnaire items. Thus, these cases were left in the dataset.

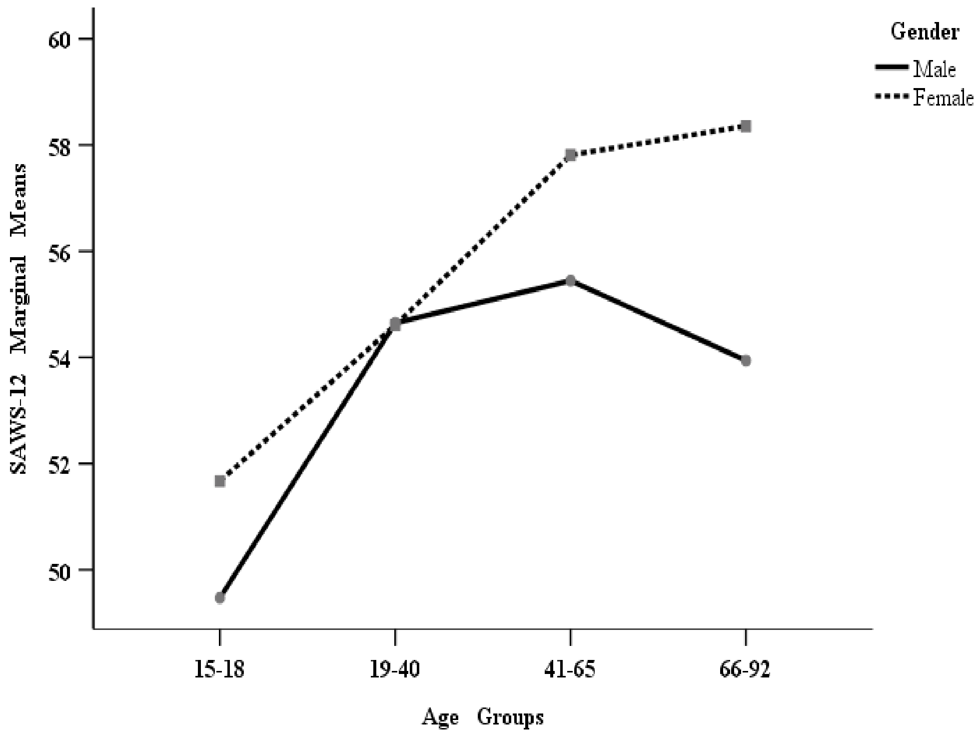
4.8.4 The ANOVA Findings

Mean wisdom differences across age groups were supported, and contrary to expectations, there were also differences in wisdom by gender. A 2 (Gender) x 4 (Age groups) factorial ANOVA was conducted at an alpha level of .05, to explore the impact of age and gender on levels of wisdom, as measured by the SAWS-12. Participants were divided into four groups according to their age (Adolescents: 15-18 year; young adults: 19-40 years, midlife adults: 41-65 years; older persons: 66-92 years). Data are mean ± standard error, unless otherwise stated. Results showed the interaction effect between age groups and gender was not statistically significant, $F(3, 701) = 1.39$, $p = .245$, $\eta_p^2 = .01$. Therefore, an analysis of the main effects for age and gender was conducted. Findings indicated the main effect for age was statistically significant, $F(3, 701) = 7.49$, $p < .001$, $\eta_p^2 = .03$, and for gender, $F(1, 701) = 5.71$, $p = .017$, $\eta_p^2 = .01$. The effect sizes were small according to Cohen’s (1988) effects for group comparisons (.01 = small, .06 = medium, and .138 = large).

Post-hoc comparisons using Hochberg’s GT2 test indicated that the mean SAWS-12 score for adolescents (*M* = 51.21, *SD* = 7.86) was significantly lower than for the other three age groups. Young adults (*M* = 54.62, *SD* = 7.99) differed significantly from the mid-life group (*M* = 57.41, *SD* = 7.68), and neither differed significantly from the older persons’ group (*M* = 56.57 *SD* = 8.09. Contrary to expectations, compared to males (*M* = 54.16, *SD* = 8.31), females (*M* = 55.35, *SD* = 8.02) scored significantly higher on SAWS-12 wisdom (see Figure 4.4). However, the magnitude of the gender difference in the means was small ($\eta_p^2 = .01$).

Figure 4.4

Mean Wisdom Comparisons for Age Groups and Gender (N = 709)



Note. The figure has been graphed by SPSS.

4.9 A Summary of Findings and Discussion from Study One

The overall aim of the current research programme was to try and clarify the complex and often inconsistent relationship between wisdom and intelligence between men and women of different age groups. To do this successfully literature recognises the importance of developing wisdom tools that have been verified in different cultures, across the adult lifespan, and measures the construct accurately (Ardelt, 2011b; Kim & Knight, 2015; Koller et al., 2017; Webster, 2003, 2007). The first aim of Study One was to validate and if necessary, refine, the factor structure and dimensionality of one of the two most popular self-assessed wisdom inventories. The purpose for this was to use the refined measure in the current research programme.

Many wisdom scholars (e.g., Alves et al., 2014; Dortaj et al., 2018; Taylor et al., 2011; Webster, 2003) have used principal component analysis (PCA) independently to evaluate the factor structure of the SAWS without verifying the model fit through confirmatory factor analysis (CFA). In the current study, CFA was applied to the SAWS 40 items. Results failed to replicate the original five factor structure of the SAWS, as the model fit was inadequate. These results are consistent with those of Fung et al. (2020), the only other researchers we found to have also applied all the SAWS 40 items to CFA. Webster (2007) validated the SAWS with CFA, using the five subscales as indicators rather than evaluating all the 40 items. Still, Webster's CFA results failed to meet the accepted criteria for adequate model fit by Hu and Bentler (1999).

To avoid overfitting or capitalising on idiosyncrasies present in a sample, protocols for validation of a measurement tool were followed (Fokkema & Greiff, 2017) and a different sample was used for CFA and exploratory factor analysis (EFA). Perhaps the most compelling finding to emerge from the analysis, is that a brief version of the SAWS, with four factors is the best fit to the data and is replicable in an independent sample. The briefer SAWS-12 showed good model fit according to Hu and Bentler's (1999) criteria.

One unanticipated finding was that the SAWS Openness dimension, which is usually viewed as a personality trait (Costa & McCrae, 1992), was found to be a basic component of wisdom. These results corroborate Webster's (2003, 2007, 2014, 2019) assertions that the SAWS Openness is a core wisdom component and not distal to wisdom as described by other wisdom scholars (Ardelt, 2011b; Glück et al., 2018).

However, the SAWS Humour facet was demonstrated not to be a core component of the measure as asserted by Webster (2003, 2007, 2019). The current findings are in accord with those of other scholars who do not consider Humour a basic component of wisdom (Ardelt, 2011b; Grossmann & Kung, 2019; Meeks & Jeste, 2009).

Another important finding was that the SAWS-12 tool was measurement invariant across age groups and gender. The suggestion is that males and females of different age groups responded to SAWS-12 questionnaire in a similar manner. This is important, given the issue of wisdom with age and gender trajectory is not clearly understood.

The research question regarding the impact of age and gender on wisdom was answered by an absence of an interaction effect between age and gender in the two-way ANOVA. The significant main effect for gender is somewhat surprising, given most contemporary Western wisdom scholarship, do not support gender differences (e.g., Ardelt, 2009; Bang, 2015; Glück et al., 2013; Moberg, 2008; Taylor et al., 2011; Webster, 2007; Webster et al., 2014). Even recently, Fung et al. (2020) found no gender differences in wisdom in their research with older Chinese persons using the SAWS, although other published non-Western studies (e.g., Cheraghi et al., 2015; Maroof et al., 2015) support gender differences in wisdom. For instance, Dortaj et al. (2018) using the 40-item SAWS in an Iranian sample of high school, university and community participants (N = 393) found that, women scored significantly higher than men on the Experience and Emotional Regulation facets of wisdom.

A possible explanation for the significant difference between gender and wisdom may partly be attributed to the very large sample size (N = 709) used in our analysis. Notably, as sample size increases, statistical power to detect small effects increase (Pallant, 2016). Yet, because the SAWS-12 was measurement invariant across gender, we can be confident that any statistically significant differences in group means, indicate true group differences (Kim et al., 2012; Millsap, 2011). Likewise, Webster (2003) found gender differences with the 30-item SAWS, with women scoring higher in a small lifespan sample of 85 adult Canadians. Perhaps, the most plausible explanation for gender differences in wisdom on the SAWS-12, might relate to the way wisdom is conceptualised by different measures. Specifically, the noncognitive emphasis of the SAWS and SAWS-12 might help to explain the observed gender differences. Some scholars posit that men may have cognitive advantages, while women may have advantages in intrapersonal domains (Baden & Higgs, 2015). Ardelt (1997) for example, found that, "...Wisdom for men is more strongly characterized by cognition and less by affect than for women" (p. 19). As SAWS-12 and its parent measure are comprised, in part, by an explicit affective, but not an explicit cognitive dimension (Webster, 2003), it is thus unsurprising that, women would score higher on this measure of wisdom. Still, the current results show that both the effect size and unit difference in gender scores are small, indicating that, although these gender differences are theoretically and statistically significant, the one-point difference in wisdom between genders in the current study is not seen as practically meaningful.

Regarding age and wisdom, adults of all ages whether young, midlife or old are wiser than adolescents on the SAWS-12. However, this relationship does not follow a linear incremental progression across the lifespan, but rather shows that although young adults differ in wisdom from midlife adults, these two groups are similar in wisdom to older persons. Interestingly, even though adolescents' mean wisdom scores are the lowest of the four groups examined, adolescence is a time of rapid wisdom acquisition (Inhelder & Piaget, 1958; Pasupathi et al., 2001; Richardson & Pasupathi, 2005). Including adolescents in the current study was vital for our continued understanding of wisdom–age development. Although the current findings are inconsistent with some other previous wisdom researchers who have either found no age effects with wisdom (e.g., Ardelt, 1997, 2010; Mansfield et al., 2010; Moberg, 2008; Taylor et al., 2011; Webster, 2003, 2007; Zacher et al., 2015), or declining wisdom with age (Ardelt, 2003), they are in accord with contemporary wisdom and ageing scholarship. Many authors found midlife adults as top wisdom scorers while young and older persons scored at the same average level (Ardelt et al., 2018; Thomas et al., 2017; Webster et al., 2014). The association between wisdom and age can only be fully examined with longitudinal data, it seems the effect sizes found in the differences between age groups and wisdom, although in the small range according to Cohen (1988), are larger than the gender effects and are theoretically and practically meaningful. Theoretically, although wisdom is not expected to be linearly related to age, we still expect adolescents to score lower than the rest because in practical terms, as Kekes (1983) assets, it takes time to resolve one's critical life experiences before wisdom can actualise (Glück, 2019).

4.10 Brief Conclusion of Study One

To conclude, it was fortuitous that the validation of the SAWS resulted in a briefer wisdom measure. As argued in the literature review, there is a paucity of short reliable wisdom measures for researchers to use, especially in those cases requiring brief tools, such as in longitudinal studies. Shorter scales are easier to use in large scale research programmes and in clinical and educational settings. A brief wisdom questionnaire, which is interpreted in a similar manner by men and women of different age groups, will provide insight into our understanding of the age–wisdom and gender–wisdom trajectories. The inclusion of adolescents in the current study was important as Richardson and Pasupathi (2005) note that, “Empirical work that directly addresses wisdom in adolescence is sparse” (p. 150). While clearly more research on this revised SAWS-12 version is needed, this revision is a step in bringing one of the most commonly used measures of wisdom in line with our evolving understanding of the concept of wisdom, thus strengthening the psychometric qualities of the scale.

As identified in this study, to strengthen the reliability of the SAWS-12, the measure (and others) will be the subject of Study Two. Given that self-report measures have been associated with social desirability responding (SDR; Paulhus, 1991) including an SDR indicator in Study Two is desirable. An SDR indicator will be useful in assessing discriminant validity (Paulhus, 1991) of the SAWS-12 and should not be correlated with wisdom (Taylor et al., 2011; Thomas et al., 2019; Webster et al., 2011). Furthermore, incorporating another brief established wisdom measure, such as the 3D-WS-12 (Thomas et al., 2017), the SAWS-12 is expected to correlate more strongly with this other wisdom indicator than with measures of intelligence which are believed to be distinct from wisdom. Study Two will contribute to understanding the stability of SAWS-12 in addition to investigating associations with intelligence variables, demographics, and correlates of wisdom and intelligence such as education. Chapter 5 will start by outlining the methodology used in Study Two.

Chapter 5–Part II

Methods–Study Two

5.1 Introduction

The present chapter presents methodology used in Study Two. The following sections outline the process, starting with the (a) justification for the methodology and alternative methodology, (b) study design, (c) participants, (d) procedure, (e) measures, (f) data analysis strategy, and (g) sample sizes. The chapter closes with a summary, conclusion, and an introduction to Chapter 6 where Study Two results are presented.

5.2 Justification for Methodology

Chapter 3 specifically argued for the methodological justification used to research the wisdom construct in Study One, which likewise applies to Study Two. Turning to potential methodological concerns regarding assessing intelligence, a variety of methods have been developed and introduced to measure this construct. Each has its advantages and limitations.

Traditionally, cognitive studies have been performed in laboratories or with pen and paper assessment methods. Such assessments, in the field of intelligence, have the same shortcomings previously discussed in Chapter 2, exemplified by the Berlin Wisdom Paradigm (BWP) given that they also involve costly resources and usually include smaller samples. Advantages of online self-assessed intelligence data collection methods are comparative to self-report assessments for wisdom, as they are simple to deliver and provide practical, inexpensive means of collecting data.

Noteworthy is that online assessments of fluid intelligence (G*f*) usually occur without issue. For an example, questions in self-reported measures, such as those used in the current thesis, may employ a “Letter Series” (LS). Scenarios involving

LS rely on the respondent using foresight and planning to discover the rule to logical problems, as such, are not subject to dishonesty. However, measuring crystallised intelligence (G*c*) in the form of vocabulary in self-administered questionnaires has limitations, as it introduces the possibility that participants can access correct responses from the internet, dictionaries, or other sources. When Abdi (2016) examined the validity of a web-based, self-rating checklist assessment of vocabulary knowledge, using a sample of university undergraduate students (N = 159), the researcher demonstrated that results were similar to those reported by Ackerman and Ellingsen (2014), who assessed vocabulary with pen and paper on a sample of college students (N = 193). Furthermore, when Hartshorne and Germine (2015) compared data from a large internet sample of participants (N = 48,537) to normative data from standardized IQ and memory tests, findings converged. The scholars, demonstrated that internet-based cognitive data reliably yielded comparable results to lab or pen and paper traditional methods. Hartshorne and Germine also assessed vocabulary using a 20-question multiple choice test with increasing difficulty through the internet. The authors reported that, vocabulary scores increased with age, supporting pen and paper and lab-based vocabulary assessments (Salthouse, 2019; Schaie, 2016). The same method will be applied in Study Two, but with 40 multiple choice questions.

Indeed, when Meyerson and Tryon (2003) evaluated the psychometric equivalency of web-based research, findings indicated that internet studies produced equivalent results to previously published non-internet data. Factors such as computer administration and uncontrollable administration settings did not appear to affect findings. Meyerson and Tryon concluded that, “Data collection on the Web is (1) reliable, (2) valid, (3) reasonably representative, (4) cost effective and (5) efficient" (p. 614). Overall, the indication is that, online self-assessment of intelligence variables is a legitimate methodological design, capable of producing results on par with those from pen and paper or lab-based traditional methods.

5.2.1 Alternative Methodology

A mixed methods approach was considered an alternative methodology. For example, engaging focus groups to discern the groups' understanding of the differences between wisdom and intelligence. The focus groups' implicit understanding of the wisdom and intelligence constructs would then be compared with that of an explicit panel of Delphi experts. Limitations of focus groups include, the samples are usually small and non-representative therefore results cannot be generalised (Mansell et al., 2004) to the wider Australian setting. Furthermore, utilising this methodology may limit the opportunity to hear the voices of those participants with opposing views or individuals who may be relatively quiet within group discussions (Mansell et al., 2004). Delphi methodology also has limitations three of which are (a) limited generalisations since a different panel of experts may reach alternative conclusions, (b) a high level of commitment is required from panellists and (c) drop-out rates are often high (Goodman, 1987; Sackman, 1975).

Consequently, the best method to adopt for the current investigation was to use self-report quantitative measures. Quantitative measures would usefully supplement and extend the knowledge of the SAWS-12 measure constructed in Study One. By employing the quantitative approach, answers to the research questions could be obtained within a reasonable timeframe without compromising the study. A clear advantage of the cross-sectional survey design is that adequate data can be collected to satisfy *an a priori* sample size requirements for the various analyses performed in Study Two.

5.3 Study Design

Consistent with Study One, Study Two employed a cross-sectional survey design in an Australian setting. Items measuring wisdom and intelligence were self-assessed. Data were collected from an on-line survey, which comprised a battery of instruments.

5.4 Participants

The initial convenience sample consisted of 461 cases. Four respondents had age related discrepancies. One participant was born in the 1980s. Two respondents reported that they were born in 1905, and one did not state her age. These participants' data were deleted, as age was integral to the current research. The final sample (N = 457, M_{age} = 35.19, SD = 17.45; age range = 16–87 years) included 115 men and 342 women. The ethnic identity of respondents indicated that 88.40% were White, 3.30% Asians, 2.20% Aboriginal or Torres Strait Islanders, 1.10% Africans and 5% identified other ethnicities. The overall self-rated health of participants on a 10-point scale (1= poor, and 10 = excellent) was above average (M = 7.47, SD = 1.69). Overall, the sample was well educated according to the Australian education system as they had completed at least 12 years of study (M = 14.46, SD = 2.87). Most of the participants (92.80%) spoke English as their first language, and 12.30% were retirees.

Table 5.1 summarises demographic characteristics of the sample. The large sample (N = 709) for Study One, permitted age to be categorised according to Eriksonian four developmental stages. However, despite 12 months of data collection, the current sample (N = 457) did not reach the same sample size as Study One dataset, therefore, was not conducive to the same four age categorisations.

Table 5.1

Participant Characteristics (N = 457)

Characteristics	Frequency	Percentage
Age		
16-29	220	48.14
30-59	177	38.73
60-87	60	13.13
Gender		
Male	115	25.20
Female	342	74.80
First language English		
Yes	424	92.80
No	33	7.20
Education level		
1-12 years	106	23.20
13-14 years	142	31.10
15-16 years	131	28.70
17-18 years	44	9.60
19-20 years	22	4.80
21+	12	2.60
Retired		
Yes	56	12.30
No	401	87.70

Note. In the Australian education system, the completion of year 12 = 12 years of education.

Although there are many theories regarding an adequate sample size for MANOVA, Tabachnick and Fidell (2019) offers that at least 20 cases per a cell are required for robustness. With multiple cells required in the current factorial MANOVAs, three age categories were deemed acceptable. Although the samples in the age groups were unequal, the current age categories closely aligned with common age groups employed within psychological research.

5.5 Procedure

5.5.1. Ethical Considerations

Prior to commencing the study, ethical clearance was sought from the University of Southern Queensland (USQ) approval number (H15REA186[B3]). As per Study One, non-student respondents were required to be 18 years or older, but USQ students enrolled in the introductory psychology course, could be as young as 15. To reach an a priori determined sample size requirement for the Study Two analyses, potential participants were recruited from July 2017 to July 2018. Participants were sourced through local newspaper advertisements, social media outlets (e.g., Facebook and Twitter) and local community groups, such as, senior citizen clubs. USQ staff and student participants were recruited by word of mouth. Psychology students participated for two course credits. No incentives were offered to other potential respondents.

Participants were invited to access the questionnaire on the internet via a link which was presented in various media, such as, the local newspaper and on Facebook. Potential participants could request a printed version of the questionnaire, which was posted to them with a reply-paid envelope. The questionnaire was estimated to take 60 minutes to complete. Participation was voluntary and anonymous, although some participants provided limited information regarding their choices on the wisdom questions to receive appropriate feedback. When inviting participants, the purpose of the research was clearly explained on the survey front page before viewing the questionnaire. Informed consent for online participation was tacit when participants accessed the questionnaire after reading the information sheet. For the printed questionnaire, participants had to sign a consent form which was returned with the completed survey.

5.6 Measures

5.6.1 Demographics

In line with Study One, potential respondents were administered an online survey questionnaire to collect general demographic data. Participants were asked their age, gender, country of birth, where they were raised, country of domiciliary, ethnicity, and years of education. Respondents were then asked whether or not English was their first language, what their occupation was, or if retired, their previous occupation. Finally, participants were asked to rate their health on a scale of 1–10 (1 = poor, 10 = excellent).

5.6.2 The SAWS–12

One of the two measures for assessing wisdom was SAWS-12, an abbreviated version of Webster's (2007) SAWS which was empirically derived in Study One. The 12-item questionnaire measures four dimensions of personal wisdom: Reminiscence/Reflection, Experience, Awareness of Own Emotions and Openness (see Appendix B). Participants were asked to consider a series of statements. For example, from the subscale of Reminiscence/Reflection "*I often find memories of my past can be important coping resources*". From the Experience dimension "*I have lived through many difficult life transitions*", from the Awareness of Own Emotions subscale, "*I am "tuned" in to my own emotions*" and from the

Openness subscale "*I often look for new things to try*". Each of the SAWS-12 subscales is made up of three positively framed questions to be rated with a 6-point Likert-type scale from (1 = "*strongly disagree*" to 6 = "*strongly agree*"). Responses are summed up to obtain a total wisdom scale score, ranging from 12-72. High scores are indicative of high levels of wisdom. From Study One, the SAWS-12 reported good reliability ($\alpha = .80$). Exploratory and confirmatory factor analyses supported a four-factor structure.

The SAWS-12 correlated highly with the 40-item SAWS parent scale (r = .90). The correlation between the two measures total wisdom scores when corrected for item overlap, was still high (r = .79). The indication is that, in general, the SAWS-12 is a good measure of the wisdom construct conceptualised by Webster's (2007) SAWS. To avoid problems associated with multicollinearity and singularity, only the SAWS-12 measure was included in Study Two analyses.

5.6.3 The 3D-WS-12

The second wisdom measure used in Study Two, was the Three-Dimensional Wisdom Scale-12 (3D-WS-12; Thomas et al., 2017). The 3D-WS-12 is a short form of the Three-Dimensional Wisdom Scale (3D-WS; Ardelt, 2003). The brief measure includes four items each on the Cognitive, Reflective and Affective, dimensions of wisdom. The 3D-WS-12 inventory is presented in Appendix C. One item from the Reflective, and two from the Affective subscales are reverse scored. A sample item from the Cognitive subscale "*A problem has little attraction for me if I don't think it has a solution*", from the Reflective dimension "*When I look back on what has happened to me, I can't help feeling resentful*" and from the Affective subscale "*I'm easily irritated by people who argue with me*". Responses are self-rated with five options (*1 = Strongly agree or definitely true of myself* to *5 = strongly disagree or* *not true of myself*). Reverse worded items are recoded and responses are summed up to obtain a total wisdom scale score which could range from 12-60. The scale developers Thomas et al. (2017) reported adequate reliability for the total 3D-WS-12 ($\propto$ = .73). The 3D-WS-12 correlated highly with the parent 3D-WS (*r* = .70). Thomas et al. (2019) reported an α = .66 for the 3D-WS-12. The reliability for the total scale calculated for the current study was ($\propto =$ .74).

5.6.4 Crystallised Intelligence (Gc)

The Shipley Institute of Living Scale (SILS; Shipley, 1940, 1953) is designed to assess general intellectual functioning in adults and adolescents. The SILS has a vocabulary sub-scale (SILS-V) that was used in the current study to assess crystallised intelligence (see Appendix D). The SILS is a 40-item multiple-choice measure that asks participants to choose one word out of four which is most like the prompting word. Five words are organised on a single line with the target word in capital letters, followed by four answer choices. The instructions state that the participants are to select the correct word and if they do not know the correct choice, they are to guess. As an example, item-11 reads: “MERIT” deserve, distrust, fight, separate. The correct response in this example is “deserve”. The prompting vocabulary ranges in degrees of difficulty, from target words such as “TALK” and “PERMIT” to “JOCOSE” and “LISSOM”. Total scores could range between 0-40. Shipley (1953) reported the SILS-V, had a split-half reliability of ($\propto$ = .87). Lodge (2013) reported high correlations between the SILS-V with WAIS-IV vocabulary subtest (*r* = .77). For the current study, the calculated Kuder-Richardson reliability index was (KR20; = .87).

5.6.5 Fluid Intelligence (Gf)

Fluid intelligence (G*f*) was measured by the Letter Series (LS; see Appendix D) subscale of the Schaie–Thurstone Adult Mental Abilities Test (STAMAT; Schaie, 1985). LS is a 10-item inductive reasoning tool, used to measure fluid intelligence. The measure involves the solution of logical problems with foresight and planning. Participants are asked to study a series of letters, (e.g., *a b a b a b a b*) and decide which letter should come next by choosing from an option of five letters (*a b c d e*). The letters in the row form a series based on a rule. The problem is to discover the rule and identify the letter that should come next in the series, for example, the series goes like this: (*ab ab ab*). The next letter in the series should be (a) in the case illustrated. Two practice examples with answers are provided. Scores could range between 0-10. The LS is a valid and reliable measure of inductive reasoning, ∝ = .77, and has been utilised for many years in the long running Seattle Longitudinal Study (SLS; Schaie, 1958). The LS has shown strong correlations with similar *Gf* measuring tools, such as the ADEPT Letter Series (Blieszner et al., 1981), *r* = .78. For the current study the calculated KR20 = .77.

5.6.6 The M–C 2 (10)

The measure is a 10-item short form of the 33-item Marlowe–Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960). The M–C 2 (10) scale was developed by Strahan and Gerbasi (1972) to assess a person's tendency to obtain approval by responding to questions in a socially desirable manner. A true–false response format is utilized presenting an equal number of positively and negatively framed items. Sample of a positive item, *"There have been times when I was quite jealous of the good fortune of others*." An example of a negative item, "*I would never think of letting someone else be punished for my wrong doings".* The M–C 2

(10) correlated well with the M–C 1 (10), another 10-item short form of the MCSDS (r = .55-.75). Correlations between the M–C 2 (10) and the 33-item scale were high (r = .80-.90). Scores for the M–C 2 (10) could range from 0-10. KR20 for four diverse subject compositions which were employed during the construction of the measure showed coefficients of .62, .75, .49, and .62.

For the current sample the calculated KR20 = .57 suggests a low level of internal consistency. Attempts to improve the scale involved assessing the point-biserial inter-item correlation coefficients for the 10 dichotomous items of the M–C 2 (10). Apart from one pair of items, the inter-item correlations were all very low (< .30; range = .00 to .24). Briggs and Cheek (1986) recommended that the best range for inter-item correlation is .20 to .40. The removal of any item from the scale did not improve the KR20. Although some researchers (Hair et al., 2014) indicate that one can accept reliability values near .60, it was decided an a priori to follow the minimum reliability coefficient of .70 commonly accepted by other scholars (DeVellis, 2017; Nunnally, 1993). Since the minimum reliability coefficient was not attained in the current sample, the M–C 2 (10) was considered unreliable and not included in further analyses.

He et al. (2015) suggested that the MCSDS could be improved by (a) avoiding ambiguous meaning in items, (b) simplifying item structure, (c) formulating items positively to prevent artefacts through negation in item keying, and (d) by updating redundant and outdated language of some items. The suggested upgrades would be especially relevant in culturally diverse groups. They proposed changing statements such as (a) *“There has been times when I was quite jealous of the good fortune of others.”* to read *“I am jealous of others with good fortune.*”, or (b) changing negative statements such as, *“I would never think of letting someone* *else be punished for my wrongdoings.*” to “*I let someone else be punished for my wrongdoings”.* The five-decades’ old language of the M–C 2 (10) might prove challenging for today’s youths to interpret.

It was disappointing not to be able to incorporate the M–C 2 (10) tool in Study Two, for several reasons. Paulhus (1991) proposed, the use of socially desirable responding scales would represent a test for discriminant validity. Therefore, in the current study, M–C 2 (10) would have aided in adding to the discriminant validity of the newly developed SAWS-12. Secondly, because self-assessed wisdom measures have also been subject to socially desirable biased responding, the M–C 2 (10) would have gone some way in illuminating whether the SAWS-12 and the 3D-WS-12 responses were contaminated by SDR for both men and women of differing age groups. Attempts to “look good” can confound and compromise the validity of the research findings (Field, 2017), especially for a highly desirable commodity such as wisdom.

5.7 Data Analysis Strategy

To further clarify the relationship between wisdom, intelligence, age and gender, answer study questions and test hypotheses, Study Two replicated some analyses from Study One. The reliability and validity of a measurement tool is closely associated with scores obtained from a specific sample at a given time. With a new measure such as the SAWS-12, replication in a different population is considered necessary and one of the most valuable tools for verification in the sciences (Schmidt, 2009). If findings are replicated across independent datasets, there is increased confidence in the results.

Analyses were conducted in consecutive stages. In the first step, Pearson’s correlations explored the study variables. Stage two enriched model fit findings for

SAWS-12 reported in Study One, by comparing SAWS-12 factor structure with that of 3D-WS-12 via CFAs. Third, we begun to explore the overarching research question, “How is wisdom and intelligence influenced by age and gender? Stage four explored intelligence and how the construct differs from wisdom through multivariate analysis of variance (MANOVA), quadratic analyses and hierarchical multiple regression. Finally, stage five employed mediation and moderation analyses to further highlight the relationships between wisdom and intelligence.

5.8 Sample Sizes

Sample size recommendations and various rules of thumb differ depending on the analysis being performed. As such, sample sizes will be presented individually for each analysis. Sample sizes were determined an a priori either from rules of thumb or through power analysis.

5.8.1 Sample Size for Correlations

Whilst correlation estimates are considered inaccurate in small sample sizes, with increasing sample sizes they approach population values (Schönbrodt & Perugini, 2013). Schönbrodt and Perugini (2013) conducted several Monte-Carlo simulations to determine the critical sample size when correlations estimates became stable. They found that correlations stabilised at a sample size of 250. The sample size of N = 457, was considered more than adequate to calculate Pearson’s product moment correlation coefficients between the variables for this study.

5.8.2 Sample Size for CFA

In keeping with Study One, sample size for CFA in Study Two was determined an a priori. For SAWS-12, an a priori sample size calculator for structural equation models (Soper, 2020) estimated to achieve $\beta = .20$, at $\alpha = .05$ and detect a medium effect size (.30) with four latent variables and 12 indicators, would require a sample size of N = 137. For the 3D-WS-12, which has three latent variables and 12 indicators the estimated sample size was calculated to be N = 119 participants. The sample of N = 457 was therefore deemed adequate for the CFAs.

5.8.3 Sample Size for Two–Way ANOVA and Factorial MANOVA

As a prerequisite for adequate statistical power for the 2 (gender) x 3 (age groups) comparison of means, a power analysis (α = .05, β = .20) to detect a medium effect size (.25) was conducted utilising G*Power 3.1.9.2 (Faul et al., 2009). A sample size of N = 158 was recommended. The sample size of N = 457 in this study was more than adequate for performing the factorial ANOVA. Regarding sample size for two-way MANOVA, a minimum of 20 cases per cell was employed as recommended by Tabachnick and Fidell (2019) as reported in the participants' Section 5.4.

5.8.4 Sample Size for Hierarchical Multiple Regression

Tabachnick and Fidell (2019) recommends that the sample size for hierarchical multiple regression should be calculated by taking into consideration the number of independent variables, where $N > 50 + 8m$, (m = number of independent variables). Using this method, the sample size for a study with five independent variables (i.e., age, gender, education, vocabulary and inductive reasoning) N = 90. The sample of N = 457 was considered adequate for the regression analyses.

5.9 Summary and Conclusion

The current chapter detailed the method and discussed measures in Study Two. Justification for utilising intelligence measures, specifically vocabulary in a self-report online questionnaire was presented. Cross-sectional survey methodology employed for Study One was retained to minimise confounds associated with changing study design. Although four age groups were utilised in Study One, three commonly used age categorisations in psychological research were proposed for Study Two, due to a lower sample size and specific minimum cell requirements for factorial MANOVA, which were not feasible with N= 457 and using four age groups. Despite the potential usefulness of an SDR measurement tool in wisdom research, an argument was made in support of discarding the M–C 2 (10) from Study Two because of its suboptimal reliability in the current sample. The results of Study Two are presented in Chapter 6.

Chapter 6–Part II

Results–Study Two

6.1 Introduction

Sections within this chapter are organised according to (a) statistical analysis used, (b) data screening, (c) assumption testings, and (d) detailed reporting of findings from Study Two. For example, the SAWS-12 factor structure derived in Study One will be replicated as part of Study Two and compared with the equally brief 12-item Three-Dimensional Wisdom Scale (3D-WS-12) to establish the SAWS-12 reliability and validity as we try to elucidate further the relationship between wisdom, intelligence, age, and gender. The chapter concludes with a summary, a brief discussion of the Study Two findings and an introduction to Chapter 7.

6.2 Statistical Analysis

All work on the computer was carried out using SPSS for Windows version 26. AMOS version 26 for SPSS was used to build and test hypothesised models. Goodness-of-fit indices were based on Hu and Bentler's (1999) criteria for model fit indices in covariance structural analysis, as detailed in Chapter 3 (see Table 3.2). Statistical significance was analysed using analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), t-tests, hierarchical multiple regression, mediation, and moderation analyses as appropriate.

6.3 Data Screening

6.3.1 Range of Scores and Missing Values

Prior to statistical analyses, data were initially screened by analysing descriptive statistics. Data screening revealed four participants with anomalous age-related discrepancies and they were excluded from further analyses to allow the relationship between age and other study variables to be accurately examined. Missing values accounted for less than 5% of the dataset and Little's MCAR test was not significant, χ^2 (401) = 364.71, p = .903. As argued in Section 4.3 of Chapter 4 against multiple imputation, when applicable we used mean replacement to impute missing values.

6.4 Assumptions Testing for MANOVA

Prior to conducting factorial MANOVAs, assumptions were tested. Assumptions for MANOVA include (a) adequate sample size for each level of the independent variables, (b) independent observations, (c) normality in relation to the distribution of residuals, (d) absence of outliers, (e) linearity, (f) equality or homogeneity of variances–covariance matrices (homoscedasticity) and (g) absence of multicollinearity and singularity.

Sample size for the MANOVA was reported in Chapter 5 (Methods), Section *5.8.3*. Pallant (2016) suggests, as a bare minimum, more cases in each cell are needed than the number of dependent variables. In the current analyses, the smallest sample size suggested by Pallant was well exceeded for each cell. We adhered to the sample of at least 20 cases per cell recommended by Tabachnick and Fidell (2019), as a large sample size helps in protecting against normality violations (Field, 2017). Regarding independence of observations, the current research did not violate the assumption of independence according to Stevens (2009) or Gravetter and Wallnau (2004), as each group had different participants and no participant was in more than one group. There was no interaction between participants as neither focus groups nor Delphi panels of experts were used.

6.4.1 Normality

Normality was assessed by stem-and-leaf, normal Q-Q plots, Detrended Normal Q-Q plots and non-significant Shapiro-Wilk test of normality. Results showed that normality plots for the 3D-WS-12 indicated normal distribution, and the Shapiro-Wilk test was not significant (p = .051). The SAWS-12, SILS-Vocabulary and the Letter Series normality plots were not normally distributed. The Shapiro-Wilk test for these three variables was also significant. Although significance tests of MANOVA are based on the multivariate normal distribution, Tabachnick and Fidell (2019) posit that, a sample size of at least 20 cases per cell ensures the robustness of MANOVAs. For the MANOVA analyses in this study, each cell had at least 20 cases.

6.4.2 Univariate Outliers

Data were screened for univariate outliers, using a cut off Z-score of ±3.29, p < .001, two-tailed (Pallant, 2016). No univariate outliers were observed for either the SAWS-12 or the 3D-WS-12. Two univariate outliers were found in the SILS–Vocabulary where two young adults had very low scores. On the inductive reasoning test (LS) there were seven outliers. One of the low scorers on the LS was also an outlier on the vocabulary test. The cases were left in the dataset as scrutiny of the raw data indicated the scores were legitimate.

6.4.3 Multivariate and Residual Outliers

MANOVA, assumes multivariate normality. This was tested indirectly by assessing Mahalanobis distances. For two dependent variables the critical cut off value is 13.82. Seven multivariate outliers were detected. Six of these were in age group 1 (16-29 years). Consecutively, the values included two outliers at 27.59, followed by 24.97, 24.24, and two values at 14.61. One individual in age group 3

(60-87 years) was an outlier with the value of 14.42. On the SAWS-12 and the 3D-WS-12 wisdom scales, only one multivariate outlier was detected in age group 1, with a value of 14.30.

Multivariate outliers are believed to potentially distort results in any direction (Tabachnick & Fidell, 2019) and according to Tabachnick and Fidell (2019), transformation of multivariate outliers can artificially distort results. Inspection of affected cases indicated that the scores were within the range of possible scores for the variables and therefore were not deleted from the dataset.

6.4.4 Linearity

Assumption of linearity was assessed by generating a matrix of scatterplots between outcome variables with gender and age categories. Matrices were separate for males and females, and the three age groups. Examination of the scatterplots of both SAWS-12 and 3D-WS-12 variables indicated that linearity was achieved. On the intelligence variables vocabulary was generally linearly related to gender in the three age groups, however fluid intelligence (G*f*) was non-linear for older females aged 60-87 years. Data transformation of the G*f* variable was envisaged. Although only the distribution of the older female fluid reasoning scores was not normally distributed, in order to resolve the problem, it would have been necessary to transform the entire G*f* variable. Transforming data in this manner can have negative consequences because while the transformation might successfully work on the G*f* with non-normal data, when applied to data that is already normal, for example, for males, the process can turn a normal distribution into a non-normal distribution (Tabachnick & Fidell, 2019). Such a possible outcome was unacceptable therefore, it was considered to accept that the power of analysis may be decreased due to deviation from linearity and proceeded with analysis.

6.4.5 Multicollinearity and Singularity

Multicollinearity and singularity were assessed using the correlation matrices and collinearity statistics. The correlation amongst the variables showed that for the wisdom variables the SAWS-12 and 3D-WS-12, $r = .34$. For the Vocabulary and the Letter Series, $r = .33$. These correlations were all > .20, but did not exceed .90, showing that there was no risk of multicollinearity (Meyer et al., 2006; Stevens, 2009). Furthermore, correlations between all variables were less than .75. Tolerance values were all above 0.20, and variance inflation factors (VIF) were all well below 10.00, also confirming that multicollinearity was not a concern (Hair et al., 2014 Menard, 1995; Meyers et al., 2016).

6.4.6 Homogeneity of Variance–Covariance Matrices (Homoscedasticity)

Due to the sensitivity of Box's M test in large samples, significance is assessed at > .001 and not >.05 (Tabachnick & Fidell, 2019). With wisdom dependent variables of SAWS-12 and 3D-WS-12, homogeneity of covariance matrices was attained with a non-significant Box's M test ($p = .010$) and Levene's tests ($p = .057$) for the SAWS-12 and ($p = .054$) for the 3D-WS-12. For the intelligence dependent variables, of Vocabulary and letter Series, homogeneity of covariance matrices was not tenable as both Box's M test ($p < .001$), and Levene's test ($p < .05$) were significant. As recommended by Field (2017), due to violations of some MANOVA assumptions, Pillai's *V* was interpreted and for post hoc tests, Hochberg's GT2 was employed due to unequal cell sample sizes. Table 6.1 depicts characteristics of the study variables.

Table 6.1

Distribution Characteristics for Measure Scores (N = 457)

Statistic	SAWS-12	3D-WS-12	LS	Vocabulary
Mean (*SE*)	54.40 (.41)	41.93 (.29)	8.78 (.09)	31.90 (.26)
Skewness (*SE*)	-.56 (.11)	.06 (.11)	-2.09 (.11)	-.73 (.11)
Kurtosis (*SE*)	.31 (.23)	-.21 (.23)	4.56 (.23)	.90 (.23)
Range (min, max)	46 (26, 72)	34 (24,58)	10 (0,10)	35 (5,40)

Note. SAWS-12 = Self-Assessed Wisdom Scale-12; 3D-WS-12 = Three-Dimensional Wisdom Scale-12; LS = Letter Series. Standard errors (*SE*) are displayed in parentheses.

6.5 Assumption Testing for Hierarchical Multiple Regression

Assumptions are often presented for different statistical procedures. However, because we are fitting variations of the linear model to the data, regression and MANOVA have the same basic assumptions which are based on normal distribution (Field, 2017). Some minor variations such as sample size for hierarchical multiple regression were reported in Section *5.8.4* of Chapter 5.

6.5.1 Bivariate Correlations

The bivariate correlations began to explore *Hypothesis 6*. The hypothesis that the revised SAWS-R (i.e., SAWS-12) would demonstrate good model fit, reliability, and different kinds of validity and that, both the derived SAWS-R, and the 3D-WS-12 would show measurement invariance across age groups and gender was partially supported. To assess the size and direction of the linear relationship between pairs of study variables, Pearson's product-moment correlation coefficients (*r*) were calculated (see Table 6.2).

Table 6.2

Correlations Between Study Variables (N = 457)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
(1) SAWS-12	(.82)					
(2) 3D-WS-12	.34**	(.74)				
(3) Vocabulary	.13**	.34**	(.87)			
(4) Letter Series	-.04	.21**	.33**	(.77)		
(5) Education	.09	.16**	.20**	.07	_	
(6) Age	.21**	.27**	.51**	.09	.34**	_
(7) Gender	.10*	.03	-.08	-.01	-.06	-.06
M	54.40	41.93	31.90	8.81	14.51	35.19
SD	8.72	6.21	5.51	1.81	2.73	17.45

Note. SAWS-12 = Self-Assessed Wisdom Scale-12; 3D-WS-12 = Three-Dimensional Wisdom Scale-12; Gender (male =1, female = 2). Reliability coefficients are in parentheses on the diagonal.

**p = <.01 (two-tailed); *p = < .05 (two tailed).

Age and education variables were continuous. Coefficients were interpreted according to guidelines for correlation effect sizes by Cohen (1988); small (r =.10–.29), medium (r =.30–.49) and large (r =.50–1.00). As reported in Table 6.2, the SAWS-12 has good reliability (α = .82) compared to 3D-WS-12 (α = .74). SAWS-12 showed discriminant validity, by demonstrating a stronger correlation with another measure of wisdom (3D-WS-12), r = .34, compared to correlates of wisdom, such as vocabulary (G*c*), (r = .13), Letter Series (G*f*), (r = -.01), education (r = .09); and demographic variables such as age (r = .21), and gender (r = .10).

Since age is an important aspect of the current study, partial correlations were run to explore the relationship between SAWS-12 and G*c*, while controlling for age. Results demonstrated that there was no significant partial correlation between SAWS-12 and G*c*, (r = .03, p = .530). An inspection of the zero-order correlation (r = .13, p = .004) demonstrated that controlling for age had a major effect on the strength of the relationship between the SAWS-12 and G*c*.

In contrast, the 3D-WS-12 showed inadequate discriminant validity as a measure of wisdom given the correlation with vocabulary (r = .34) was the same as its correlation with SAWS-12. Furthermore, there was a significant partial correlation between the 3D-WS-12 and G*c*, (r = .24, p < .001). The zero-order correlation (r = .34, p < .001) indicated that, although controlling for age had some effect on the strength of the relationship between the 3D-WS-12 and G*c*, the relationship remained significant. There was a significant partial correlation between G*f* and the 3D-WS-12, (r = .19, p < .001). The zero-order correlation between 3D-WS-12 and G*f*, (r =.20, p < .001) showed that controlling for age had very little effect on the strength of the relationship between 3D-WS-12 and fluid reasoning.

6.5.2 Comparative CFAs for SAWS-12 and 3D-WS-12

To continue with *Hypothesis 6*, SAWS-12 was submitted to CFA to try and replicate and evaluate its construct validity in a new population sample. SAWS-12 was again compared with the 3D-WS-12. Findings demonstrated that SAWS-12, in comparison to the 3D-WS-12, displayed good model fit for the data as shown in Table 6.3. SAWS-12 in this current independent sample (SAWS-12a), and in general, achieved an even better model fit indices than in Study One (SAWS-12b). What was unexpected is the very low CFI and TLI indices obtained for the established 3D-WS-12. According to Hu and Bentler’s (1999) criteria for good model fit indicates the 3D-WS-12 is an ill-fitting model for the data. Figure 6.1 presents SAWS-12 model with standardised parameters estimates compared to 3D-WS-12 shown in Figure 6.2.

Table 6.3

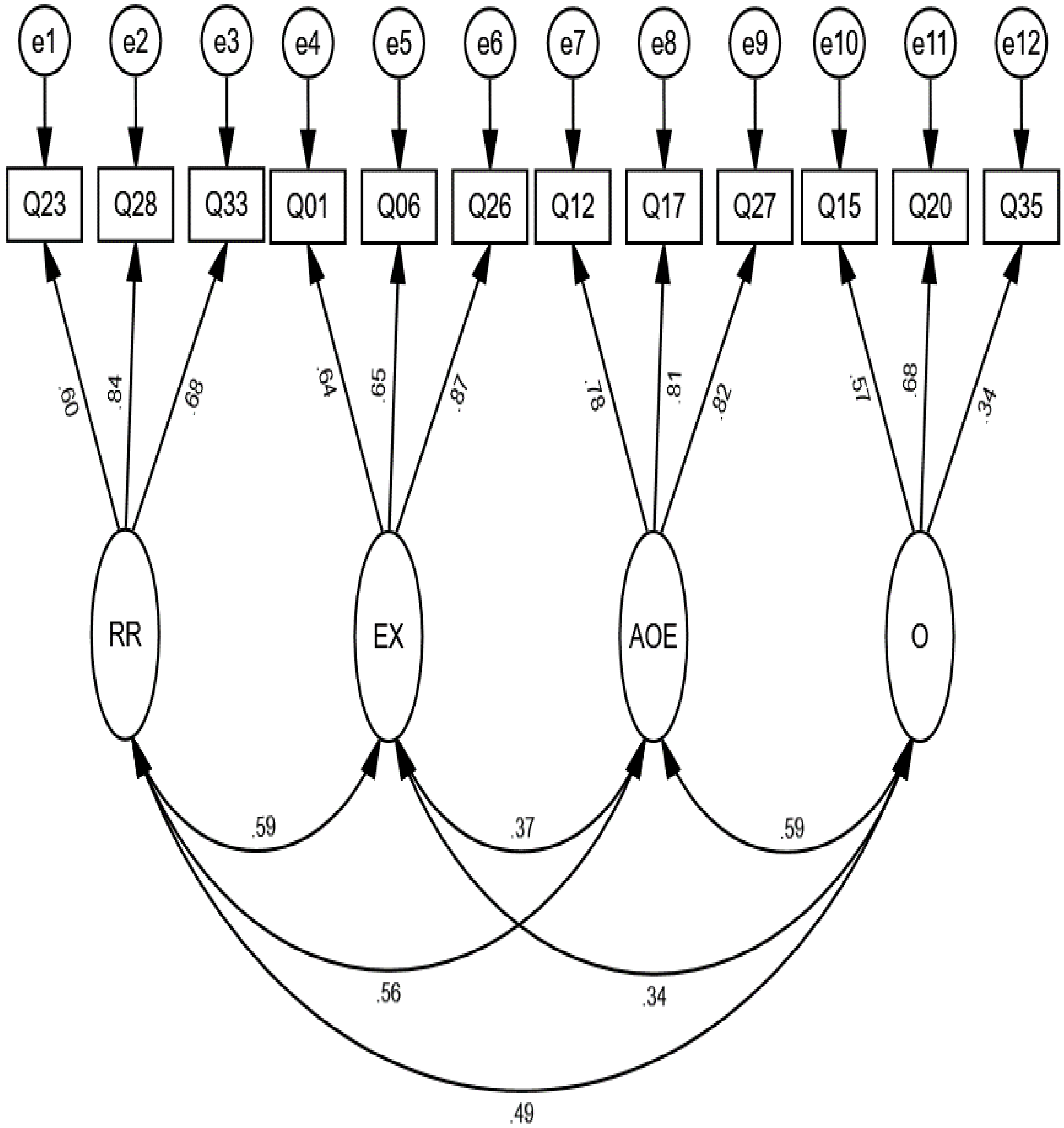
Comparative CFA Results for SAWS-12 and 3D-WS-12 (N = 457)

CFA Model	χ^2	df	χ^2/df	RMSEA [90% CI]	CFI	GFI	TLI	SRMR
SAWS-12a	110.10	48	2.29	.05 [0.04, 0.07]	.96	.96	.95	.05
SAWS-12b	122.57	48	2.55	.07 [0.05, 0.08]	.94	.95	.92	.05
3D-WS-12	242.38	51	4.75	.09 [0.08, 0.10]	.79	.92	.73	.07

Note. SAWS-12a = CFA results from Study Two for the 12-item Self-Assessed Wisdom Scale; SAWS-12b = CFA results from Study One for the 12-item Self-Assessed Wisdom Scale; 3D-WS-12 = the 12-item Three-Dimensional Wisdom Scale; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; GFI = Goodness of Fit Index; TLI = Tucker–Lewis Index; SRMR = Standardised Root Mean Residual.

Figure 6.1

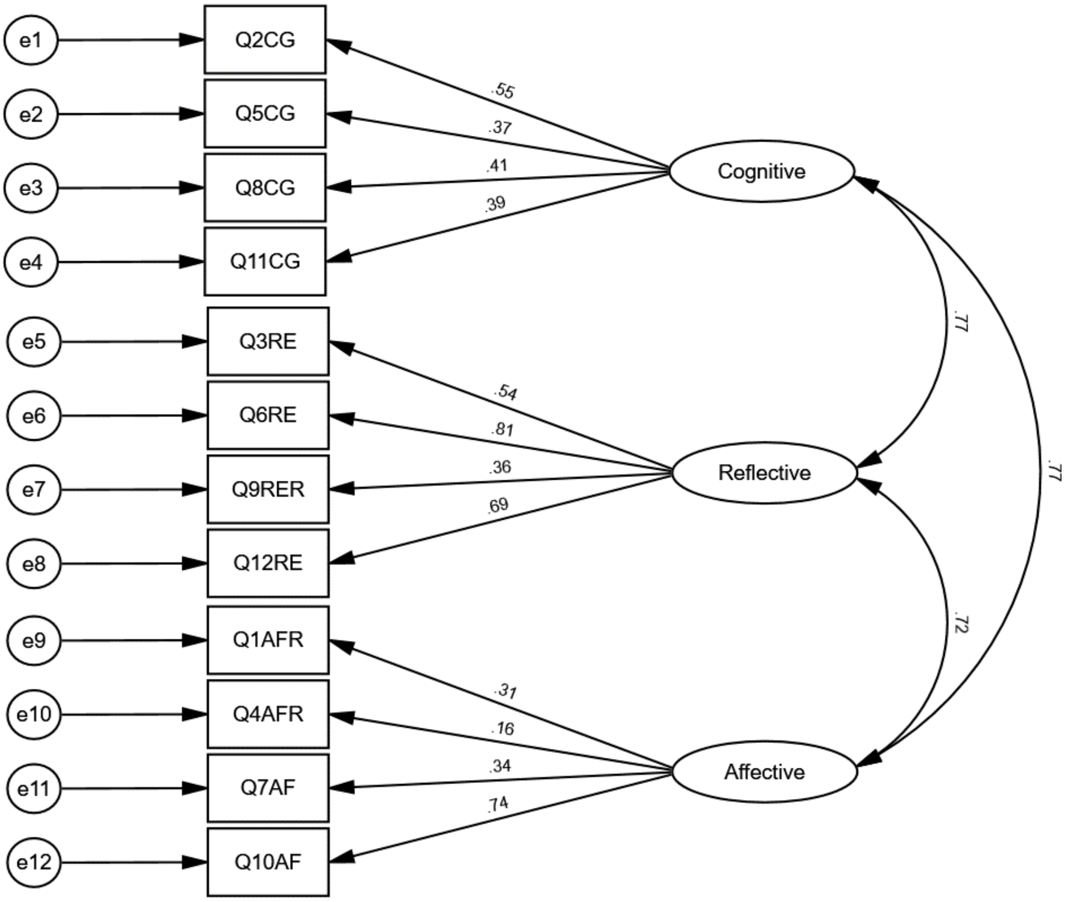
SAWS-12 Four Factors with Standardised Parameter Estimates



Note. Ovals represent latent variables, circles represent error terms, and rectangles represent observed variables. RR = Reminiscence/Reflection with items Q23, Q28, Q33; EX = Experience with items Q01, Q06, Q26; AOE = Awareness of Own Emotions with items Q12, Q17, Q27, and O = Openness with items Q15, Q20, Q35.

Figure 6.2

3D-WS-12 Three Factors with Standardised Parameter Estimates



Note. Ovals represent latent variables, circles represent error terms, and rectangles represent observed variables. Q2CG, Q5CG, Q8CG, Q11CG = Cognitive items, Q3RE, Q6RE, Q9RER, Q12RE = Reflective items; Q1AFR, Q4AFR, Q7AF, Q10AF = Affective items.

6.5.3 Measurement Invariance (MI) for SAWS-12 and 3D-WS-12

The study compared MI for SAWS-12 and the 3D-WS-12, findings are presented in Table 6.4. SAWS-12 attained MI at the scalar level with age groups and gender, in support of *Hypothesis* 6, with good model fit. Men and women of different age categories interpret the SAWS-12 measure in a conceptually similar manner.

Table 6.4

Measurement Invariance for Age and Gender (N = 457)

Model	χ^2	df	χ^2/df	CFI	ΔCFI	SRMR	RMSEA, [90% CI]
Self-Assessed Wisdom Scale-12 (SAWS-12) with Age Groups							
Configural Invariance	308.89	174	1.78	.920	_	.07	.04, [0.03, 0.05]
Metric Invariance	317.43	182	1.74	.919	< .01	.07	.04, 0.03, 0.05]
Scalar Invariance	341	192	1.78	.911	.01	.08	.04, [0.03, 0.05]
Self-Assessed Wisdom Scale-12 (SAWS-12) with Gender							
Configural Invariance	190.98	96	1.99	.946	_	.07	.05, [0.04, 0.06]
Metric Invariance	205.30	104	1.97	.943	< .01	.10	.05, [0.04, 0.06]
Scalar Invariance	224.57	114	1.97	.938	.01	.10	.05, [0.04, 0.06]
Three-Dimensional Wisdom Scale-12 (3D-WS-12) with Age Groups							
Configural Invariance	345.42	153	2.26	.784		.08	.05, [0.05, 0.06]
Metric Invariance	375.86	171	2.20	.770	.01	.09	.05, [0.04, 0.06]
Scalar Invariance	401.02	183	2.19	.755	.02	.09	.05, [0.04, 0.06]
Three-Dimensional Wisdom Scale-12 (3D-WS-12) with Gender							
Configural Invariance	307.62	102	3.02	.781	_	.09	.07, [0.06, 0.08]
Metric Invariance	315.89	111	2.85	.782	< .01	.09	.06, [0.06, 0.07]
Scalar Invariance	320.34	117	2.74	.784	< .01	.09	.06, [0.05, 0.07]

Note. ΔCFI = Change in Comparative Fit Index; SRMR = Standardised Root Mean square Residual; RMSEA = Root Mean Square Error of Approximation.

However, with the 3D-WS-12, the measure achieved MI at the scalar level for gender and at the metric level for age groups in partial support of *Hypothesis 6*. The suggestion is that although men and women might interpret the survey questions in a similar manner, different age groups may well interpret the questionnaire differently. Results also demonstrated that the 3D-WS-12 displayed poor Comparative Fit Indices (CFI) in the current sample. Despite the weak and non-supportive fit indices for the 3D-WS-12, it was decided to proceed with analyses, but findings must be interpreted cautiously with this in mind.

6.5.4 Means for SAWS-12 and 3D-WS-12 with Age and Gender

Hypothesis 7 predict that there would be significant mean differences across age groups, but not gender on both SAWS-R (i.e., SAWS-12) and the 3D-WS-12, would find partial support from SAWS-12 and full support from the 3D-WS-12. A MANOVA was run to test this hypothesis instead of a regression analysis, because multiple dependent variables can be analysed simultaneously (which is more appropriate for the one-on-one comparison of SAWS-12 and the 3D-WS-12). A 2 (Gender) x 3 (Age groups) factorial MANOVA was run to examine whether the SAWS-12 and the 3D-WS-12 scores differed for men and women in different age categories. To recap, the three age categories included: Young persons (16–29 years, n = 220), midlife (30–59 years, n = 177) and older persons (60–87 years, n = 60). Gender and the age groups were the independent variables.

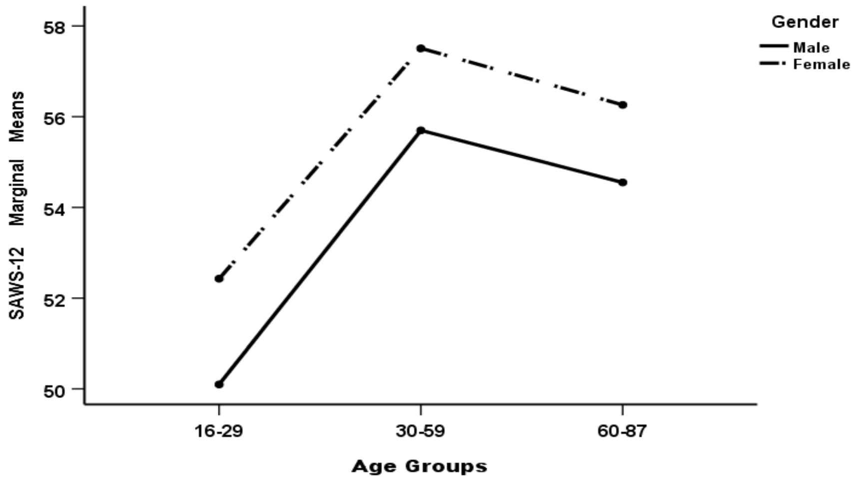
Results showed the interaction effect between age category and gender was not significant, $F(4, 902) = 1.68$, $p = .152$, Pillai's $V = .02$, $\eta_p^2 = .01$. Regarding age and wisdom, there was a significant main effect of age groups, $F(4, 902) = 11.61$, $p < .001$, Pillai's $V = .10$, $\eta_p^2 = .05$. Follow up univariate two-way ANOVA were run, with the main effect of age category considered. There was a statistically significant main effect of age group for SAWS-12 wisdom score, $F(2, 451) = 15.54$, $p < .001$, $\eta_p^2 = .06$, and also for the 3D-WS-12 wisdom score, $F(2, 451) = 13.45$, $p < .001$, $\eta_p^2 = .06$. The magnitude of both the effect sizes were moderate.

Bonferroni-adjusted post hoc tests with Hochberg's GT2 pairwise comparisons were run for the differences in mean wisdom scores between age groups. The mean SAWS-12 score for young adults (*M* = 51.88, *SD* = 9.08) was significantly lower than for the two other groups. However, the higher midlife SAWS-12 score (*M* = 57.07, *SD* = 7.55) did not differ significantly from that of the older persons (*M* = 55.77, *SD* = 8.09). For the 3D-WS-12, the mean score for young adults (*M* = 40.02, *SD* = 5.43) was significantly lower than for the two other groups. However, the lower mean of the midlife group (*M* = 43.42, *SD* = 6.64) did not differ significantly from that of the older persons (*M* = 44.53, *SD* = 5.46). The findings are depicted in Figure 6.3 and Figure 6.4.

Regarding gender and wisdom, the MANOVA was non-significant, $F(2, 450) = 1.91$, $p = .149$, Pillai's $V = .01$, $\eta_p^2 = .01$. Yet, for SAWS-12, the univariate ANOVA for gender was significant, $p = .049$, $\eta_p^2 = .01$, failing to support the hypothesis, although the effect size was small. As Figure 6.3 shows, the mean SAWS-12 score for males, (*M* = 52.97, *SD* = 8.79) was significantly lower than for females (*M* = 54.88, *SD* = 8.66).

Figure 6.3

Mean SAWS-12 for Gender and Age Groups (N = 457)

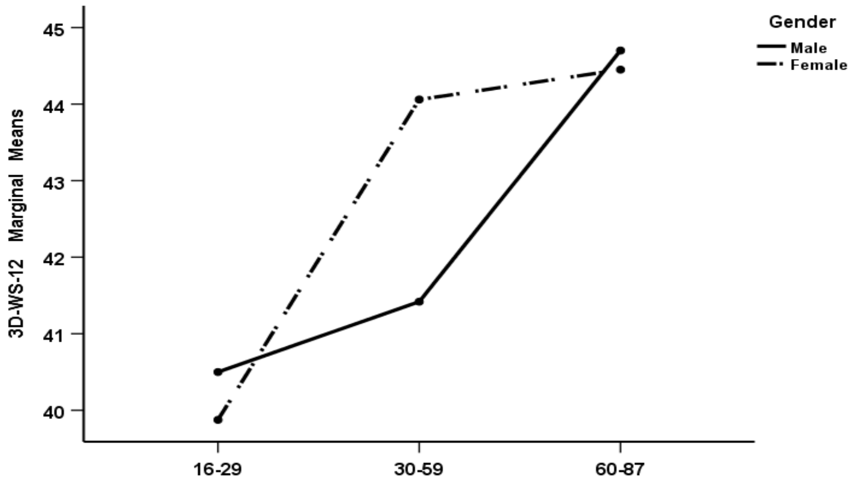


Note. The figure has been graphed by SPSS.

For 3D-WS-12, the univariate ANOVA for gender was not significant, p = .409, $\eta_p^2 = .00$, as seen in Figure 6.4. Supporting the hypothesis, the mean 3D-WS-12 score for males (M = 41.57, SD = 6.13) was not significantly lower than for females (M = 42.05, SD = 6.24).

Figure 6.4

Mean 3D-WS-12 for Gender and Age Groups (N = 457)



Note. The figure has been graphed by SPSS. It should be noted that the gender differences show a restricted range of the scores. For clarity purposes only, the perceived differences may appear greater than they actually are, and should be taken into account when interpreting this graph.

6.5.5 Comparison of Means for Intelligence with Age, and Gender

The wisdom dependent variables used in the current thesis for mean comparisons are easily amenable for incorporation in structural equation modelling (SEM) for the purpose of measurement invariance (MI) analyses. However, the crystallised (G*c*) and fluid (G*f*) intelligence variables in the form of vocabulary and fluid reasoning are generally unsuitable for such treatment. The reason is that MI is based on factor analysis whereby during CFA, each individual item on the latent variable has an error term (Byrne, 2016). For vocabulary and inductive reasoning scales, participants could only pick one of four or five proffered options, meaning, there is a “zero-sum” problem. Picking one item means all the other items will not be picked, factor analysis and CFA are not applicable as there is no shared variance.

The SILS vocabulary (Shipley, 1940, 1953) used in the current study has been normed in men and women of different age groups, and highly correlates with the “gold standard” WAIS-IV vocabulary subtest (Lodge, 2013). Regarding the G*f*, inductive reasoning measure, which is part of the Schaie–Thurstone Adult Mental Abilities Test (STAMAT; Schaie, 1985), is a similarly normed test. The indication is that these two measures can be used with confidence in our following analyses.

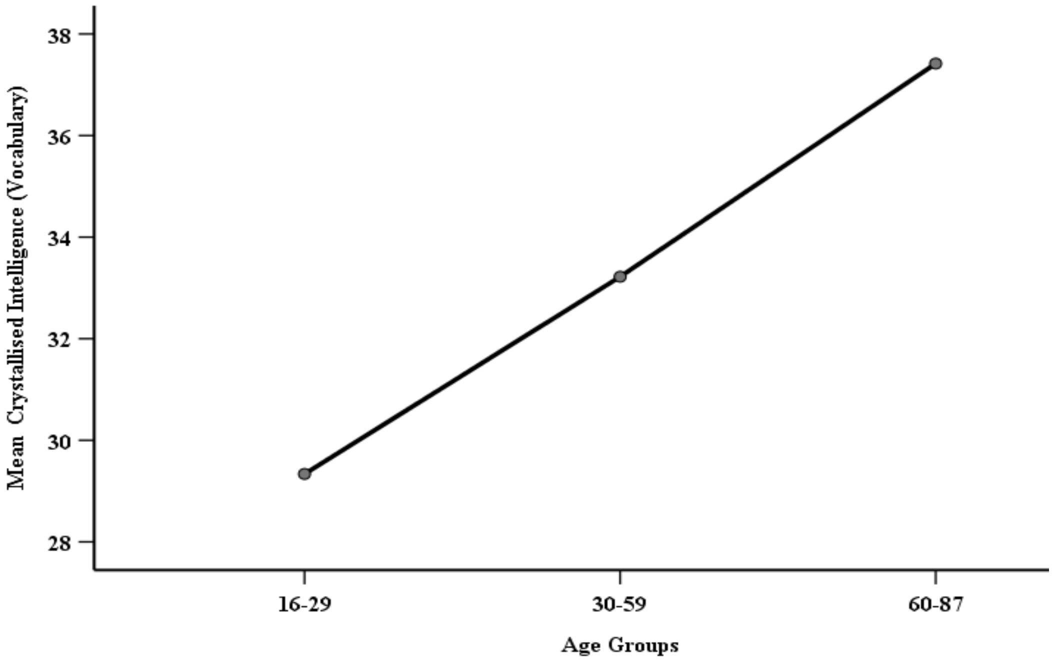
Hypothesis 8 predict that there would be significant mean intelligence differences across age groups but not gender, for both G*c* and G*f.* This was supported by the data. A 2 x (Gender) x 3 (Age groups) factorial MANOVA was conducted to further clarify age and gender differences in cognition. G*c* in the form of vocabulary and G*f* as the Letter Series (LS) scores served as outcome variables. Gender and the three age groups served as the independent variables. Findings indicated, there was no statistically significant interaction effect between gender and the participant’s age category, $F(4, 902) = 0.89$, $p = .470$, Pillai’s $V = .01$. The main effect of age groups was significant, $F(4, 902) = 26.85$, $p < .001$, Pillai's $V = .21$, $\eta_p^2 = .11$; but not for gender, $F(2, 450) = 0.34$, $p = .715$, Pillai's $V = .00$.

Follow up univariate two-way ANOVAs were run, with the main effect of age group considered. There was a statistically significant main effect of age group for G*c*, $F(2, 454) = 79.14$, $p < .001$, $\eta_p^2 = .26$. The magnitude of the effect size was large. There was also a statistically significant result for G*f*, Letter Series, $F(2, 454) = 4.32$, $p = .014$, $\eta_p^2 = .02$, but with a small effect size. Bonferroni adjusted post hoc tests with Hochberg's GT2 pairwise comparisons were run for the differences in mean intelligence scores between age groups.

Results showed that the mean vocabulary score for the young persons (M = 29.34, SD = 5.48) were significantly lower than the midlife group (M = 33.22, SD = 4.19) and the older persons group (M = 37.42, SD = 3.19). The mean for the midlife group was also significantly lower than for the older persons group. Figure 6.5 shows vocabulary mean scores trending upwards with age.

Figure 6.5

Mean Vocabulary Scores for Three Age Groups (N = 457)

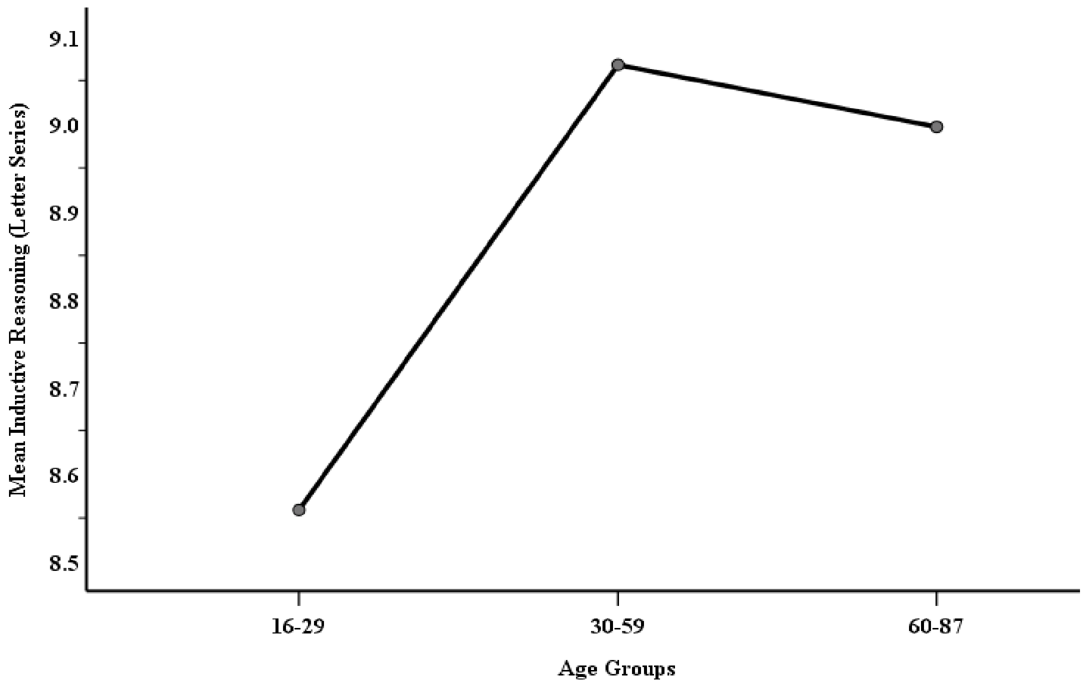


Note. The figure has been graphed by SPSS.

Regarding G*f*, only the young persons' mean inductive reasoning score (*M* = 8.56, *SD* = 2.05) significantly differed from the midlife group (*M* = 9.07, *SD* = 1.47). Albeit the actual difference in mean scores between these two groups was small. Older persons (*M* = 9.00, *SD* = 1.62) did not significantly differ from either that of the young persons or the midlife group. Figure 6.6 suggests, there may be a non-linear relationship between G*f* and age, this relationship is examined next.

Figure 6.6

Mean Letter Series Scores for Three Age Groups (N = 457)



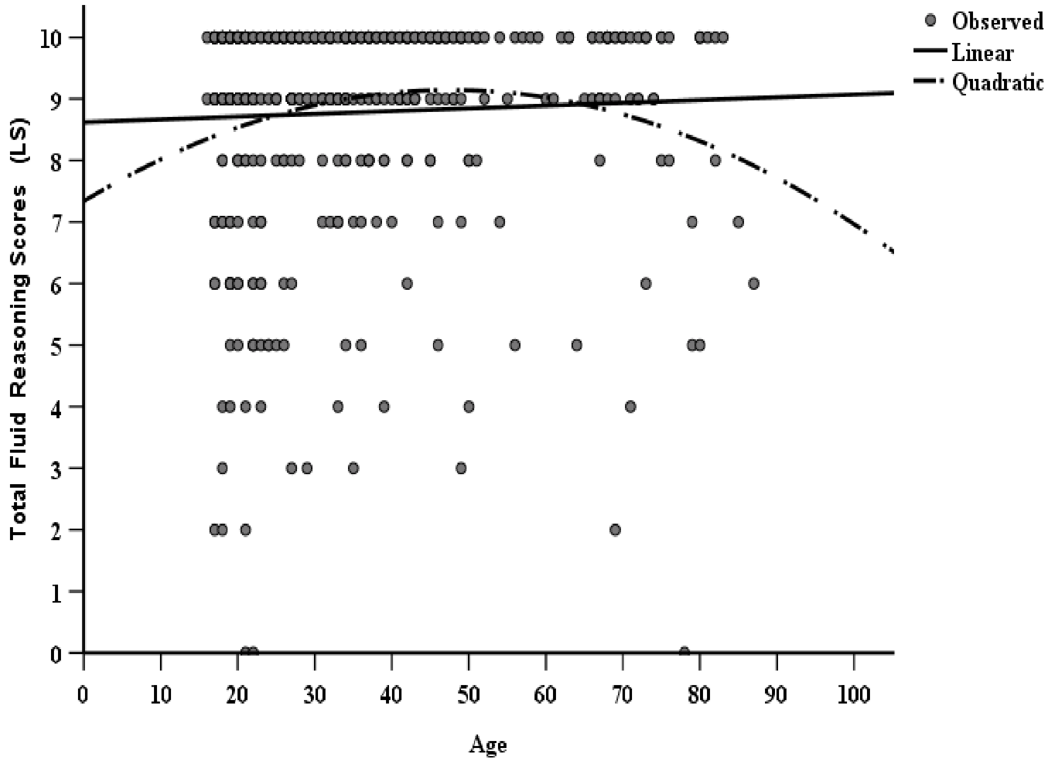
Note. The figure has been graphed by SPSS.

6.5.6. Quadratic Assessment of Age Effects on Inductive Reasoning

Hypothesis 9, predicted that the relationship between fluid reasoning and age is curvilinear with a peak at midlife. As such, midlife adults will generally score higher than either younger persons or older persons on inductive reasoning. This was supported by the data. Of note is that in the current study, the linear association between inductive reasoning and age was nonsignificant (*r* = .08). A curvilinear regression analysis (quadratic model) was conducted to assess the ability of age to predict levels of G*f* using the total Letter Series score. To avoid multicollinearity, the age variable was centred on the mean and used to create a centred age squared variable. Tolerance (= 0.47) was above 0.20 and the variance inflation factor (VIF = 2.13) was well below 10.00, indicating that multicollinearity was not an issue in this analysis (Hair et al., 2014). Age centred as a predictor, was entered first (Model 1). The linear regression of Model 1 was not significant, $F(1, 455) = 3.65$, $p = .057$. In the next step (Model 2), the centred age squared variable was entered. The overall Model 2 was statistically significant, $R^2 = .02$, $\Delta R^2 = .01$, $\Delta F(1, 454) = 4.70$, $p = .016$. The trend in Model 2, pointed to a downward slope with a negative β value. As shown in Figure 6.7, inductive reasoning in the form of the Letter Series first went up with age, reaching an apex in the late 40s/early 50s, before trending downwards. The effect size is small and it appears there is a potential ceiling effect with the bulk of the sample of all ages attaining near or maximum scores.

Figure 6.7

Curvilinear Relationship Between Letter Series and Age (N = 457)



Note. The figure has been graphed by SPSS.

6.5.7 Quadratic Assessment of Age Effects on Wisdom

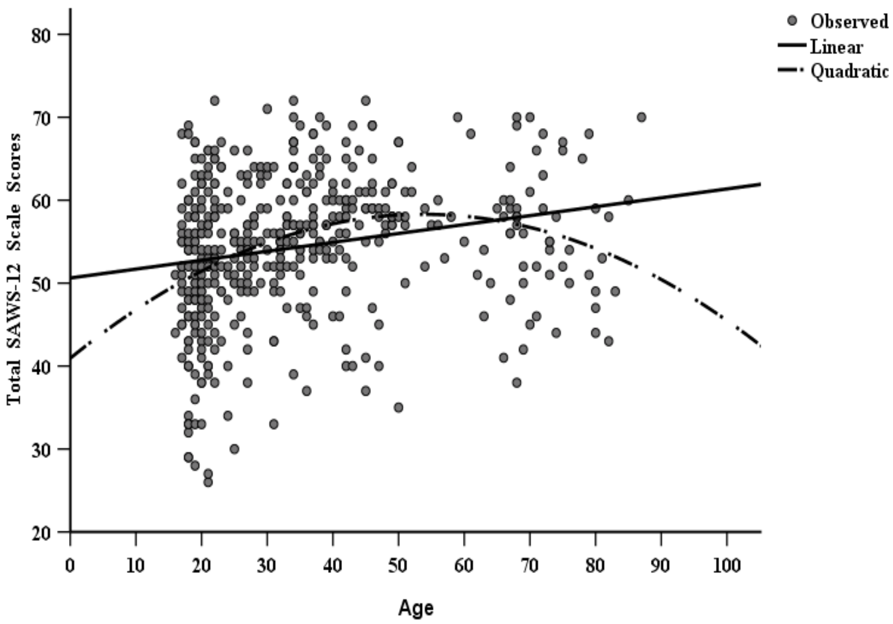
Hypothesis 10 predicted that the relationship between wisdom and age as measured by the total SAWS-R (i.e., SAWS-12) and total 3D-WS-12 scores would follow a curvilinear trend from adolescence to older age with the zenith at midlife. This was supported by the data. This hypothesis tested one theoretical assumption that wisdom and age trajectory might follow the path of “fluid and crystallised intelligence” (Sternberg, 2005a). Although the current bivariate correlations between wisdom and age for the SAWS-12 (r = .21) and the 3D-WS-12 (r = .27) indicated significant positive linear relationships, literature suggested that this association warrants deeper probing. A curvilinear regression analysis (quadratic model) was conducted to assess the ability of age to predict levels of wisdom using the total

SAWS-12 and total 3D-WS-12 scores. To avoid multicollinearity, the age variable was centred on the mean, and used to create a centred age squared variable.

6.5.7.1 Curvilinear Results for SAWS-12 with Age. For the SAWS-12, age centred variable as a predictor was entered first (Model 1). The linear regression Model 1 was significant, $F(1, 455) = 22.02$, $p < .001$, explaining 4.60% variance in SAWS-12 scores. In the next step (Model 2), the centred age squared variable was entered. The overall Model 2 was also significant, $R^2 = .09$, $\Delta R^2 = .05$, $\Delta F(1, 454) = 23.76$, $p < .001$, indicating the non-linear addition to the model was statistically significant. The combined linear and non-linear model was also significant, $F(2, 454) = 23.44$, $p < .001$. The trend in Model 2, after the addition of age centred squared, pointed to a downward slope with a negative β value, indicating that the SAWS-12 wisdom first went up with age, attaining a peak in the late 40s/early 50s, before trending downwards (see Figure 6.8).

Figure 6.8

Linear and Quadratic Trends for SAWS-12 with Age (N = 457)

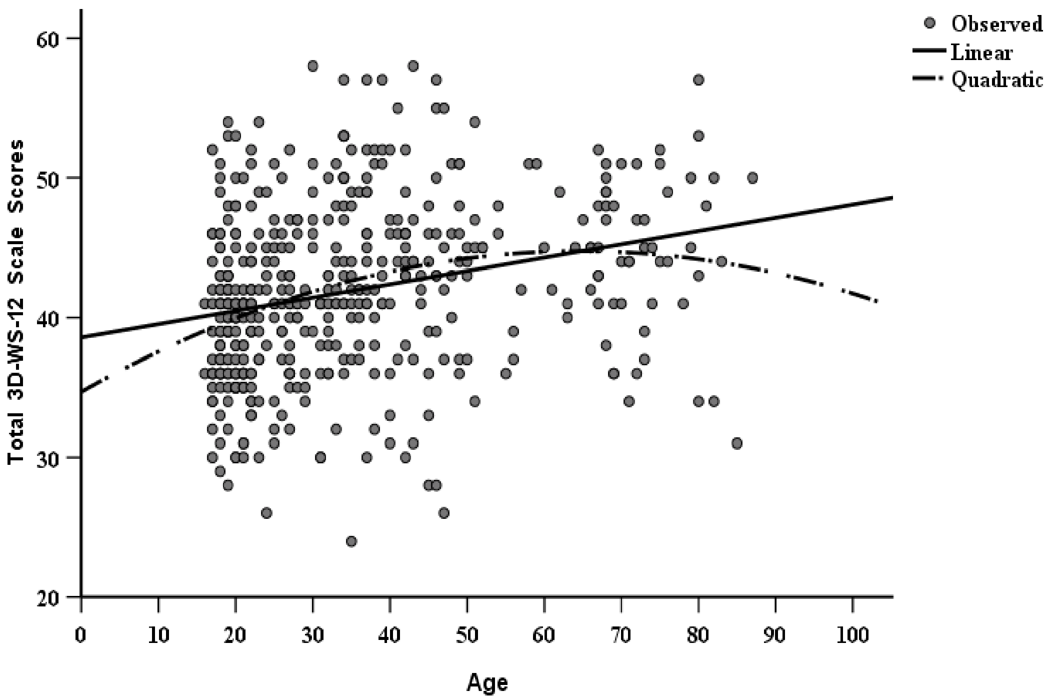


Note. The figure has been graphed by SPSS.

6.5.7.2 Curvilinear Results for 3D-WS-12 with Age. For the 3D-WS-12, age centred variable as a predictor was entered first (Model 1). The linear regression Model 1 was significant, $F(1, 455) = 35.09$, $p < .001$, explaining 7.20% variance in 3D-WS-12 scores. In the next step (Model 2), the centred age squared variable was entered. The overall Model 2 was also significant, $R^2 = .09$, $\Delta R^2 = .02$, $\Delta F(1, 454) = 7.51$, $p = .006$, indicating the non-linear addition to the model was statistically significant. The combined linear and non-linear model was also significant, $F(2, 454) = 23.44$, $p <.001$. The trend in Model 2, after the addition of age centred squared, pointed to a downward slope with a negative β value, indicating that the 3D-WS-12 wisdom first went up with age, attaining a peak in the late 40s/early 50s, before trending downwards (see Figure 6.9).

Figure 6.9

Linear and Quadratic Trends for 3D-WS-12 with Age (N = 457)



Note. The figure has been graphed by SPSS.

6.5.8 Are High Wisdom Scorers Older and Better Educated Than the Rest?

Although as predicted in *Hypothesis 10*, in general, the relationship between wisdom and ageing was shown to be quadratic, it is still expected that the wisest individuals would be older than the rest (Ardelt, 2010; Glück et al 2013). *Hypothesis 11* predicted that, the wisest individuals on the SAWS-R (i.e., SAWS-12) and the 3D-WS-12 would be not only older, but also better educated than the rest of the sample, received mixed support. Effect sizes were interpreted according to Cohen's (1988) convention, η^2 = .01 = small, .06 = moderate, and .138 = large. Significance level cut-off was set at .025.

6.5.8.1 Top Wisdom Scorers and Age. Independent-samples t-tests were conducted to determine whether the top 25% wisdom scorers on the SAWS-12 and the 3D-WS-12 were significantly older than the rest of the participants. Age in years served as the dependent variable. For the independent variables, participants were divided into two groups on each wisdom measure, Group 1: Participants with wisdom scores ≥ 75%; Group 2: The rest of the participants. Analyses were run separately for SAWS-12 and the 3D-WS-12. The mean age of the top 25% wisdom scorers on the SAWS-12 (M_{age} = 37.63, *SD* = 16.77) was significantly higher than for the rest of the sample (M_{age} =31.55, *SD* = 17.86); $t(455) = 3.66$, $p < .001$ (two tailed). The magnitude of the differences in the means (M_{diff} = 6.08, 95% CI = [2.81, 9.34]) was small (η^2 = .03).

Similarly, for the 3D-WS-12, the mean age of the top 25% wisdom scorers (M_{age} = 41.99, *SD* = 18.73) was significantly higher than for the rest of the sample (M_{age} =30.93, *SD* = 15.15); $t(455) = 6.60$, $p < .001$ (two tailed). The magnitude of the differences in the means (M_{diff} = 11.06, 95% CI = [7.77, 14.36]) was moderate (η^2 = .10).

6.5.8.2 Top Wisdom Scorers and Educational Achievement. Independent-samples t-tests were conducted to determine whether the top 25% wisdom scorers on the SAWS-12 and the 3D-WS-12 were significantly better educated than the rest of the participants. Education in years served as the dependent variable. For the independent variables, participants were divided into two groups on each wisdom measure, Group 1: Participants with wisdom scores ≥ 75%; Group 2: The rest of the participants. Analyses were run separately for SAWS-12 and the 3D-WS-12. The mean education in years of the top 25% wisdom scorers on the SAWS-12 (M = 14.73, SD = 2.79) was not significantly higher than for the rest of the sample (M = 14.19, SD = 2.59); $t(455) = 2.09$, $p = .037$ (two tailed).

For the 3D-WS-12, the mean education of the top 25% wisdom scorers (M = 15.07, SD = 2.85) was significantly higher than for the rest of the sample (M = 14.16, SD = 2.59); $t(455) = 3.52$, $p < .001$ (two tailed). The magnitude of the differences in the means (M_{diff} = 0.91, 95% CI = [0.40, 1.42]) was small ($\eta^2 = .03$).

6.6 Hierarchical Regression with Wisdom, Intelligence, and Demographics

To further clarify relationships between wisdom, intelligence, age, and gender, and help understand “How does wisdom and intelligence differ from each other?”, hierarchical multiple regressions were conducted. Preliminary analyses were run to ensure there were no violation of assumptions as discussed in Section 6.4 for MANOVA and Section 6.5 for hierarchical multiple regression above. Analyses were performed separately on the dependent variables of SAWS-12 and 3D-WS-12 to assess the ability of the two intelligence variables of G*c* (vocabulary) and G*f* (Letter Series) to predict levels of wisdom after controlling for the influence of age, gender, and education. Table 6.5 presents full details of each regression model.

With respect to SAWS-12, in Step 1 we entered the demographic variables of age, gender, and education as a block. The overall model was significant, $F(3, 453) = 9.34$, $p < .001$ and accounted for 5.80% of variance in SAWS-12 scores. However, only age and gender reached significance. Next, since working memory or G*f* is a prerequisite condition for crystallised intelligence, the Letter Series scale was entered in Step 2. The overall model was significant, $F(4, 452) = 7.49$, $p < .001$, explaining 6.20% of the variance. After controlling for age, gender, and education, the extra 0.40% variance explained by the Letter Series was not significant, $p = .172$.

In Step 3, we added the other intelligence variable, vocabulary. Overall, the model was significant, $F(5, 451) = 6.31$, $P < .001$. Vocabulary accounted for an additional 0.30% of the variance in SAWS-12 score, which was not significant, $p = .209$. Only age and gender attained statistical significance with age posting a higher value ($\beta = .19$, $p = .001$), than gender ($\beta = .11$, $p = .014$), but not education ($\beta = .02$, $p = .682$). Of the intelligence control variables, neither the Letter Series ($\beta = -.08$, $p = .088$), nor Vocabulary ($\beta = .07$, $p = .209$) attained statistical significance. Although age and gender accounted for unique variance in SAWS-12, both education, crystallised, and fluid intelligence did not.

With respect to the 3D-WS-12, in Step 1 we entered the demographic variables of age, gender and education as a block. The overall model was significant, $F(3, 453) = 13.14$, $p < .001$ and accounted for 8.00% of variance in 3D-WS-12 scores. However, only age reached significance, gender or education did not. After entry of the Letter Series scale in Step 2 the overall model was still significant, $F(4, 452) = 14.22$, $p < .001$, explaining 11.20% of the variance; and after controlling for age, gender, and education, the extra 3.20% of variance explained by the Letter Series was significant, $\Delta R^2 = .03$, $\Delta F\ (1, 452) = 16.22$, $p < .001$.

In Step 3, we added the other intelligence variable of vocabulary. Overall, the model was significant, $F(5, 451) = 15.59$, $p < .001$. Vocabulary accounted for an additional 3.60% of the variance in 3D-WS-12 score, which was significant, $p < .001$. In the final model, age, the Letter Series and vocabulary attained statistical significance with vocabulary posting the highest value ($\beta = .23$, $p < .001$), compared to age ($\beta = .12$, $p = .027$), and the Letter Series ($\beta = .11$, $p = .016$). However, neither education ($\beta = .07$, $p = .117$) nor gender ($\beta = .06$, $p = .141$), attained statistical significance. While age, and crystallised and fluid intelligence accounted for unique variance in 3D-WS-12, gender and education did not.

Table 6.5

Hierarchical Regressions on SAWS-12 and 3D-WS-12 (N = 457)

	Step 1				Step 2				Step 3			
Variable	*B*	β	*t*	*p*	*B*	β	*t*	*p*	*B*	β	t	*p*
The Self-Assessed Wisdom Scale-12 (SAWS-12)												
Constant	45.96	-	16.62	< .001	48.41	-	14.70	< .001	46.20	-	12.38	< .001
Age	0.11	.22	4.44	< .001	0.11	.22	4.52	< .001	0.09	.19	3.36	.001
Gender	2.19	.11	2.39	.017	2.19	.11	2.39	.017	2.27	.11	2.47	.014
EDU	0.06	.02	0.36	.716	0.07	.02	0.42	.673	0.06	.02	0.41	.682
LS					-0.30	-0.06	-1.37	.172	-0.40	-.08	-1.71	.088
VOCAB									0.11	.07	1.26	.209
R^2	.06				.06				.07			
F	9.34*				7.49				6.31			
ΔR^2	.06				.00				.00			
ΔF	9.34*				1.87				1.58			

Hierarchical Regressions on SAWS-12 and 3D-WS-12 (N = 457)

	Step 1				Step 2				Step 3			
Variable	*B*	β	*t*	*p*	*B*	β	*t*	*p*	*B*	β	t	*p*
The Three-Dimensional Wisdom Scale-12 (3D-WS-12)												
Constant	34.85	-	17.93	< .001	29.86	-	13.09	< .001	24.67	-	9.73	< .001
Age	0.09	.24	5.05	< .001	0.08	.23	4.84	< .001	0.04	.12	2.22	.027
Gender	0.75	.05	1.16	.248	0.75	.05	1.18	.240	0.92	.06	1.48	.141
EDU	0.19	.08	1.73	.085	0.17	.08	1.58	.114	0.17	.07	1.57	.117
L S					0.62	.18	4.02	< .001	0.39	.11	2.42	.016
VOCAB									0.26	.23	4.34	< .001
R2	.08				.11				.15			
F	13.14*				14.22*				15.59*			
ΔR^2	.08				.03				.04			
ΔF	13.14*				16.12*				18.83*			

Note. B = Unstandardised coefficients; *β* = standardised coefficients. EDU= Education; LS = Letter Series; VOCAB = Vocabulary.

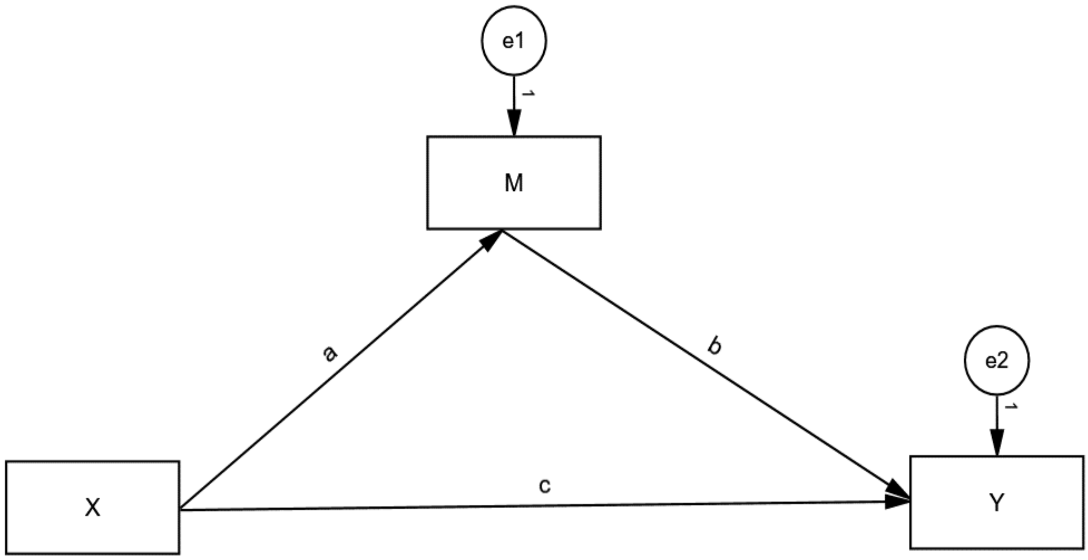
*$p \leq .001$.

6.7 Mediation and Moderation Analyses

Hypothesis 12 predicted that, intelligence would mediate the relationship between age and wisdom, whereas age and gender would moderate the relationship between intelligence and wisdom, was partially supported. To test this hypothesis, a mediation analysis was first performed using SPSS with PROCESS macro tool by Hayes (2018), to examine intelligence variables of G*c* (vocabulary) and G*f* (Letter Series), as possible mediators between age and wisdom. The general mediation model depicted in Figure 6.10 was used to assess the size of the indirect effect (i.e., mediation) and its 95% CI. If the CI contains zero, then we cannot be confident that a genuine mediation effect exists, but, when the CI does not contain zero, then, we can be confident that mediation has occurred (Field, 2017).

Figure 6.10

Combined Conceptual and Statistical Mediation Model



Note: X = Exogenous variable; M = Mediating variable; Y = Outcome variable; e1, e2 = error terms. Direct effect of X on M = a. Direct effect of M on Y = b. Direct effect of X on Y = c. Indirect effect of X on Y through M = ab. Total effect = ab + c.

6.7.1 Mediation of Age and Wisdom by Intelligence

Wisdom was measured by SAWS-12 and 3D-WS-12. Coefficients for various paths shown in Figure 6.10 were calculated. Findings are presented in Table 6.6 for Paths a and c.

At first, a test was conducted to determine whether the effect of age on SAWS-12 was mediated by G*c* (vocabulary). The total effect of age on SAWS-12, computed as (ab + c) on the path model showed, $B = 0.11$, $SE = 0.02$, $t = 4.70$, $p < .001$, 95% CI [0.06, 0.15) was significant and positive. To test the indirect effect (i.e., mediation), of age on SAWS-12 by vocabulary, bootstrapping was implemented to generate confidence intervals around the indirect effects and their standard errors using 5,000 bootstrap samples. Findings showed, $B = 0.01$, Bootstrap $SE = 0.02$, Bootstrap 95% CI [-0.03, 0.04], $\beta = .02$. The expectation that vocabulary mediates the relationship between age and SAWS-12 wisdom was not supported, as zero fell within the lower and upper bound of the 95% CI.

A test was also conducted to determine whether the effect of age on SAWS-12 was mediated by G*f* (Letter Series). The total effect of age on SAWS-12, computed as (ab + c) on the path model showed, $B = 0.11$, $SE = 0.02$, $t = 4.70$, $p < .001$, 95% CI [0.06, 0.15) and was significant and positive. To test for the indirect effect (i.e., mediation), of age on SAWS-12 by the Letter Series, bootstrapping was implemented to generate confidence intervals around the indirect effects and their standard errors using 5,000 bootstrap samples. Findings showed, $B = -0.003$, Bootstrap $SE = 0.003$, Bootstrap 95% CI [-0.010, 0.003], $\beta = -.01$. The expectation that the Letter Series mediates the relationship between age and SAWS-12 wisdom was not supported, as zero fell within the lower and upper bound of the 95% CI.

Regarding 3D-WS-12, a test was also conducted to determine whether the effect of age on 3D-WS-12 was mediated by vocabulary. The total effect of age on 3D-WS-12, computed as (ab + c) on the path model showed, *B* = 0.10, *SE* = 0.02, *t* = 5.92, *p* < .001, 95% CI [0.06, 0.13] was significant and positive. To test for the indirect effect (i.e., mediation), of age on vocabulary, bootstrapping was implemented to generate confidence intervals around the indirect effects and their standard errors using 5,000 bootstrap samples. Findings showed, *B* = 0.05, Bootstrap *SE* = 0.01, *β* = .14, Bootstrap 95% CI [0.03, 0.07]. The expectation that vocabulary mediates the relationship between age and 3D-WS-12 wisdom was supported because zero fell outside the lower and upper bound of the 95% CI.

A test was also conducted to determine whether the effect of age on 3D-WS-12 was mediated by the Letter Series. The total effect of age on 3D-WS-12, computed as (ab + c) on the path model showed, *B* = 0.10, *SE* = 0.02, *t* = 5.92, *p* < .001, 95% CI [0.06, 0.13] was also significant and positive. To test for the indirect effect (i.e., mediation), of age on the Letter Series, bootstrapping was implemented to generate confidence intervals around the indirect effects and their standard errors using 5,000 bootstrap samples. Findings showed, *B* = 0.01, Bootstrap *SE* = 0.003, *β* = .02, Bootstrap 95% CI [-0.00013, 0.01295]. The expectation that the Letter Series mediates the relationship between age and 3D-WS-12 wisdom was not supported, as zero fell within the lower and upper bound of the 95% CI.

Table 6.6

Mediation of Age and Wisdom by Intelligence (N = 457)

	Path a					*Path c*				
Variable	*B*	*SE*	*t*	*p*	95% CI	*B*	*SE*	*t*	*p*	95% CI
Y = Self-Assessed Wisdom Scale (SAWS-12)										
X = Age, M = Vocabulary	0.16	0.01	12.63	< .001	[0.14, 0.19]	0.10	0.03	3.74	< .001	[0.05, 0.15]
X = Age, M = Letter Series	0.01	0.01	1.91	.057	[0.00, 0.02]	0.11	0.02	4.80	< .001	[0.07, 0.16]
Y = Three-Dimensional Wisdom Scale (3D-WS-12)										
X = Age, M = Vocabulary	0.16	0.01	12.63	< .001	[0.14, 0.19]	0.05	0.02	2.52	.012	[0.01, 0.08]
X = Age, M = Letter Series	0.01	0.01	1.91	.057	[0.00, 0.02]	0.09	0.02	5.64	< .001	[0.06, 0.12]

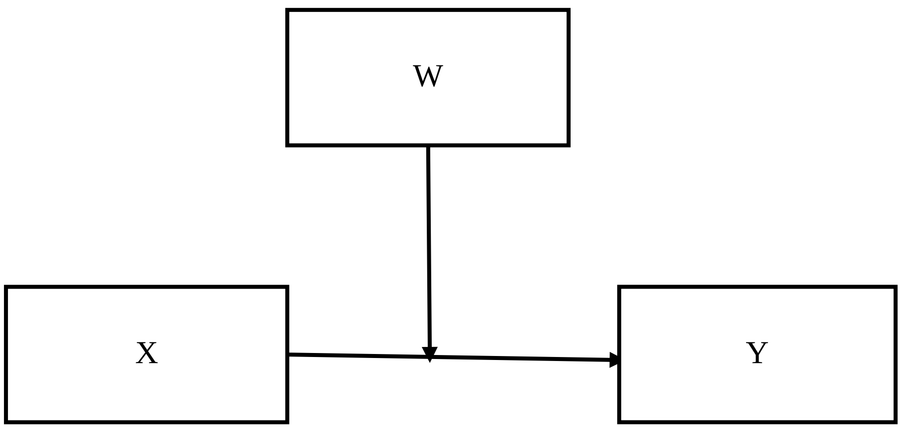
Note. Path a = Direct effect of X on M; Path c = Direct effect of X on Y.

6.7.2 Moderation of Intelligence and Wisdom by Age and Gender

A moderation analysis in SPSS with PROCESS macro tool by Hayes (2018) was run to examine age and gender as possible moderators between either crystallised intelligence (G*c*), in the form of vocabulary or fluid intelligence (G*f*), in the form of the Letter Series and SAWS-12 or 3D-WS-12 wisdom. Figure 6.11 is a conceptual moderation model. Statistically, a significant interaction term of XW would indicate moderation. Mean-centring of variables is no longer required when carrying out moderated multiple regression, to alleviate multicollinearity among the regression terms (Jose, 2013). Mean-centring was still performed on the moderator and predictor variables, since the procedure facilitates interpretation of regression parameters (Hayes, 2018).

Figure 6.11

Conceptual Model of Moderation



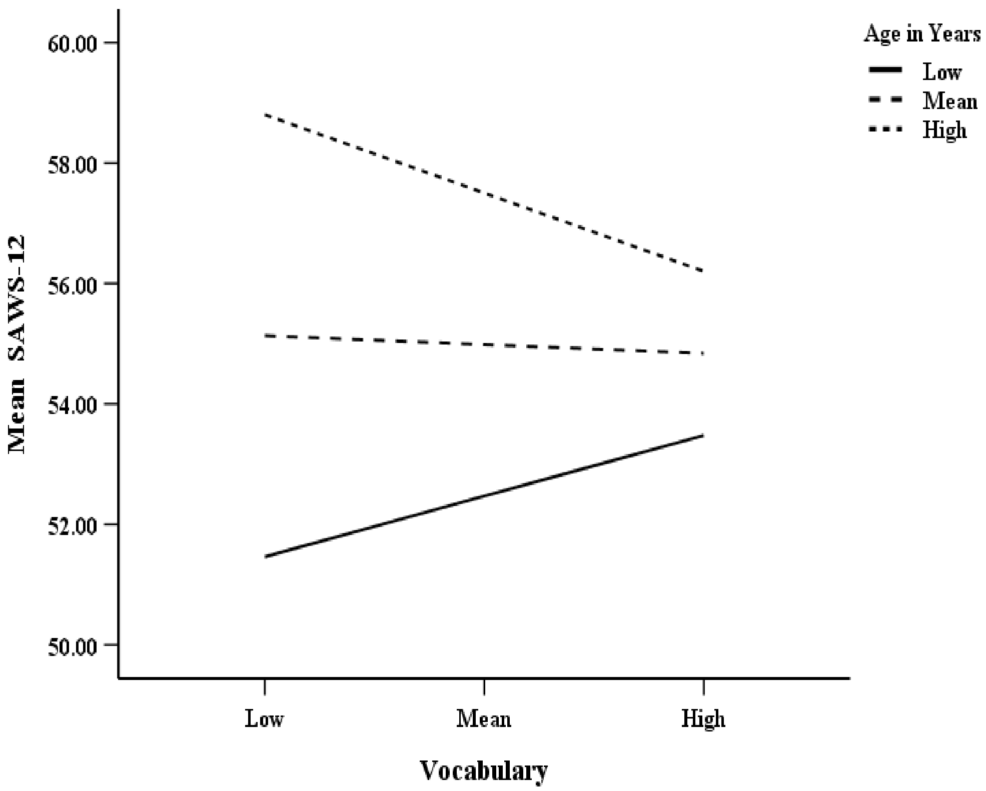
Note. X = Independent variable; Y= Outcome variable; W = Moderator variable.

6.7.2.1 Moderation of Intelligence and Wisdom by Age. An analysis for G*c* (vocabulary) and SAWS-12 with age as moderator was run in SPSS with Hayes (2018) PROCESS macro. All variables were continuous. Results indicated that the model was significant, $F(3, 453) = 9.31$, $p < .001$, $R^2 = .06$. The interaction term was also significant, (*B* = -0.01, *SE* =0.01, *t* = - 2.31, 95% *CI* [-0.02, -0.002], *p*=.021) and the ΔR^2 = .01, showed the interaction effect accounted for 1.10% added variation in SAWS-12.

To clarify the nature of the interaction, tests of simple slopes, such as the "pick-a-point" method (Ragosa, 1980) and/or Johnson-Neyman regions of significance (Johnson & Fay, 1950) can be implemented. When simple slopes were plotted at three levels of the age moderator (see Figure 6.12), the relationship between vocabulary and SAWS-12 was positive but not significant (*B* = 0.18, *SE*.= 0.10, *p*=.073). At the mean, the slope was negative but not significant (*B* = -0.03, *SE*, = 0.09, *p* = .768); and at the +1 *SD* on the centred age variable representing higher age, the slope was negative, but also non-significant (*B* = -0.24, *SE* = 0.15, *p* = .115).

Figure 6.12

Simple Slopes for Vocabulary, SAWS-12, and Age



Note. The figure has been graphed by SPSS.

Although the *pick-a-point* method allows for graphical visualization, some scholars (Hayes & Matthes, 2009) have criticised the approach for failing to identify the specific values of the moderator, for which there is a statistically significant relationship between the predictor and outcome variable. As shown above in the present analysis, the method missed the significant interaction points with all three points returning non-significant findings. The Johnson-Neyman procedure was employed to highlight the regions of significance. This method computes the regression model for the predictor and outcome at multiple values of the moderator and the significance of the regression slopes. Part of the analysis in Table 6.7, shows the relationship between vocabulary and SAWS-12 is significant and negative from around age 41.

Table 6.7

Moderation with Johnson-Neyman Zones of Significance

Age in Years	*B*	*SEB*	*t*	*p*	95% CI
19.86	-0.27	0.16	-1.66	.099	[-0.58, 0.05]
23.41	-0.31	0.18	-1.75	.081	[-0.65, 0.04]
26.96	-0.35	0.19	-1.82	.070	[-0.73, 0.03]
30.51	-0.39	0.21	-1.88	.061	[-0.80, 0.02]
34.06	-0.44	0.23	-1.92	.055	[-0.88, 0.01]
37.61	-0.48	0.24	-1.96	.050	[-0.96, 0.001]
41.16	-0.52	0.26	-2.00	.047	[-1.03, -0.01]
44.71	-0.56	0.28	-2.02	.044	[-1.11, -0.02]
48.26	-0.61	0.30	-2.05	.041	[-1.18, -0.02]
51.81	-0.65	0.31	-2.07	.039	[-1.27, -0.03]

Note. N = 457; SEB = Standard error of B.

Analyses were run for the G*f* (Letter Series) and SAWS-12 with age as a moderator. The variables were continuous. Results showed, the model was significant, $F(3, 453) = 8.00$, $p < .001$, $R^2 = .05$. The interaction effect was not significant, $B = -0.002$, $SE = 0.01$, $t = -0.15$, 95% CI [-0.03, 0.02], $p = .880$, $\Delta R^2 = .00$.

Analyses were also run for G*c* (vocabulary) and 3D-WS-12 with age as a moderator. All the variables were continuous. Findings showed that the model as a whole was significant, $F(3, 453) = 21.99$, $p < .001$, $R^2 = .13$. However, the interaction term between age and vocabulary was not statistically significant, $B = -0.001$, $SE = 0.004$, $t = -0.21$, 95%CI [-0.01, 0.01], $p = .833$, $\Delta R^2 = .00$. Similarly, for G*f* (Letter Series), the interaction effect, $B = 0.01$, $SE = 0.01$, $t = 0.58$, 95% CI [-0.01, 0.02], $p = .565$) was not significant. The results indicate age as a non-significant moderator between either G*c* or G*f* and 3D-WS-12.

6.7.2.2 Moderation of Intelligence and Wisdom by Gender. The same analyses as Subsection *6.7.2.1* were run with gender as a moderator and showed no significant findings. The indication is that the relationships between either G*c* or G*f*, with either SAWS-12 or 3D-WS-12, are not moderated by gender. Results are summarised in Table 6.8.

Table 6.8

Moderation of Intelligence by Gender on Wisdom

Variable	*B*	*SEB*	*t*	*p*	95% CI
Self-Assessed Wisdom Scale-12 (SAWS-12 outcome)					
Gender x Vocabulary	-0.02	0.19	-0.10	.924	[-0.39, 0.35]
Gender x LS	1.08	0.56	1.93	.054	[-0.02, 2.19]
Three-Dimensional Wisdom Scale-12 (3D-WS-12 outcome)					
Gender x Vocabulary	-0.08	0.13	-0.62	.537	[-0.33, 0.17]
Gender x LS	-0.34	0.39	-0.87	.385	[-1.12, 0.43]

Note. N = 457; LS = Letter Series; SEB = Standard error of B.

6.8 Summary and Brief Discussion of Study Two

Study Two, set out to continue to investigate the research question, “How does age, and gender influence wisdom, and intelligence?” Further clarification on “How does wisdom and intelligence differ from each other?” was also explored. A key finding from Study Two was that the brief refined SAWS-12 constructed in Study One was replicable in a new population sample. SAWS-12 displayed good measurement invariance and psychometric properties, superior to those of the 3D-WS-12 in the current sample. Findings from Study Two also suggests that the SAWS-12 is a short, direct, reliable measure of the wisdom construct, which may be useful at the longitudinal research level and for vulnerable population groups with short attentional spans. The poorer psychometric properties of the 3D-WS-12 in our research suggest that the measure would benefit from further improvements before the tool can be considered a valid measure of wisdom.

Regarding wisdom and gender, the current findings for SAWS-12 and the 3D-WS-12 differ. The 3D-WS-12 findings are in accord with those of other researchers who have demonstrated no gender differences in wisdom (e.g., Bang, 2015; Glück, 2019; Glück et al., 2013; Webster et al., 2014). SAWS-12 in Study Two (as in Study One), found gender influenced wisdom scores with women scoring significantly higher than men, although with a small effect size, corroborating results by Webster (2003), who found similar gender differences using the 30-item SAWS. Dortaj et al. (2018) also reported women scored higher than men on some facets of the 40-item SAWS. The reason for gender differences might be because the SAWS-12 and the 3D-WS-12 correlate at (r = .34), which suggests that they are tapping into different conceptions of wisdom.

Concerning wisdom and age, wisdom is generally thought to increase from adolescence through adulthood. In the current study with a lifespan sample, both the SAWS-12 and the 3D-WS-12 demonstrated a weak curvilinear relationship with the apex at midlife, which is in accord with that of other contemporary scholars (e.g., Ardelt et al., 2018; Sternberg, 2005a; Thomas et al., 2017; Webster et al., 2014). A possible suggestion is that despite older individuals' distinct advantage in greater life experiences, older age is often accompanied by increases in dogmatism and mental rigidity, which are known to hinder wisdom development (Meacham, 1990). Furthermore, compared to older persons, midlife individuals, show greater Openness to experiences, giving them an advantage in wisdom (Webster et al., 2014). Notwithstanding the inverted U-curve relationship between wisdom and ageing reported in previous studies (Ardelt et al., 2018; Thomas et al., 2017; Webster et al., 2014) we still expected the wisest individuals to be older than the rest. The implication is that it requires time, difficult life experiences, self-reflection, and learning from one's experiences for wisdom to be realised (Ardelt et al., 2018; Webster et al., 2014; Weststrate et al., 2018). This notion was supported on both the SAWS-12 and the 3D-WS-12 because the wisest individuals were indeed older than the rest. Moreover, on the 3D-WS-12 the wisest were also better educated compared to the rest of the sample, merging well with the cognitive nature of the scale; however, this finding did not hold for the SAWS-12.

Regarding intelligence and gender, this study does not support gender differences in intelligence. Concerning intelligence and ageing, this research is in accord with intelligence literature that crystallised intelligence increases with age. Although the fluid reasoning results generally followed the expected curvilinear association with age, peaking around midlife, the curve is rather flat. The bulk of the sample scored near or at maximum rate, indicating a potential ceiling effect. The ceiling effect observed with the Letter Series measure in the current research is a new finding and suggests the measure might require upgrading to match the cognitive levels observed in the current cohort of elders and the sample in general.

The hierarchical multiple regression helped to highlight the relationship between wisdom, intelligence, age, gender, and education. Differences again emerged between SAWS-12 and the 3D-WS-12. Although age and gender accounted for unique variance in SAWS-12, education, crystallised, and fluid intelligence did not.

In addition to age, both crystallised and fluid intelligence accounted for unique variance in the 3D-WS-12, while gender and education did not. These findings clearly reinforce that the two measures of wisdom are assessing somewhat different aspects of the construct with the 3D-WS-12 drawing on a strong cognitive component. The implication is that the 3D-WS-12, but not the SAWS-12 has closer association with intelligence.

There were mixed findings out of the mediation and moderation analyses. The mediation analyses showed while the relationship between age and SAWS-12 wisdom is not explained by either G*c* or G*f*, for the 3D-WS-12 the G*c* but not G*f* help to describe part of the relationship. The moderation analysis showed that neither age nor gender moderated the relationship between intelligence and 3D-WS-12. Age moderated the relationship between crystallised intelligence and SAWS-12 wisdom at certain junctures along one's life cycle (see Figure 6.12). Yet, these findings are rather puzzling and even counterintuitive as they suggest at older age, higher levels of crystallised knowledge imply less wisdom in the SAWS-12 sense. Arguably, the observed results might indicate a Type 1 error which is known to increase in large samples (Kim, 2020). These results must be interpreted with caution. A detailed discussion of the research findings from Study One and Study Two follows in Chapter 7.

Chapter 7

General Discussion

7.1 Introduction

Wisdom and intelligence are ancient multidimensional concepts that have proved difficult to define and measure for centuries. Conventionally, empirical studies in wisdom and intelligence have been in disparate fields of enquiry. Some researchers (e.g., Sternberg, 1985b, 1986, 2000) have attempted to bring the two domains closer together; with Paul Baltes and colleagues at the Max Planck Institute for Human Development in Berlin (e.g., P. Baltes & Baltes, 1990; Baltes & Lindenberger, 1997; Kliegl et al., 1989) making major contributions to both cognitive and wisdom studies. This thesis aimed to examine the relationship between wisdom and intelligence and attempted to clarify the complex and often inconsistent influence of age and gender on these constructs. To do this successfully, literature acknowledges the importance of developing tools that have been verified in different cultures, across the adult lifespan, and measures the constructs accurately.

The first part of this thesis, Study One, set out to validate and if necessary, refine the factor structure of one of the two most popular self-assessed wisdom inventories, Webster's (2007) 40-item, five factor Self-Assessed Wisdom Scale (SAWS). The purpose was to confirm whether the SAWS five dimensions would hold in the current sample, in order to use the validated tool for this research programme. To our knowledge, no studies could be found submitting the 40-items of the SAWS to an exploratory factor analysis (EFA) using the robust Maximum Likelihood (ML) method and confirmatory factor analysis (CFA). An earlier validation study of the SAWS in Australia by Taylor et al. (2011) used the older principal components analysis (PCA) without confirming the structure with CFA. A more recent validation of the SAWS in Hong Kong by Fung et al. (2020) also employed PCA followed by CFA. Another purpose of this thesis was to investigate whether the SAWS facet of Openness was antecedent to wisdom as proposed by other wisdom models; since no evidence was found that this issue has been previously examined.

The second objective of this thesis, Study Two, was to validate the new SAWS-12, a refined version of the parent SAWS, in a new population sample. Further testing in a different population was essential before the measure could be recommended for use by other researchers. Though until now, there is no accepted "gold standard" wisdom measurement tool for comparison, the equally popular short form of Ardelt's (2003) 3D-WS, the Three-Dimensional Wisdom Scale-12 (3D-WS-12) was used for a one-on-one comparison with the refined SAWS-12. A further purpose of Study Two was to use the two brief measures of wisdom to explore wisdom, intelligence, age, and gender with the objective of trying to clarify these relationships.

The current chapter sets out a detailed discussion of findings from the two studies in this research programme, including potential underlying mechanism that may account for the results. By extension, "Wisdom, Intelligence, and the Good Life" are discussed in Section 7.3 to further integrate and demonstrate the thesis findings. Limitations and strengths of the research are highlighted and discussed in this chapter. Consideration for the unique contributions of the thesis to the field of knowledge and general implications of the findings including future directions, are also the focus of the current chapter. The work is completed with an overall summary and conclusion.

7.1.1 Validation of the 40-item SAWS with Confirmatory Factor Analysis

While the validation of a measurement tool is not unusual in the literature (Beccaria, 2010; Fein & Day, 2004; García-Campayo et al., 2018; Kim & Knight, 2015), as far as we could determine, it is less common for the SAWS in the Australian environment (see Taylor et al., 2011). Perhaps the most obvious finding to emerge from the CFA analysis is that the five dimensions of the 40-item SAWS failed to replicate in the current study. This finding corroborates the hypothesis and lends credence to the prediction that, the SAWS factor structure is untenable in its current form. It was established that the SAWS requires refinement before the instrument can be considered a reliable and valid measure of the wisdom construct. Compelling is that these results agree with those of other scholars such as Fung et al. (2020) who also failed to replicate the SAWS five factors through a CFA in their recent research. Conversely, Webster (2007) reported replicating the SAWS five dimensions in a PCA followed by a satisfactory CFA utilising the same data. There are three likely reasons for the lack of concordance between the current research finding with Webster's CFA results.

The first relates to the different analytic strategies used. In the current study, the SAWS five dimensions with its 40 items, were submitted to a CFA, the same analytical procedure used by Fung et al. (2020). However, Webster (2007) used the SAWS five factors or latent variables (i.e., Experience, Emotional Regulation, Reminiscence/Reflection, Humour and Openness) as manifest indicators rather than as latent variables as was originally intended during the development of the measure. Although Webster argued that such a methodology was justified to simplify model parameters, he conceded, "This is a suboptimal strategy" (p. 171). From what is known in structural equation modelling (SEM), all the error terms in the model are specifically estimated and accounted for (Tabachnick & Fidell, 2019). That is, by having an individual error term on each of the indicator variables the researcher is checking for several things, specifically, whether or not the model fits the data. By using the factors as manifest variables, there is a collapsing of all the error terms and of hiding any problems in measurement that may be obscuring the error variance.

Second, Webster's (2007) earlier cross validating the PCA findings with a CFA using the same data, is also problematic for testing the validity of a factor structure. A factor structure derived from a PCA or EFA will almost always fit well in a CFA when using the same sample as this procedure capitalises on any chance factors present in the dataset (Babyak, 2004; Flora & Flake, 2017; Yarkoni & Westfall, 2017). This methodology leads to model overfitting, or capitalising on the idiosyncrasies of the sample at hand. Fokkema and Greiff (2017) demonstrated that even when they used a completely random uncorrelated dataset for PCA or EFA, followed by CFA, the results produced a remarkably good model fit. The clear inference from Fokkema and Greiff's work is that, performing PCA or EFA and then CFA on the same data, "Yields deceivingly optimistic model fit indices and parameter estimates" (p. 400) and can have detrimental effects on the interpretation of the CFA. Reasons for such good model fit to data include: capitalising on chance characteristics of the data by performing a PCA or EFA, finding patterns that only reflect sampling fluctuations and using these as a hypothesis for a CFA on the same data. Given that SEM model fit indices are dependent on how well sample covariances are reproduced by the fitted model, if the sample covariances are small in comparison to sample variances, according to Greiff and Heene (2017) it is easy for any model to reproduce them well and show excellent model fit. Strikingly, as sample size increases, overfitting becomes less of a problem because sample correlations tend to approach population mean (Fokkema & Greiff, 2017).

Finally, sample size might also explain the current inconsistency in CFA findings relative to Webster's (2007) empirical work. Webster's study with 171 cases, might have been underpowered. Terwee et al. (2017) recommends to obtain a definitive psychometric appraisal for questionnaires, a minimum sample of seven times the number of items in the measure is required. Using this recommendation, the study by Webster of the 40-item SAWS would require 280 cases. Furthermore, Schönbrodt and Perugini (2013) suggest a sample of around 250 is necessary to attain stable correlation estimates. In the current analysis, having a large sample, it was possible to split the data randomly into two independent samples, subjecting one sample to EFA and the other to CFA thus validating the measure by replicating in two similar but different samples.

7.1.2 Exploratory Factor Analysis of the SAWS

The pattern that emerges from the EFA is one of subsets of items from the five factor SAWS with a good fit, supporting our predictions. It has been postulated the 40-item SAWS is best described by five dimensions (Taylor et al., 2011; Webster, 2007, 2019). This does not appear to be the case in our findings. It was demonstrated Webster's (2007) five factor SAWS inventory of Experience, Emotional Regulation, Reminiscence/Reflection, Humour, and Openness is best explained by a model with four dimensions without the Humour facet. There are certain similarities and differences between the current findings and those reported by other researchers, such as, Dortaj et al. (2018). Dortaj et al.'s PCA of the 40-item SAWS with an Iranian sample supported a four factors model, but without the Openness facet. The reason for the different four factors retained between the current study and that by Dortaj et al.'s is not clear but may have something to do with cultural values. Perhaps, with Iran, an Islamic State, oftentimes with rigid and inflexible religious demands on its populace (Cheraghi et al., 2015), respondents may not be open to new experiences, accounting for the failure of the Openness facet to appear in Dortaj et al.'s Iranian sample.

Considering that "self-mockery" (Sharp, 2001), and "levelling humour" (Thornhill, 1992) or the art of deflating the pretensions of those who take themselves too seriously, are the hallmark of the Australian ethos, it is perplexing that Humour did not appear as a facet in the Australian sample. The conjecture is that, maybe, the Humour items failed to resonate with the Australians in the current sample or perhaps the possibility that Humour is not a valid wisdom factor.

The finding that the Humour factor did not emerge in this analysis is supported by Ardelt's (2011b) contention that Humour is a consequence of wisdom rather than a component. The current result is also consistent with the relatively low frequency inclusion of Humour in definitions of wisdom in the literature reviewed, first by Meeks and Jeste (2009) and more recently by Grossmann and Kung (2019). Although some wisdom scholars (e.g., Damon, 2000; Jason et al., 2001; Perry et al., 2002; Taranto, 1989) recognise the role of Humour in wisdom, they consider Humour as a lesser aspect of the construct, rather than a core component. It is not unexpected that in the current research, the Humour component fragmented into at least three components, all of which loaded on factors unsupported by Webster's (2003, 2007, 2019) current conceptualisation of the SAWS component structure.

Another noteworthy result in the EFA analysis is the finding that the Emotional Regulation subscale has a more complex structure than that originally conceptualised by Webster (2007, 2019). The subscale is shown to consist of items relating to Awareness of Own Emotions, which composes Factor 3. Other items concerned with Regulating Emotions in Situations, loaded on a factor outside the revised four factor solution. The current results for this factor support those of Alves et al. (2014) who reported the Emotional Regulation factor has, “Items oriented to the identification of emotions [that] are clearly separated from those connected with the inner experience of emotions” (p. 53). The implications of this split between, being aware of one’s emotional experience and controlling it, with the relatively greater importance of awareness in this measure of wisdom is an important topic for further research.

7.1.2.1 Openness as Antecedent Wisdom Factor. Perhaps the most unexpected finding in Study One is the lack of support for the Openness facet of the SAWS as a wisdom precursor. Instead, results from the SEM and CFA analyses show that Openness is a basic component of wisdom, as this model is a better fit for the data. What is surprising about this finding is that, the MORE Life Experience wisdom model (Glück & Bluck, 2013; Glück et al., 2018) proposes that Openness is but one of four crucial resources required for wisdom development, appearing long before wisdom. Ardelt (2011b) views Openness as a personality trait predicting wisdom. There is also abundance of literature (Costa & McCrae, 1992; Erikson, 2008; McCrae et al., 2000; Roberts et al., 2006) that considers personality traits as distal in nature, formed in a deeper level of the personality structure of the self. What makes the current finding counterintuitive, is the study by Dortaj et al. (2018) whose PCA did not retain Openness, and the exclusion of Openness in the earlier list of the common subcomponents of wisdom by Meeks and Jeste (2009), and supported in the most recent list by Grossmann and Kung (2019). Although Jason et al. (2001) and

Yang (2001) incorporate Openness as part of their wisdom construct, it does not appear as an independent facet in their conceptualisations of wisdom.

Our results support Webster's (2003, 2007, 2019) assertions that Openness is an integral component of wisdom and infers an assumption that the SAWS Openness facet is more than just a personality trait. While the types of covariance structure analyses employed in this study are commonly used to test alternate models such as these, our findings would support further research on this question using longitudinal data to further test whether Openness is a component of wisdom or exists prior to the development of wisdom. Given complexities inherent in wisdom conceptualisations and analyses, the SEM findings provide some of the first direct empirical evidence that Openness is not antecedent to wisdom at least in this popular measure of the wisdom construct. An ongoing challenge for understanding of wisdom and its measurement is distinguishing which of the qualities associated with wisdom are components, which are precursors, and which are consequences.

7.1.3 Measurement Invariance, Reliability, Validity, and CFA for SAWS-12 and 3D-WS-12

The picture that emerges from the measurement invariance (MI) analyses show the SAWS-12 tool is invariant across both age groups and gender, as predicted, and these findings hold in different population groups and across time. These results demonstrate, regardless of age group membership, males and females interpret and respond to the SAWS-12 questionnaire in a conceptually similar manner. What these findings mean for the current study is that we can be confident when computing multi-group comparisons of factor means, such as analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), and t-tests; any statistically significant differences in group means indicate true group differences (Kim et al., 2012; Meredith, 1993; Millsap, 2011). These are key findings for a new abbreviated measure of wisdom and encouraging, given that to our knowledge, no studies on the 40-item SAWS have reported MI analyses. These results provide extra support for the reliability of the SAWS-12, as MI is also a measure of the scale's construct validity (Greene & Brown, 2009).

From the reliability and validity studies, SAWS-12 demonstrated high levels of internal consistency, with alphas exceeding those recommended for new measures by Cronbach and Shavelson (2004). This is compelling evidence that in developing the SAWS-12, brevity does not come at the expense of precision despite reducing the original length of the scale from 40 to 12 items. The SAWS and SAWS-12 have similar content representativeness, as their total scores were highly correlated. In the cross-measure correlations a correction was made for item overlap by removing items chosen for the SAWS-12 from the full-length SAWS before computing the correlations between corresponding full-length and abbreviated total. Arguably, the two measures are likely assessing the same underlying construct. For example, the SAWS-12 demonstrated expected association with age as other measures of wisdom reported in contemporary literature (e.g., Ardelt et al., 2018; Thomas et al., 2017; Webster et al., 2014) and gender (Dortaj et al., 2018; Webster, 2003) supporting the validity of the newly developed abbreviated form. The reliability of SAWS-12 was found to be much higher than that of the well-established 3D-WS-12, for which the current study recorded a similar reliability as Thomas et al. (2017) reported during its inception. The implication is that this brief SAWS-12 might be effective in capturing the complexities inherent in the wisdom construct and suggest it can be substituted in studies in lieu of the SAWS parent scale.

In the CFA replication analysis in Study Two, the SAWS-12 demonstrated an even better model fit to the data, than in Study One. Given that construct validity is essential in measurement and theory (Crocker & Algina, 2008), the findings for SAWS-12 lends credibility to the psychometric robustness of the tool in a different population sample and across time. Contrary to expectations, the 3D-WS-12 evinced less than adequate model fit parameters in the current sample.

Reasons for the underperformance of the 3D-WS-12 are not entirely clear, but there are several relevant points for consideration. For example, when García-Campayo et al. (2018) attempted to validate a Spanish version of the 3D-WS-12, they were unsuccessful which prompted them to propose their own short form. Although cross-cultural differences in wisdom may partly account for the inability of the measure to replicate the factor structure, some Western scholars (e.g., Taylor et al., 2011) have also failed to replicate the structure of the parent scale. On review of the literature, to the best of our knowledge, there appears to have been no follow up studies by Thomas et al. (2017) who constructed the measure to determine whether the tool's psychometric properties remained robust in other populations or across time. Had the scale developers conducted further validation studies, inadequacies with the measure may have become apparent and possibly overcome. Also, during the development of the 3D-WS-12, the measure was not directly tested against alternative models of wisdom, such as the SAWS, to determine how the scale would perform.

From discussions thus far, it is not surprising the 3D-WS-12 also showed unsatisfactory MI across age groups compared to the SAWS-12. This indicates the tool may not be tapping the same construct at all ages. The notion is not unusual. For instance, in developmental psychology, the process of reflection or perspective taking represented in the 3D-WS-12 by the Reflective element, can change across the adult lifespan. Ardelt et al. (2018) showed for the 3D-WS Reflective facet, wisdom increased with age until midlife, remained relatively stable, then subsequently increased again after age 71. To now, there is no single criteria for accepting data as a good model fit (Hayduk & Glaser, 2000). However, using the recommendations by Hu and Bentler (1999), the present CFA findings for the 3D-WS-12 in the current sample, indicate the measure requires further testing in different population samples and against other models of wisdom, with necessary refinements to establish the tool as a valid measure of wisdom.

In the current thesis, a SAWS-12 was successfully constructed from the SAWS, with the new brief measure demonstrating excellent psychometric properties. No attempt was made to obtain a better fitting structure for the 3D-WS-12 as dropping items would result in fewer than three items for some facets. According to Osborne and Costello (2009) a factor with less than three indicators, is generally weak and unstable. Any major revisions of the scale are important considerations for future research.

In view of the controversies surrounding the full version of the SAWS (e.g., Alves et al., 2014; Ardelt, 2011b; Dortaj et al., 2018; Fung et al., 2020), the findings for the SAWS-12 are particularly meaningful, considering it is the first instance to our knowledge that a brief form of the SAWS has been constructed and the factor structure was confirmed, not only in a new sample, but also in a different population across time. Taken together, the current findings for the SAWS-12 meet expectations of a scale that is psychometrically strong and might encourage others to incorporate the SAWS-12 in their research design, a distinct advantage where time is of the essence, as the tool can be administered quicky within the context of longitudinal studies, minimises administration costs, time, and response fatigue.

7.1.4 A Note on Effect Sizes

Prior to discussing mean wisdom and intelligence differences across age groups and gender, we note the significant results in the current thesis posted effect sizes ranging from small (η_p^2 = .01), medium (η_p^2 =.06), and large (η_p^2 =.138) according to Cohen's (1988) criteria for group mean comparisons. It is perhaps predictable that most of the effect sizes are small. Possibly, the reason for the anticipated small effect sizes relate to the complex nature of the wisdom and intelligence constructs.

Also, sample sizes may play a role in effect sizes reported by researchers. Granting large samples do not create small effect sizes per se, but they do provide enough power to detect small effects. Therefore, an a priori power analysis is useful to determine the minimum number of participants required to detect an effect of a given size. We also observe that other wisdom scholars (e.g., Ardelt, 2009; Cheraghi et al., 2015) who applied the same statistical analyses as the current thesis, that is, ANOVAs, MANOVAs, and t-tests, also reported small effect sizes. Whether small effects, that are statistically and theoretically significant, are also practically useful, is traditionally determined by other researchers, practitioners, and policy makers.

7.1.5 Bivariate Correlations

An important pattern emerged from the bivariate correlations, which partly clarifies differences and similarities between wisdom and intelligence. The moderate correlation between the SAWS-12 and the 3D-WS-12 (r = .34) is similar to correlations previously reported by wisdom scholars using the SAWS, 3D-WS, or 3D-WS-12 (e.g., Glück et al., 2013; Taylor et al., 2011; Thomas et al., 2019), and suggests that these scales assess a shared construct, even though the connections are not overly strong. What is also evident at the bivariate level, is the 3D-WS-12 shares the same positive correlation with the SAWS-12 as it does with crystallised intelligence (G*c*), and significant positive, although weaker relationships with inductive reasoning (G*f*) and education. This is not wholly unexpected given the 3D-WS-12 but not the SAWS-12 has a strong cognitive component.

The present bivariate correlation results are important in at least two major respects. First, the nonsignificant correlation between the SAWS-12 with education, and G*f*, also with G*c* after controlling for age, suggests the SAWS-12 tool likely measures wisdom uncontaminated by intelligence. Second, the 3D-WS-12 does not display adequate discriminant validity, as would be expected for a measure of wisdom (e.g., the SAWS-12), due to the 3D-WS-12 significant correlations with intelligence. What these results might mean for researchers measuring wisdom using the 3D-WS-12 (but not the SAWS-12) in their work, is that, to gain a clearer interpretation of research findings, scholars should consider incorporating a short measure of G*c* and G*f* so that the variance related to intelligence effects can be measured and controlled.

A further striking finding to emerge at the bivariate level, is that the 3D-WS-12 is significantly positively correlated with age, while the parent scale, the 3D-WS is often associated with negative correlations with age (e.g., Ardelt, 2003, 2016; Glück et al., 2013). A possible explanation for these differences might be that even though the 3D-WS-12 has reverse-worded items, the current sample includes many adolescents and young adults. Since G*f* declines with age, novel information, such as reverse worded items are harder for older persons to manipulate and interpret correctly.

Hence, measures with reverse worded statements are observed to be negatively related to age when the study sample is composed of mostly older persons (e.g., Ardelt, 2003, 2016; Glück et al., 2013). Adolescents and younger adults with higher fluid abilities may not be as adversely affected, perhaps counterbalancing the negative correlation of the 3D-WS and 3D-WS-12 with age. The suggestion is that, when research like the current study, uses a lifespan sample with a large proportion of adolescents and young adults, then, as expected, the 3D-WS-12 would likely post a positive relationship with age. Many scholars who have used a lifespan sample with the 3D-WS have not found the measure to be negatively related to age (e.g., Ardelt, 2010; Mansfield et al., 2010; Taylor et al., 2011). The implication is that the SAWS-12 with no reverse worded items also demonstrated a positive correlation with age, and to our knowledge the parent scale the SAWS has not previously been negatively correlated with age. Including adolescents and young adults in the present study extends previous findings. Our study also enhances the knowledge of the nuances researchers might encounter when assessing wisdom and age with different measures.

7.1.6 The Effects of Gender on Wisdom and Intelligence

Although contemporary wisdom literature does not support gender differences (Aldwin, 2009; Glück, 2019) the observed gender results for the SAWS-12 are compelling. At the bivariate level, the SAWS-12 was the only variable to correlate with gender significantly and positively, albeit weakly, with women scoring higher. Gender differences were demonstrated in the ANOVA in Study One and these results were mirrored in the MANOVA in Study Two in a different population. Nevertheless, the gender effects are small ($\eta_p^2 = .01$) according to Cohen’s (1988) effect sizes for group mean comparisons with, η_p^2 (small = .01, medium = .06, large

= .138). In contrast, there were no gender differences in wisdom on the 3D-WS-12. These gender findings for the SAWS-12 and the 3D-WS-12 are not entirely surprising because they are theoretically and conceptually meaningful.

Some scholars posit that men may have cognitive advantages, while women may have advantage in intrapersonal domains (Baden & Higgs, 2015). In fact, Ardelt (1997) found that, "...Wisdom for men is more strongly characterized by cognition and less by affect than for women" (p. 19). Since the SAWS-12 and its parent measure the SAWS are comprised in part by an explicit affective but not an explicit cognitive dimension (Webster, 2003), it is not surprising women would score higher on this measure of wisdom. However, the 3D-WS-12 with its strong cognitive and affective components, there were no gender differences. Considering the SAWS-12 and the 3D-WS-12 share a modest correlation (*r* = .34) this suggests the measures are tapping somewhat different conceptions of wisdom, which may also partly help to explain the contradictory gender findings. Webster (2019) notes that convergent validity between the parent scales, the SAWS and the 3D-WS, is relatively weak, again implying they may be measuring different facets of wisdom.

Several researchers show no gender differences on the SAWS (e.g., Fung et al., 2020; Glück et al., 2013; Moberg, 2008; Webster, 2007; Webster et al., 2014), others still (e.g., Dortaj et al., 2018; Webster, 2003) have found gender differences on the SAWS. Webster (2003) reported gender differences on the 30-item SAWS in a small lifespan sample of 85 Canadians with women also scoring higher. Similarly, Dortaj et al. (2018) demonstrated women scored significantly higher on the Experience and Emotional Regulation facets of the 40-item SAWS in an Iranian sample of 395 high school, university, and community participants. One possibility for this inconsistency in gender differences on the SAWS and the SAWS-12 can be explained in part by the finding that the observed gender effects are only small, therefore, it is plausible that such effects are reported inconsistently in the literature. In support of the 3D-WS-12 results, other wisdom scholars (e.g., Ardelt, 2003; Bang, 2015; Glück, 2019; Glück et al., 2013; Moberg, 2008; Webster, 2007; Webster et al., 2014) have found no relationship between wisdom and gender.

In the current study, we are confident the significant differences in group means indicate true gender differences because SAWS-12 is invariant across gender (Meredith, 1993; Millsap, 2011). Notwithstanding these gender differences are theoretically and statistically significant, some might perhaps question the practical usefulness of these findings. While statistical significance relates to whether an effect exists, practical significance refers to the magnitude of the effect and its usefulness in the real world, although what is meaningful might be subjective and may depend on the context. Since wisdom provides not only clarity of insight but also tools and coping resources to improve the welfare of self and others in pursuit of a good life, arguably enhancing the wisdom of men and women through wisdom interventions (see Knight & Laidlaw, 2009) appears ethically warranted. The occurrence of gender differences in this study, help to strengthen our understanding of wisdom as measured by the SAWS-12 and by extension the SAWS, adding empirical clarification to the body of literature in this area.

On the question of mean intelligence differences with gender, results emerged between crystallised (G*c*) and fluid (G*f*) intelligence with gender, to support the lack of gender differences in intelligence. This implies, while there might be individual differences in intelligence, such differences are no more pronounced for male or female. However, current findings appear to be either consistent or different from those of other researchers, depending on whether G*c* or G*f* is being assessed.

In relation to G*c* and gender, the current findings are in accord with those of other scholars (e.g., Hyde, 1981, 2005) who found no gender differences in crystallised intelligence. However, the G*f* findings oppose other empirical reports where either men or women perform better. For example, G*f* defined as performance on tests such as the Raven's matrices, a meta-analysis of 57 studies showed men performed significantly better than women (Lynn & Irwing, 2004). Yet, findings from combined cross-sectional and longitudinal data on episodic memory, a measure of G*f*, showed women performing better than men (Lundervold et al., 2014). Such inconsistencies can be explained, in part, by differences in measures used to assess G*f* and which aspects of G*f* are being examined.

The indication is that different measures are assessing different cognitive functions and the intelligence construct has been conceptualised in diverse ways and not all definitions are consistent (see Gottfredson, 1997; Snyderman, 1987; Sternberg, 1992). The way the intelligence concept is operationalised and assessed is likely to affect research outcomes. This echoes the wisdom and gender results we described earlier in this section, where the SAWS-12 and the 3D-WS-12 posted opposing gender outcomes. The inference is that, because wisdom and intelligence are complex, multidimensional constructs, which are difficult to define and measure, researchers need to determine carefully what measures and their facets are assessing if research results are to be compared and replicated.

7.1.7 The Effects of Age on Wisdom, and Intelligence

The pattern of results found between wisdom and the ageing trajectory from the ANOVA for SAWS-12 in Study One were reflected in the MANOVA findings for both SAWS-12 and 3D-WS-12 in Study Two. We established a link between wisdom and the ageing trajectory, which shows adults of all ages whether young, midlife or old, are wiser than adolescents. The strength of the connection between mean wisdom scores and age does not follow a linear progressive increment across the lifespan but rather, a generally inverted U-curve progression which demonstrates that although young adults differ in wisdom from midlife adults, these two groups are similar in wisdom to older persons. Even though adolescents' mean wisdom scores are the lowest of the groups we examined, Pasupathi et al. (2001) posits, adolescence is a time of rapid wisdom acquisition. A lifespan perspective is therefore warranted in the study of wisdom development and including adolescents in the current study, makes a relevant contribution to continued understanding of the wisdom–age trajectory.

The current findings are inconsistent with previous wisdom research. There are scholars who either found no age effects with wisdom (e.g., Ardelt, 1997, 2010; Mansfield et al., 2010; Moberg, 2008; Taylor et al., 2011; Webster, 2003, 2007; Zacher et al., 2015), declining wisdom (Ardelt, 2003; Glück et al., 2013), or midlife adults as top wisdom scorers, while young and older persons scored at the same average level (Ardelt et al., 2018; Thomas et al., 2017; Webster et al., 2014). Although the association between wisdom and age can only be fully examined with longitudinal data, it seems possible that the current findings could be attributed to cohort group differences.

There is unequivocal data from cross-sectional and longitudinal studies that suggest wisdom characteristics increase in adolescence and early adulthood for individuals in general (e.g., Inhelder & Piaget, 1958; Pasupathi et al., 2001; Richardson & Pasupathi, 2005). According to some scholars (e.g., Staudinger, 2008; Sternberg, 2005a) conditions for wisdom to develop further, an individual might require a supportive social environment, educational opportunities, and a strong desire to pursue psychosocial growth. One interpretation of why the current cohort of elders performed better than expected might be the supportive environment they shared.

The oldest old in the current sample (combined Study One and Study Two) totalling 3.52%, were born pre second world war (WWII). These small group of elders, the “Silent” generation, grew up experiencing the effects of the great depression followed by WWII. However, most of the current sample of older adults, the “Baby Boomer” generation were born post WWII and like many of their same age peers, born in industrialised Western societies, this cohort group of older Australians grew up in conditions advantageous for wisdom acquisition, if so desired. They missed world-wide economic recession during the great depression in the 30s, enjoyed improved education (Flynn, 2007), greater social support, better health, and general well-being (Frey & Stutzer, 2010). Furthermore, the cohort of older persons appear highly motivated and are known to engage in spiritual contemplation, which is acknowledged to increase greater self-insight (Vohra-Gupta et al., 2007) and might positively impact wisdom development. Nevertheless, despite theories of decrements in wisdom with ageing (Sternberg, 2005a), the wisdom–age relationship is complex. Indications are that it is not chronological age per se which is important, but the specific types of experiences one encounters over the lifespan. Hence, wisdom might increase with age for those with the opportunity and motivation to pursue its development (Staudinger & Glück, 2011a).

The current non-significant differences between older persons’ wisdom scores and those of either young or midlife groups were unexpected given older adults are often observed to be inflexible (Meacham, 1990) and less open to new experiences (Webster et al., 2014), conditions detrimental for wisdom development.

Although these findings enhance our understanding of the relationship between wisdom and age cohorts, to develop a fuller picture, additional studies are needed to examine these relationships in longitudinal data. The inference from the current study is that, this older cohort of seniors have applied their advantageous social and environmental opportunities to self-reflect and integrate their life experiences in a wisdom fostering manner; qualities which wisdom scholars and lay persons agree are necessary for wisdom to actualise.

7.1.7.1 The Curvilinear Relationship Between Wisdom and Age. Based on the zero-order correlations, age was positively related to both SAWS-12 and 3D-WS-12. The bivariate correlations masked the inverse U–curve pattern between age and wisdom with the apex at midlife, supporting the combined "fluid and crystallised" intelligence view proposed by Sternberg (2005a). The decline in wisdom might be due to characteristics of later life, postulated to be damaging to wisdom, such as decreases in fluid intelligence (Kievit et al., 2016), increases in rigidity or dogmatism (Meacham, 1990; Schultz & Searleman, 2002), or a decrease in Openness to experiences (Webster et al., 2014). The understanding and regulation of complex emotions is curvilinearly related to age (Labouvie-Vief, 2003, 2009; Labouvie-Vief et al., 2007) and such declines in emotional functioning in older age might also affect wisdom scores, favouring midlife adults.

The curvilinear relationship between wisdom and age has been reported by other wisdom scholars who have applied both self-report (Ardelt et al., 2018; Thomas et al., 2017; Webster et al., 2014) and performance measures such as the Berlin Wisdom Paradigm (BWP; Baltes & Staudinger, 2000). Therefore, our results are unlikely to be restricted to the measures used in the current study. Although empirical evidence has shown that in adulthood, age is not necessarily linearly correlated with wisdom (Baltes & Staudinger, 2000; Gluck et al., 2013; Levenson et al., 2005; Taylor et al., 2011; Thomas et al., 2019; Webster, 2007) many other researches have not reported a curvilinear relationship between wisdom and age (Ardelt, 2003; Dortaj et al., 2018; Fung et al., 2020; Glück et al., 2013; Taylor et al., 2011; Webster, 20003, 2007). The inconsistency is very likely because the curvilinear relationship was not investigated in those studies. Since the relationship between age and wisdom appears to be curvilinear, studies that only assess the linear association, without curvilinear trends, might miss this connection and consequently obtain an incomplete picture.

It is somewhat confusing that the obtained results show a curvilinear relationship, between wisdom and age, which appears to contradict the earlier ANOVA and MANOVA findings reported from two different population samples. We demonstrated that wisdom, purported to be at its zenith during midlife (Sternberg, 2005a) is not significantly different from that of older persons. By way of explanation, the observed curvilinear trend has been shown by other wisdom scholars to be weak and Ardelt et al. (2018) reported a rather flat inverted U–shape curve between wisdom and age for the composite 3D-WS. Arguably, for the current cohort of elders, their group wisdom scores still dovetail with that of the midlife group, despite wisdom decrements observed in later life. These results further enhance and extend knowledge of the relationship between wisdom and age.

7.1.7.2 Are the Wisest Individuals Older and Better Educated? The study demonstrated wisdom scores on the 3D-WS-12, the wisest are in fact not only older but also more erudite, whereas scores on the SAWS-12 showed the wisest to be older yet no better educated than the rest. Intuitively it was expected individuals endowed with most wisdom would be older, a notion supported by both laypersons (Glück &

Bluck, 2011) and researchers (Staudinger, 1999; Glück & Bluck, 2013). The reason might be because according to Kekes (1983), theoretically, it takes time for wisdom to develop.

The wise are expected to achieve higher education, as education might encourage individuals to be open to new experiences, which according to Ardelt et al. (2018) encourages wisdom development. Many scholars (e.g., Kohn & Schooler, 1983; Kohn et al., 2000) found people with higher education are more open to change, while those with lower educational achievements, are inclined to be authoritarian and inflexible, common scourges to wisdom growth (Schultz & Searleman, 2002). For the SAWS-12, it was argued that the noncognitive focus of the scale allows for participants with lower education to respond competently to the questionnaire. These findings, are supported by the work of other scholars. Glück et al. (2013) found on the SAWS there were no differences in wisdom scores with educational achievements, but on the 3D-WS participants with higher education scored significantly higher than others. Webster (2003) also found no relationship between the SAWS and education.

The current findings accord with earlier bivariate observations, showing education to be unrelated to SAWS-12 wisdom, but significantly and positively associated with the 3D-WS-12, although weakly. With reference to the 3D-WS-12, we established a link with Ardelt's (2003) concepts for the 3D-WS and corroborate her ideas that a positive association between age and wisdom might be more likely among highly educated individuals than in those individuals with a lower education due to the cognitive nature of the measure. These findings continue to highlight similarities and differences between the SAWS-12 and the 3D-WS-12 and by extension their parent measures.

In relation to intelligence and ageing trajectory, while the ANOVA and MANOVA findings demonstrated a pattern of increments and decrements between wisdom and ageing, what transpires from the MANOVA for crystallised intelligence (G*c*) and ageing is entirely different. A pattern was observed of linear positive augmentation of G*c* scores across the adult lifespan, with a large effect size. The G*c* and wisdom findings with age help to clarify the research question, "How does wisdom and intelligence differ from each other?", as far as wisdom and G*c* is concerned. The implication is that as individuals age, they become smarter which may have positive impact on how they relate to their environment as G*c* helps focus on the *how* of doing things (Sternberg, 2019a; Sternberg & Detterman, 1986). The potential is also there to become wiser, although wisdom is not a gift received as a result of old age. The current results for G*c* corroborate consensus from intelligence scholars (e.g., Hartshorne & Germine, 2015; Salthouse, 1982, 2019; Schaie, 2016) who report linear increases in crystallised intelligence until one's 60s or 70s, supplementing our knowledge in this area.

7.1.7.3 The Curvilinear Relationship Between Fluid Reasoning and Age. Noteworthy, the MANOVA showed a pattern of fluid intelligence (G*f*) and ageing that is similar to the trajectory followed by wisdom and ageing in the present study. The results revealed significant G*f* differences between young persons and midlife group, though the two groups do not significantly differ from the group of older individuals. What these results are implying is that the development of G*f* across the adult life-course is more similar to the development of wisdom than to the development of G*c*. Nevertheless, the G*f* and ageing trajectory in this thesis is unexpected and contradicts prevailing intelligence literature which proposes that ageing is particularly harmful to G*f* (Kievit et al., 2016).

As predicted the study found a curvilinear relationship between G*f* and age, however, a caveat was identified. The inverted U–shaped curve remained relatively flat, a clear indication of a ceiling effect, as many seniors (and other respondents) attained near maximum or even perfect scores. It was therefore assumed the cohort of older persons (and the sample at large) do not find the G*f* Letter Series questionnaire sufficiently challenging. To our knowledge, this ceiling effect has not been previously described with the Letter Series measure.

The ceiling effect was somewhat surprising in relation to the older persons, considering there is clear cross-sectional and longitudinal evidence that G*f* declines over the adult lifespan, starting in an individual's mid-twenties and becoming more pronounced in late midlife (e.g., Park et al., 2002; Salthouse, 2009, 2018, 2019; Schaie, 2016; Schaie & Willis, 2010). The current study shows the expected downward slide in G*f* with ageing is not a foregone conclusion. Although reasons for the current inconsistencies in our findings, compared to those from empirical research are not entirely clear, there are several points of interest to consider.

One possibility is due to improvements in education post WWII, the current cohort of elders are more familiar with cognitive performance tests (Neisser, 1997) which gives them an advantage in IQ assessments, compared to their predecessors. Another consideration is because human functioning and development is shaped by socio-cultural contexts and accompanying historical changes (Baltes et al., 1979, Bronfenbrenner, 1986; Schaie, 1965) it appears old age in Western nations is getting younger (Gerstorf et al., 2020). Current 75-year-olds are shown to function cognitively like 56-year-olds did 20 years ago (Gerstorf et al., 2015), as such, it is not surprising that the present cohort of elders performed better than expected. A third possible explanation is that, older age is theorised to be accompanied by declines in cognitive processing speed (Salthouse, 1996, 2000). Bugg et al. (2006) showed controlling for processing time may reduce or even eliminate such age-related declines in reasoning assessments. Hence, it may be partly because the G*f* questionnaire was untimed that the older adults performed better than expected, yet, unlimited time does not account for the observed ceiling effect.

Of consideration is the Letter Series measure was designed over five decades ago and may no longer be an adequate or relevant measure of G*f* and might require upgrading. These results, challenge stereotypical associations between G*f* and ageing. The study's findings augment and extend our understanding of the relationships between G*c*, G*f*, and wisdom with ageing, cohort effects, and importance of the measures that researchers use in studying these phenomena.

7.1.7.4 How Similar are Wisdom and Intelligence Ageing Trajectories?

Perhaps profoundly, it was demonstrated that the wisdom and ageing trajectory is an inverted U-curve, regardless of the content of the assessment tool which might be non-cognitive (e.g., SAWS-12) or strongly cognitive (e.g., 3D-WS-12). The wisdom–ageing progression parallels that traced by G*f* over the adult life-course in accord with the theorised view of wisdom as “fluid intelligence” suggested by Sternberg (2005a). It was also demonstrated that G*c* linearly increases with age and such increments are large. Seemingly, there are opposing processes at work whereby G*f*, as the genetically driven mechanics or memory appear to decline with age, while the culturally accumulated knowledge driven cognitive pragmatics, or G*c* increase with ageing (Baltes, 1993). Gains in G*c* appear insufficient to staunch the losses observed in G*f* with an overall downward trend in wisdom commencing in late midlife. It can be inferred from our findings that, increasing G*f* with ageing could possibly inoculate or cushion individuals against such later life declines in wisdom.

Schaie (2016) argued that age-related cognitive declines can be ascribed to disuse of specific skills, dubbed the “use it or lose it” hypothesis, it appears such losses might be reversed through educational interventions. Some two-thirds of participants in a cognitive training program showed significant improvement and 40% of those who had declined significantly were returned to their earlier pre-decline level of cognitive functioning (Saczinski et al., 2002; Schaie, 2013, 2016; Schaie & Willis, 1986). There is also evidence that engagement in intellectual, social and physical activities might offer protective benefits from age-related cognitive decline. While there is some support for the *use it or lose it* hypothesis (e.g., Salthouse, 2006) others (e.g., Bielak, 2010) advocate caution. Continued research is warranted to tease out which interventions might provide the greatest benefit to the ageing mind and consequently to wisdom growth.

7.2 Hierarchical Multiple Regression, Mediation, and Moderation

In the regression results, for the SAWS-12, it was demonstrated that, although age and gender are significant positive predictors of wisdom, G*c*, G*f*, and education are not. In contrast, differences emerge for the 3D-WS-12 with G*c*, G*f*, and age positively predicting wisdom, while gender or education did not. These findings are not surprising, given they continue to emphasise the intelligence connections with the 3D-WS-12 but not the SAWS-12, and the gender influence on the SAWS-12. Not only do these findings merge with those from the current MANOVA results, they are also supported by the work of Glück et al. (2013) who found for the parent scale, the SAWS, non-significant correlations with G*c* and G*f* after controlling for age. For the 3D-WS the significant positive correlations with G*c* and G*f* remained after controlling for age.

The issue of the relationship between age and wisdom is interesting, because at the bivariate level it was shown that a large correlation exists between age and vocabulary (*r* = .51). Such a strong correlation might attenuate or even obscure the underlying relationship between wisdom and age, unless controlled. These findings, help to extend our knowledge and explain important theoretical differences between measures of wisdom. An important implication for wisdom and intelligence research is that for multidimensional concepts, researchers need to be alert to the fact that there is no single measure that can adequately capture all the complexities involved in these constructs.

Regarding the mediation analysis, it was recognised as another layer of intricacy to our understanding of the relationships between wisdom, intelligence, and age. To explicate why a relationship exists between age and wisdom, it was demonstrated, at least for the 3D-WS-12, that G*c* but not G*f* mediates this relationship. These findings suggest that because of the cognitive orientation of the scale, knowledge acquisition might be intertwined to wisdom growth. Intelligence does not mediate the relationship between age and SAWS-12 which supports the earlier MANOVA and regression results. There are multiple indications that, the mechanism for acquiring SAWS-12 wisdom across the lifespan, may not entirely depend on how intelligent an individual might be.

The moderation analyses showed that neither age, nor gender moderated the relationship between intelligence and 3D-WS-12. This implies that, to acquire 3D-WS-12 wisdom, intelligence might be equally helpful for men and women of all ages. Although gender failed to moderate the relationship between G*f* and SAWS-12 wisdom, G*c* did. The “simple slopes” (see Figure 6.12) counterintuitively show for midlife and older persons that more G*c* means less wisdom according to the SAWS-

12. These results are in opposition to the MANOVA and also the regression analysis which show no relationship between SAWS-12 wisdom and G*c* after controlling for age. Caution is due when interpreting the moderation results between G*c* and SAWS-12 by age. It was argued that in reality there is no relationship between age and G*c* on SAWS-12 Wisdom on several accounts. Large samples of around 500, as in the present analysis, greatly increase the chance of a Type I error (Kim, 2020). In addition, it was noted in part of the Johnson-Neyman analysis (see Table 6.7), the upper bound CI for the significant zones almost cross zero (range = –0.01 to –0.03), reducing confidence in these results. It was suggested that this moderation finding was possibly an artefact of age and crystallised intelligence, which would support the strong relationship between age and vocabulary (r = .51) evidenced earlier in this section. In conclusion a true effect is probably unlikely, that is age does not moderate the relationship between G*c* and SAWS-12 wisdom.

7.3 Wisdom, Intelligence, and the Good Life

The notion that wisdom and intelligence are distinct constructs sharing some characteristics has been advocated by experts and laypersons (Sternberg & Jordan, 2005). Distinction between wisdom and intelligence is crucial to ensure that wisdom assessment tools, used by researchers, do not inadvertently also measure intelligence. It is an important consideration because, whereas intelligence helps us engage successfully with our current and even in seeking new environments (Sternberg, 2019a), wisdom positions us favourably to live a full life, that is not only good for oneself but all humankind, deal with the vagaries of life, and ultimately face our own mortality (Ardelt, 2000a).

Since the distinction between wisdom and intelligence is important, ancient and modern scholars have tried to determine just how the two concepts differ.

Ancient philosophers such as Aristotle (ca. 350 B.C.E./1999) spoke of practical wisdom (phrónēsis), or doing and acting wisely, as clearly distinct from intelligence. Aristotle viewed phrónēsis as a master virtue, that is necessary and sufficient for all virtues, but saw intelligence as a form of *cleverness* or *shrewdness* (Schwartz & Sharpe, 2019). Others (e.g., Clayton, 1983; Holliday & Chandler, 1986) contend that intelligence focuses on the *how* of doing things, while wisdom centres on whether one *should* perform certain actions. The current research programme is from an empirical perspective. Indubitably, without intelligence we cannot advance human knowledge. As Kupperman (2005) suggests, to use that knowledge to advance the welfare of the self and others to attain the good life, requires wisdom.

The two studies in this thesis demonstrated that the acquisition of wisdom is related to one's gender, depending how wisdom has been conceptualised, operationalised, and measured by the researcher. Hence, our results either corroborate or repudiate contemporary literature. Wisdom measured by the SAWS showed gender differences with women scoring higher, supporting some researchers (e.g., Dortaj et al., 2018; Webster, 2003). However, the three-dimensional wisdom is gender neutral, verifying prevailing knowledge (e.g., Aldwin, 2009; Glück, 2019; Jung, 1964). What is salient is that the relationship between wisdom and gender is complex.

This thesis also showed intelligence is gender neutral, although empirical studies are inconsistent in this area too. Specifically, one area in which gender differences in intelligence are less ambiguous and more consistent, is in crystallised intelligence. Crystallised intelligence findings on gender in this study receives wide support in intelligence literature from longitudinal and cross-sectional data, which report no gender differences (e.g., Hartshorne & Germine, 2015; Hyde, 1981, 2005;

Salthouse, 1982; Schaie, 2016). However, although no gender differences in fluid reasoning were found, previous literature has been markedly inconsistent, depending on the aspect of fluid reasoning being assessed and the assessment tool used. Age differences were identified in wisdom and intelligence. Importantly, in the current thesis, except for crystallised intelligence, which was linearly related to age; the wisdom–age trajectory was remarkably similar to that obtained for age–fluid reasoning, with both charting a curvilinear curve across the adult life-course. The inverted U-curve for wisdom and age was found, irrespective of the content of the wisdom measurement tool.

Still, in many societies, intelligence is coveted with the school systems designed to try and enhance students' intelligence; but wisdom which is sorely needed by society (Sternberg, 2003, 2019b), as far as could be determined is not part of regular school curriculum. Some researchers (e.g., Ardelt, 2008, 2020; Bruya & Ardelt, 2018; Ferrari & Potworowski, 2008; Sternberg & Grigorenko, 2003; Sternberg et al., 2007) demonstrated wisdom could be learnt in the classroom and our findings, generally support the role of education in wisdom acquisition. In short, teaching wisdom at school can provide handsome dividends for the future by encouraging wise individuals. The wise are known to set goals in multiple life undertakings which contribute to *optimal development*, for the *self* and *others* (Webster, 2003, 2007, 2019).

Furthermore, what has been observed is that wisdom like many categories of behaviours, for example, helping behaviours in children are influenced by modelling (Bandura, 1977). In organisations mentoring by generative wise older leaders has been shown to empower younger generations of leaders (McKenna & Rooney, 2019; Northouse, 2018; Zacher et al., 2011; Zacher et al., 2014) to become tomorrows' wiser leaders, for the benefit of all. Consistent with the findings of this study, the ideal mentors should not be too old, excluding our oldest old seniors from mentoring roles. For the oldest old, onset of illness, physical debilities, and accompanied cognitive decline, reported in the literature (e.g., Kaufman, 2001) does not augur well for retaining one's wisdom in the twilight years. Other avenues aimed at promoting wisdom in adults, might include mindfulness (Levenson & Aldwin, 2013) and therapeutic interventions (e.g., Knight & Laidlaw, 2009). From this thesis, therapeutic interventions specifically focused on increasing G*f* would be beneficial. In order to win the race for a better tomorrow, it is imperative to foster and nurture King Solomon's wisdom (King James Bible, 1769/1990, 1 Kings 3: 16–18) the kind of wisdom that entails the good life for the self and others, whether it be through a combination of teaching, modelling behaviour, meditation and mindfulness, or therapeutic intervention.

7.4 Limitations and Strengths

We note that there are some major limitations to the current research specifically in relation to the recruitment process which employed convenience samples. The most obvious criticism regarding convenience sampling is sampling bias due to the unknown reasons why some individuals choose to take part in the studies and others do not, as such the sample is not a clear representative of the entire population.

Another limitation of the current research is that because of the relatively small group of older respondents who participated in our data collection, it is not clear how reliable these findings are. Therefore, the current results cannot be generalised to all the older adults in Australia. In order to be confident of the validity of the results, these studies would need to be replicated with a balanced age sample of adolescents, young adults, midlife adults, and older persons.

A further limitation of the two studies is that they were both cross-sectional. The association between wisdom, intelligence, and age can ultimately only be determined with longitudinal data, as cohort effects might be partly responsible for the results. One of the strengths of the current research, is that our samples were large enough to support these analyses, however the respondents were mostly female, less than 45 years of age, and the large majority were White Australians. Due to the nonrepresentative nature of the data, generalisability is thus potentially limited.

Nevertheless, the use of a sample with a wide age range and the inclusion of adolescents and young adults has the potential to help in further clarifying the wisdom–age and intelligence–age relationships. Future research with other populations and with population-based sampling, rather than convenience samples would strengthen the case of the usability of the SAWS-12.

Related to the sample composition, research suggests cultural variations on the conceptions of wisdom (García-Campayo et al., 2018; Grossmann et al., 2012; Kung & Grossmann, 2018; Yang, 2001, 2011; Yang & Intezari, 2019). With the current sample recruited from Australia; there is the potential impact of cultural differences influencing the factor structure and utility of the SAWS-12. Nevertheless, one advantage of the SAWS-12 is that the measure displayed strong psychometric properties which has an important role to play in cross-cultural wisdom research.

Although the SAWS-12 and the 3D-WS-12 used in the current research are individual difference measures of wisdom, this is clearly a trade-off in conceptualising and measuring wisdom as a trait, or wisdom as a state. Grossmann et al. (2019) proposed that wisdom measurement can depend on the situation, therefore impacting research findings. Recent development of a measure, assessing both personality traits and situations, such as the Situated Wise Reasoning Scale (SWIS; Brienza et al., 2018) could prove useful in future wisdom studies.

Self-report measures can limit validity due to social desirability (SDR) responses by respondents (Shaughnessy et al., 2012). The current research was designed to incorporate an SDR measure. It was disappointing to find the reliability of the M–C 2 (10) was unacceptably low in the current study. Future research may need to incorporate an SDR measure with more items to improve internal consistency.

The design of the present studies may also have been limited by the use of electronic, self-report measures. Although this method of data collection is employed by many researchers as it is a practical and efficient method of collecting large amounts data, it also limits the control the researcher has over certain factors. As an example, there was no way of determining whether participants were honest about various demographic questions and responses on the inventories may potentially have also been either false, misunderstood, or interpreted in different ways by different participants. Although convenience would be compromised, these limitations could be overcome in future research by utilising pen and paper inventories with the researcher present.

Despite the fact that the statistical test indicators used in the thesis were in line with recommendations (e.g., Hu & Bentley, 1999) and widely applied by other wisdom researchers (e.g., Greene & Brown, 2009; Thomas et al., 2017) for testing model fit in structural equation modelling (SEM), parsimonious fit indices which have been adjusted to penalise models that are less parsimonious, were not sought and applied. As an example, although the Comparative Fit Index (CFI) was used extensively in the current SEM analyses, the parsimonious CFI (PCFI) was not used. Granting many researchers believe that parsimony adjustments are important, there is some debate about whether or not they are appropriate with the understanding that scholars should evaluate model fit independent of parsimony considerations, but evaluate alternative theories favouring parsimony. Such a process would mean that models with more parameters are not penalised, but if simpler alternative models seem to be as good, then such models might be chosen. Of note is that the Tucker-Lewis Index (TLI) used in the thesis for assessing model fit, is an example of an index that adjusts for parsimony, even though that was not its original intent. We suggest that for future research parsimonious fit indices should be incorporated in the SEM analyses.

Even though different methods such as the eigenvalue criterion, parallel analysis (PA), and minimum average partial (MAP) tests were employed to finally determine the number of factors to retain during the factor analysis, a visual inspection of the scree plot was also utilised. Still, the scree plot may at times be ambiguous and open to different interpretation by different researchers. Due to the subjective nature involved in interpreting scree plots, this method although widely used by many wisdom scholars because of its simplicity and usefulness represent a limitation in the current study.

Traditionally, cognitive studies have been performed in labs or with pen and paper. Measuring crystallised intelligence in the form of vocabulary in a self-administered questionnaire introduces the possible limitation that participants could have accessed correct answers from the internet, dictionaries, or other sources. The current findings for crystallised intelligence, followed the pattern expected from literature using traditional pen and paper in a group or individual setting. Adolescents scored the lowest whilst the older persons scored the highest. In fact, Abdi (2016) as well as Hartshorne and Germine (2015) demonstrated results from Web-based vocabulary assessment, yielded comparable findings to lab or pen and paper traditional methods. When Meyerson and Tryon (2003) evaluated the psychometric equivalency of web-based research, they found that, internet studies produced equivalent results to previously published non internet data. In fact, factors such as computer administration and uncontrollable administration settings did not appear to affect the results. Meyerson and Tryon concluded that, “data collection on the Web is (1) reliable, (2) valid, (3) reasonably representative, (4) cost effective, and (5) efficient” (p. 614).

7.5 Unique Contributions to Knowledge

One major contribution of this research is that it extends the wisdom and intelligence literature within the Australian context. In terms of the SAWS wisdom measure, given that the measure was constructed using a Canadian sample, the current Australian participants data provide tentative evidence of the SAWS cross-cultural relevance. A further contribution is the introduction, for the first time in a Western society, of a brief measure of wisdom, with facets to measure different components of wisdom.

The main benefit of the SAWS-12 is that it extends the scope of studies in which wisdom can be measured. The availability of this abbreviated form of the SAWS extends the potential application of the SAWS to assessment situations where brevity is a priority to include in research protocols, as often happens in longitudinal studies. Another possible benefit of the SAWS-12 is that by providing a standard instrument for use by the research community, knowledge about its psychometric properties and its external correlates can accumulate. Potentially, other researchers can benefit from the work done by others. Also, a further advantage is that brief measures eliminate item redundancy (Gosling et al., 2003). Since lengthy measures can be a source of participant frustration at what appears to be answering the same question over and over; brief tools can help to reduce participant irritation and boredom. All these benefits can partly serve to ameliorate the psychometric costs of short measures which are not as robust as full-length indicators (Burisch, 1984a, 1984b).

Another contribution is that, this research addressed the issue of the SAWS Openness facet, which has been contested by other wisdom scholars that it is not a core component of wisdom (e.g., Ardelt, 2011b). This is the first time, to our knowledge, that there is empirical support to show that Openness is indeed a necessary and an integral part of the SAWS. Furthermore, it was confirmed that the Humour facet of the SAWS might not belong in the measure as indicated by Webster (2003, 2007, 2019).

Our research established for the first time, to our knowledge, that the Letter Series inventory requires updating because of the ceiling effect. This knowledge is important for other researchers who might want to incorporate the scale in their future research. Finally, the current study provides preliminary information that scholars can use to help decide whether the SAWS-12 or 3D-WS-12 is the most appropriate choice for their research.

7.6 General Implications and Future Directions

The outcomes of this programme of research provide several avenues for future research. The present research explored the validation of the five factors of the

SAWS, suggested an alternative factor structure for a shorter version of the scale, and then compared the measure on a one-on-one analysis with another brief wisdom tool. To the best of our knowledge, this is the first time an alternative structure has been advanced, for use in the Western society with a lifespan sample, in spite of a history recognising conceptual and psychometric problems with the initial five factor structure going back to its development by Webster (2003, 2007). Clearly more work is needed on both the conceptual basis and content analysis of the SAWS-12 item set as well as on the psychometric properties (see Koller et al., 2017 for methods of content analysis and alternative approaches to psychometric adequacy). This analysis helps to shed some light on what the SAWS-12 measures now, confirming that a subset captures the three factors identified by Ardelt (2011b) as part of wisdom (although perhaps not sufficient for it) and supporting the addition of Openness to that list.

7.7 Conclusions

This thesis began with Lao Tzu, the Chinese philosopher's ineffable statement that, "Knowing others is intelligence; knowing yourself is true wisdom" (Lao Tzu, n.d./1995, p.14). The purpose of the current study was to determine how wisdom and intelligence differed from each other and the way in which these constructs are expressed in men and women of different ages. Although all the findings are from cross-sectional data, we are unable to claim true developmental effects, a task only possible through longitudinal work. Returning to the questions posed at the beginning of this study, it is now possible to summarise the outcomes of the wide range of hypotheses posed to answer these research questions.

The most obvious finding to emerge from this study was that Webster's (2007) 40-item SAWS was not tenable in its current form. However, it was demonstrated the scale could be revised and refined to produce a briefer 12-item measure. The SAWS-12 scale showed measurement invariance, reliability, construct, and discriminant validity, as well as stability over time with superior psychometrics compared to the well-established 3D-WS-12. This study also confirmed that the Openness facet of the SAWS is an integral component of the measure and not antecedent to wisdom, as proposed by other models of wisdom. Likewise, it was demonstrated that the Humour facet of the SAWS might not belong in the measure supporting other scholars (e.g., Grossmann & Kung, 2019). Although many theories of wisdom have been put forward, we found the two extreme views of the *declining wisdom* with age, starting in early life advocated by Meacham (1990) or the *received* view, favoured by laypeople, where wisdom comes with old age were unsupported. Indeed, the ideas of the loss of wisdom with age presented by Meacham are clearly outdated and are now considered irrelevant or even "ageist" viewpoints with only historical importance. The study confirmed that, wisdom, does not linearly increase with age, instead follows Sternberg's (2005a) theoretical assumption that wisdom is akin to "fluid intelligence" with low scores during early and late life, peaking around midlife. Importantly, this wisdom trajectory across the life-course was independent of the content of the measurement tool. It was also established that the later life decrements in wisdom, were not as severe as literature suggests due to findings showing the older persons as a group were similar in wisdom to the midlife group, even though middle age is theorised to be the time of maximum wisdom growth (e.g., Sternberg, 2005a).

Furthermore, this thesis confirmed that, crystallised intelligence is linearly related to age. Yet, once more, although in general, fluid intelligence followed an age trajectory like the *fluid intelligence* seen in the age–wisdom trajectory the late life decrements were minimal. Clear cohort effects were found with the fluid reasoning and ageing data, opposing, and challenging the trend of other empirical work. It was also found education and crystallised intelligence are important for three-dimensional wisdom acquisition in line with the greater cognitive orientation of the scale, but not crucial ingredients for SAWS wisdom.

The current investigation of wisdom over the adult lifespan shows the advantage of including adolescents and young adults in research samples. It was argued adolescents with increasing fluid ability, may serve as a protective element in measures with negatively worded statements such as the 3D-WS-12, from correlating negatively with wisdom. Moreover, adolescents and young adults, who are often excluded from intelligence studies make an important contribution to understanding the relationship between intelligence and age over the life-course.

Finally, after many investigations, this thesis found some answers to our research questions and hypotheses, but also posed many more. We confirmed some previous research and posted new findings. Yet, Lao Tzu's assertions remain as ineffable as ever, perhaps an apt subject of enquiry for our philosopher colleagues.

References

Aartsen, M. J., Smits, C. H., van Tilburg, T., Knipscheer, K. C., & Deeg, D. J. (2002). Activity in older adults: Cause or consequence of cognitive functioning? A longitudinal study on everyday activities and cognitive performance in older adults. T*he Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *57*(2), 153–162. https://doi.org/10.1093/geronb/57.2.P153

Abdi, S. (2016). *Determining the validity of web-based, self-rating checklist of vocabulary knowledge* [Unpublished master's thesis]. The Norman J. Arnold School of Public Health. University of South Carolina.

Achenbaum, W. A., & Orwoll, L. (1991). Becoming wise: A psycho-gerontological interpretation of the Book of Job. *The International Journal of Aging and Human Development*, *32*(1), 21–39. http://doi.org/10.2190/419R-X8FC-Q6NE-0M85

Ackerman, P.L., & Ellingsen, V.J. (2014). Vocabulary overclaiming—A complete approach: Ability, personality, self-concept correlates, and gender differences. *Intelligence, 46,* 216-227. https://doi.org/10.1016/j.intell.2014.07.003

Albert, M. S., & Heaton, R. K. (1988). Intelligence testing. In M. S. Albert & M. B. Moss (Eds.), *Geriatric neuropsychology* (pp. 13–32). Guilford Press.

Aldwin, C. M. (2009). Gender and wisdom: A brief overview. *Research in Human Development*, *6*(1), 1–8. https://doi.org/10.1080/15427600902779347

Aldwin, C. M., Igarashi, H., & Levenson, M. R. (2019). Wisdom as self-transcendence. In R. J. Sternberg & J. Glück (Eds.), *The Cambridge* *handbook of wisdom* (pp. 122 – 143). Cambridge University Press. https://doi.org/10.1017/9781108568272.007

Alquraan, M., Alshraideh, M., & Bsharah, M. (2010). Psychometric properties and differential item functioning (DIF) analyses of Jordanian version of Self-Assessed Wisdom Scale (SAWS-Jo), *International Journal of Applied Educational Studies, 9*(1), 52–66. Retrieved March 15, 2020, from https://www.researchgate.net/publication/261192380_Psychometric_Properties_and_Differential_Item_Functioning_DIF_Analyses_of_Jordanian_Version_of_Self-Assessed_Wisdom_Scale

Alves, P., Morgado, L., & de Oliveira, B. (2014). Wisdom assessment: Portuguese adaptation of the Self-Assessed Wisdom Scale – SAWS – by Jeffrey Webster. *Psychologica, 57*(1), 41–59. https://doi.org/10.14195/1647-806_57_1_3

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing.* American Educational Research Association.

American Psychological Association. (2020). *Publication manual of the American Psychological Association* (7th ed.). https://doi.org/10.1037/0000165-000

Anastasi, A., & Urbina, S. (2009). *Psychological testing* (Student ed.). Pearson College Division.

Anderson, B. J. (1998). *Development of wisdom-related knowledge in adolescence and young adulthood* [Unpublished doctoral dissertation]. University of Toronto.

Anderson, T. (2020). Brief Wisdom Screening Scale: Multi-sample factor analysis and validation. PsyArXiv. https://doi.org/10.31234/osf.io/2mszf

Arbuckle, J. L. (2020). *AMOS version 26.0 computer program.* IBM SPSS.

Arbuckle, J. L., & Wothke, W. (1999). *AMOS 4.0 user's guide.* SmallWaters Corporation.

Ardelt, M. (1997). Wisdom and life satisfaction in old age. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 52*(1), 15–27. http://doi.org/10.1093/geronb/52B.1.P15

Ardelt, M. (2000a). Intellectual versus wisdom-related knowledge: The case for a different kind of learning in the later years of life. *Educational Gerontology, 26*(8), 771–789. https://doi.org/10.1080/036012700300001421

Ardelt, M. (2000b). Antecedents and effects of wisdom in old age: A longitudinal perspective on aging well. *Research on Aging, 22*(3), 360–394. https://doi.org/10.1177/0164027500224003

Ardelt, M. (2000c). Still stable after all these years? Personality stability theory revisited. *Social Psychology Quarterly, Special Millennium Issue on The State of Sociological Social Psychology, 63*(4), 392–405. https://doi.org/10.2307/2695848

Ardelt, M. (2003). Empirical assessment of a three-dimensional wisdom scale. *Research on Aging, 25*(3), 275–324. https://doi.org/10.1177/0164027503025003004

Ardelt, M. (2004). Wisdom as expert knowledge system: A critical review of a contemporary operationalization of an ancient concept. *Human Development, 47*(5), 257–285. https://doi.org/10.1159/000079154

Ardelt, M. (2008). Self-development through selflessness: The paradoxical process of growing wiser. In H. A. Wayment & J. J. Bauer (Eds.), *Transcending self-interest: Psychological explorations of the quiet ego (*pp. 221–233). American Psychological Association. https://doi.org/10.1037/11771-020

Ardelt, M. (2009). How similar are wise men and women? A comparison across two age cohorts. *Research in Human Development, 6*(1), 9–26. https://doi.org/10.1080/15427600902779354

Ardelt, M. (2010). Are older adults wiser than college students? A comparison of two age cohorts. *Journal of Adult Development, 17*(4), 193–207. https://doi.org/10.1007/s10804-009-9088-5

Ardelt, M. (2011a). Wisdom, age, and well-being. In K. W. Schaie & L. Willis (Eds.), H*andbook of the psychology of aging* (7th ed., pp.279–291). Elsevier. https://doi.org/10.1016/B978-0-12-380882-0.00018-8

Ardelt, M. (2011b). The measurement of wisdom: A commentary on Taylor, Bates, and Webster's comparison of the SAWS and 3D-WS. *Experimental Aging Research*, *237*(2), 241–255. https://doi.org/10.1080/0361073.554509

Ardelt, M. (2016). Disentangling the relations between wisdom and different types of well-being in old age: Findings from a short-term longitudinal study. *Journal of Happiness Studies, 17*(5), 1963–1984. https://doi.org/10.1007/s10902-015-9680-2

Ardelt, M. (2020). Can wisdom and psychosocial growth be learned in university courses? *Journal of Moral Education, 49*(1), 30–45. https://doi.org/10.1080/03057240.2018.1471392

Ardelt, M., & Oh, H. (2010). Wisdom: Definition, assessment, and its relation to successful cognitive and emotional aging. In D. V. Jeste, & C. Depp (Eds.), *Successful cognitive and emotional aging* (pp. 87–113). American Psychiatric Publishing.

Ardelt, M., Pridgen, S., & Nutter-Pridgen, K. L. (2018). The relation between age and three-dimensional wisdom: Variations by wisdom dimensions and education. *The Journals of Gerontology: Series B, 73*(8), 1339–1349. https://doi.org/10.1093/geronb/gbx182

Ardelt, M., Pridgen, S., & Nutter-Pridgen, K. L. (2019). Wisdom as a personality type. In R. J. Sternberg & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 144–161). Cambridge University Press. https://doi.org/10.1017/9781108568272.008

Aristotle. (1999). *Nicomachean Ethics* (M. Ostwald, Trans.). Prentice-Hall, Library of Liberal Arts. (Original work published ca. 350 B.C.E.)

Arzeen, N., Haq, M. A., & Arzeen, S. (2013). An investigation of relationship between wisdom and subjective well-being for a sample of Pakistani adolescents. *Frontier Women University Journal of Social Sciences, 7*(1), 39–46. http://sbbwu.edu.pk/journal/SUMMER-2013-vol-7-No-1/6.pdf

Assmann, A. (1994). Wholesome knowledge: Concepts of wisdom in a historical and cross-cultural perspective. In D. L. Featherman, R. M. Lerner, & M. Perlmuter (Eds.), *Life-span development and behaviour, Vol. 12 (*pp. 187–224). Erlbaum.

Assmann, J. (2006). *Ma'at: Justice and immortality in ancient Egypt*. C. H. Beck.

Australian Bureau of Statistics. (n.d.). *Australian Government.* https://beta.abs.gov.au/

Babyak, M. A. (2004). What you see may not be what you get. A brief, nontechnical introduction to overfitting in regression- type models. *Psychosomatic*

Medicine, *66*(3), 411–421. https://doi.org/10.1097/00006842-200405000-00021

Baden, D., & Higgs, M. (2015). Challenging the perceived wisdom of management theories and practice. *Academy of Management Learning and Education, 14*(4), 539–555. https://doi.org/10.5465/amle.2014.0170

Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology*, *23*(5), 611–626. https://doi.org/10.1037/0012-1649.23.5.611

Baltes, P. B. (1993). The aging mind: Potential and Limits. *The Gerontologist, 33*(5), 580–594. https://doi.org/10.1093/geront/33.5.580

Baltes, P. B. (2004). *Wisdom as orchestration of mind and virtue*. Max Planck Institute for Human Development.

Baltes, P. B., & Baltes, M. M. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In P. B. Baltes & M. M. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences* (pp. 1–34). Cambridge University Press.

Baltes, P. B., Cornelius, S. W., & Nesselroade, J. R. (1979). Cohort effects in developmental psychology. In J. R. Nesselroade & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 61–87). Academic Press.

Baltes, P. B., & Freund, A. M. (2003). The intermarriage of wisdom and selective optimization with compensation: Two meta-heuristics guiding the conduct of life. In C. L. M. Keyes & J. Haidt (Eds.), *Flourishing: Positive psychology and the life well-lived* (pp. 249–273). American Psychological Association.

Baltes, P. B., Glück, J., & Kunzmann, U. (2002). Wisdom: Its structure and function in regulating successful lifespan development. In C. R. Snyder & S. J. Lopez (Eds.), *The handbook of positive psychology* (pp. 327–350). Oxford University Press.

Baltes, P. B., & Lindenberger, U. (1997). Emergence of a powerful connection between sensory and cognitive functions across the adult life span: A new window to the study of cognitive aging? *Psychology and Aging, 12*(1), 12–21. https://doi.org/10.1037//0882-7974.12.1.12

Baltes, P. B., & Smith, J. (1990). Toward a psychology of wisdom and its ontogenesis. In R. Sternberg (Ed.), *Wisdom: Its nature, origins, and development* (pp. 87–120). Cambridge University Press.

Baltes, P. B., & Smith, J. (2008). The fascination of wisdom: Its nature, ontogeny, and function. *Perspectives on Psychological Science, 3*(1), 56–64. http://doi.org/10.1111/j.1745-6916.2008.00062.x

Baltes, P. B., Smith, J., & Staudinger, U. M. (1992). Wisdom and successful aging. In T. B. Sonderegger (Ed.), *Current theory and research in motivation, Vol. 39. Nebraska symposium on motivation 1991: Psychology and aging* (p. 123–167). University of Nebraska Press.

Baltes, P. B. & Staudinger, U. M. (1993). The search for a psychology of wisdom. *Current Directions in Psychological Science, 2*(3), 75–80. http://doi.org/10.1111/1467-8721.ep10770914

Baltes, P. B., & Staudinger, U. M. (2000). Wisdom: A metaheuristic (pragmatic) to orchestrate mind and virtue toward excellence. *American Psychologist, 55*(1), 122. http://doi.org/10.1037/0003-066X.55.1.122

Bandura, A. (1977). *Social learning theory* (1st ed.). Prentice-Hall.

Bang, H. (2015). African American undergraduate students' wisdom and ego-identity development: Effects of age, gender, self-esteem, and resilience. *Journal of Black Psychology, 41*(2), 95-120. https://doi.org/10.1177/0095798413510176

Bangen, K. J., Meeks, T. W., & Jeste, D. V. (2013). Defining and assessing wisdom: A review of the literature. *The American Journal of Geriatric Psychiatry, 21*(12), 1254–1266. https://doi.org/10.1016/j.jagp.2012.11.020

Beccaria, G. J. (2010). The reliability, validity and clinical utility of the Problem Solving Inventory in an Australian setting: A consideration of positive psychology [Unpublished doctoral dissertation]. University of Southern Queensland, Toowoomba, Australia.

Beermann, U., & Ruch, W. (2009). How virtuous is humor? What we can learn from current instruments. *Journal of Positive Psychology, 4*(6), 528–539. https://doi.org/10.1080/17439760903262859

Bentler, P. M. (2007). On tests and indices for evaluating structural models. *Personality and Individual Differences, 42*(5), 825–829. https://doi.org/10.1016/j.paid.2006.09.024

Bentler, P. M., & Kano, Y. (1990). On the equivalence of factors and components. *Multivariate Behavioral Research, 25*(1), 67–74. https://doi.org/10.1207/s15327906mbr2501_8

Bergsma, A., & Ardelt, M. (2012). Self-reported wisdom and happiness: An empirical investigation. *Journal of Happiness Studies, 13*(3), 481–499. https://doi.org/10.1007/s10902-011-9275-5

Berry, J. W. (1974). Radical cultural relativism and the concept of intelligence. In J. W. Berry & P. R. Dasen (Eds.), *Culture and cognition: Readings in cross-cultural psychology*. (pp. 225–229). Methuen.

Bialosiewicz, S., Murphy, K., & Berry, T. (2013). *An introduction to measurement invariance testing: Resource packet for participants*. http://comm.eval.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=63758fed-a490-43f2-8862-2de0217a08b8

Bickley, P. G., Keith, T. Z., & Wolfle, L. M. (1995). The three-stratum theory of cognitive abilities: Test of the structure of intelligence across the lifespan. *Intelligence*, *20*(3), 309–327. https://doi.org/10.1016/0160-2896(95)90013-6

Bielak, A. A. M. (2010). How can we not "lose it" if we don't understand how to "use it"? Unanswered questions about the influence of activity participation on cognitive performance in older age: A mini-review. *Gerontology, 56*(5), 507-519. https://doi.org/10.1159/000264918

Bielak, A. A. M., Anstey, K. J., Christensen, H., & Windsor, T. D. (2012). Activity engagement is related to level, but not change in cognitive ability across adulthood. *Psychology and Aging*, *27*(1), 219–228. http://dx.doi.org/10.1037/a0024667

Binet, A., & Simon, T. (1916). *The development of intelligence in children (The Binet-Simon Scale).* (E. S. Kite, Trans.). Williams & Wilkins Co. https://doi.org/10.1037/11069-000

Birren, J. E. & Svensson, C. M. (2005). Wisdom in history. In R. J. Sternberg & J. Jordan (Eds.), *A handbook of wisdom: Psychological perspectives* (pp. 3–31). Cambridge University Press. https://doi.org/10.1017/CBO9780511610486.002

Blanchard-Fields, F., & Norris, L. (1995). The development of wisdom. In M. A. Kimble, S. H. McFadden, J. W. Ellor, & J. J. Seeber (Eds.), *Aging, spirituality, and religion* (pp. 102–118). Fortress Press.

Blasi, A. (1980). Bridging moral cognition and moral action: A critical review of the literature. *Psychological Bulletin*, *88*(1), 1–45. https://doi.org/10.1037/0033-2909.88.1.1

Blieszner, R., Willis, S. L., & Baltes, P. B. (1981). Training research in aging on the fluid ability of inductive reasoning. *Journal of Applied Developmental Psychology, 2*(3), 247–265. https://doi.org/10.1016/0193-3973(81)90005-8

Bluck, S., & Glück, J. (2005). From the inside out: People’s implicit theories of wisdom. In R. J. Sternberg, & J. Jordan (Eds.), *A handbook of wisdom. Psychological perspectives* (pp. 84–109). Cambridge University Press.

Bowden, S. C., Weiss, L. G., Holdnack, J. A., & Lloyd, D. (2006). Age-related invariance of abilities measured with the Wechsler Adult Intelligence Scale-III. *Psychological Assessment, 18*(3), 334–339. https://doi.org/10.1037/1040-3590.18.3.334

Brienza, J. P., Kung, F. Y. H., Santos, H. C., Bobocel, D. R., & Grossmann, I. (2018). Wisdom and bias: Towards a process-sensitive measurement of wisdom-related cognition. *Journal of Personality and Social Psychology 115*(6), 1093-1126. https://doi.org/10.1037/pspp0000171

Briggs, S. R., & Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality, 54*(1), 106–148. https://doi.org/10.1111/j.1467-6494.1986.tb00391.x

Brody, N. (1992). *Intelligence* (2nd ed.). Academic Press.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development research perspectives. *Developmental Psychology, 22*, 723–742. https://doi.org/10.107/0012-1649,22,6.723

Brown, S. C. (2004). Learning across campus: How college facilitates the development of wisdom. *Journal of College Student Development*, *45*(2), 134–148. https://doi.org/10.1353/csd.2004.0020

Brown, S. C., & Greene, J. A. (2006). The wisdom development scale: Translating the conceptual to the concrete. *Journal of College Student Development*, *47*(1), 1–19. http://doi.org/10.1353/csd.2006.0002

Brugman, G. (2000). *Wisdom: Source of narrative coherence and eudaimonia: A Life-span perspective,* [Doctoral dissertation, University of Utrecht]. Delft, The Netherlands: Eburon.

Brugman, G. M. (2006). Wisdom and aging. In J. E. Birren, K. W. Schaie, (Eds.), *Handbook of psychology of aging* (pp. 445–476). Elsevier.

Bruya, B, & Ardelt, M. (2018). Wisdom can be taught: A proof-of-concept study for fostering wisdom in the classroom. *Learning and Instruction*, *58*(1), 106–114. https://doi.org/10.1016/j.learninstruc.2018.05.001

Bugg, J. M., Zook, N. A., DeLosh, E. L., Davalos, D. B., & Davis, H. P. (2006). Age differences in fluid intelligence: Contributions of general slowing and frontal decline. *Brain And Cognition*, *62*(1), 9– 16. https://doi.org/10.1016/j.bandc.2006.02.006

Buja, A., & Eyüboğlu, N., (1992). Remarks on parallel analysis. *Multivariate Behavioral Research, 27*(4), 509–540. https://doi.org/10.1207/s15327906mbr2704_2.

Burisch, M. (1984a). You don't always get what you pay for: Measuring depression with short and simple versus long and sophisticated scales. *Journal of Research in Personality, 18*(1), 81–98. https://doi.org/10.1016/0092-6566(84)90040-0

Burisch, M. (1984b). Approaches to personality inventory construction: A comparison of merits. *American Psychologist, 39*(3), 214–227. https://doi.org/10.1037/0003-066X.39.3.214

Burisch, M. (1997). Test length and validity revisited. *European Journal of Personality, 11*(4), 303–315. https://doi.org/10.1002/(SICI)1099-0984(199711)11:4<303::AID-PER292>3.0.CO;2-#

Byrne, B. M. (2016). *Structural equation modelling with Amos: Basic concepts, applications, and programming (*3rd ed.). Routledge.

Byrne, B. M., Baron, P., & Campbell, T. L. (1993). Measuring adolescent depression: Factorial validity and invariance of the Beck Depression Inventory across gender. *Journal of Research on Adolescence, 3*(2), 127–143.

Byrne, B. M., & van de Vijver, F. (2010). Testing for measurement and structural equivalence in large-scale cross-cultural studies: Addressing the issue of nonequivalence. *International Journal of Testing, 10*(2), 107–132. https://doi.org/10.1080/15305051003637306

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, *56*(2), 81–105. https://doi.org/10.1037/h0046016

Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment* (1st ed.). SAGE Publications.

Carroll, J. B. (1993). *Human cognitive abilities: A survey of factor analytic studies* (1st ed.). Cambridge University Press.

Case, R. (1992). *The mind's staircase: Exploring the conceptual underpinnings of children's thought and knowledge* (Author ed.) Psychology Press.

Cattell, R. B. (1943). The measurement of adult intelligence. *Psychological Bulletin, 40*(3), 153–193. https://doi.org/10.1037/h0059973

Cattell, R. B. (1966). The Scree test for the number of factors. *Multivariate Behavioral Research*, *1*(2), 245–276. http://dx.doi.org/10.1207/s15327906mbr0102_10

Cattell, R. B. (1971). *Abilities: Their structure, growth and action* (1st ed.). Houghton Mifflin.

Cattell, R. B. (1987). *Intelligence: Its structure, growth and action* (1st ed.). Elsevier Science.

Cattell, R. B., & Horn, J. L. (1978). A check on the theory of fluid and crystallized intelligence with description of new subtest designs. *Journal of Educational Measurement*, *15*(3), 139–164. https://doi.org/10.1111/j.1745-3984.1978.tb00065.x

Chandler, M. J., & Holliday, S. (1990). Wisdom in a postapocalyptic age. In R. J. Sternberg (Ed.) *Wisdom: Its nature, origins, and development.* (pp. 121–141). Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139173704.007

Cheraghi, F., Kadivar, P., Ardelt, M., Asgari, A., & Farzad, V. (2015). Gender as a moderator of the relation between age cohort and three-dimensional wisdom in Iranian culture. *International Journal of Aging and Human Development*, *81*(1-2), 3–26. https://doi.org/10.1177/0091415015616394

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indices for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Clarke, E. G. (1974). *The wisdom of Solomon: Commentary by Clarke*. Cambridge University Press.

Clayton, V. P. (1975). Erikson's theory of human development as it applies to the aged: Wisdom as contradictive cognition. *Human Development, 18*(1-2), 119–128. https://doi.org/10.1159/000271479

Clayton, V. (1976). *A Multidimensional Scaling analysis of the Concept of Wisdom* [Unpublished doctoral dissertation]. University of Southern California.

Clayton, V. P. (1983). Wisdom and intelligence: The nature and function of knowledge in the later years. *The International Journal of Aging and Human Development, 15*(4), 315–321. https://doi.org/10.2190/17TQ-BW3Y-P8J4-TG40

Clayton, V. P., & Birren, J. E. (1980). The development of wisdom across the life span: A re-examination of an ancient topic. In P. B. Baltes & J. O. G. Brim (Eds.), *Life span development and behavior.* (Vol. 3, pp. 103–135). Academic Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Erlbaum. https://doi.org/10.4324/9780203771587

Comfrey, A. L., & Lee, H. B. (2016). *A first course in factor analysis* (2nd ed.). Psychology Press.

Conway, J. M., & Huffcutt, A. I. (2003). A review and evaluation of exploratory factor analysis practices in organizational research. *Organizational Research Methods, 6*(2), 147-168. https://doi.org/10.1177/1094428103251541

Cornelis, M. C., Wang, Y., Holland, T., Agarwal, P., Weintraub, S., & Morris, M. C. (2019). Age and cognitive decline in the UK Biobank. *PLoS ONE 14*(3), Article e0213948. https://doi.org/10.1371/journal.pone.0213948

Costa, P. T., Jr., & McCrae, R. R. (1992). Four ways five factors are basic. *Personality and Individual Differences, 13*(6), 653–665. https://doi.org/10.1016/0191-8869(92)90236-

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation, 10*(7), 1–9. Retrieved June 11, 2020, from http://pareonline.net/getvn.asp?v=10&n=7

Crocker, L., & Algina, J. (2008). *Introduction to classical and modern test theory*. Cengage Learning.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. P*sychometrika*, *16*(3) 297-334. https://doi.org/10.1007/BF02310555

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52*(4), 281–302. https://doi.org/10.1037/h0040957

Cronbach, L. J., & Shavelson, R. J. (2004). My current thoughts on coefficient alpha and successor procedures. *Educational and Psychological Measurement, 64*(3), 391–418. https://doi.org/10.1177/0013164404266386

Crowne, P. D., & Marlowe, C. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology*, *24*(4), 349–354. https://doi.org/10.1037/h0047358

Csikszentmihalyi, M., & Nakamura, J. (2005). The role of emotions in the development of wisdom. In R. J. Sternberg & J. Jordan (Eds.), *A handbook of* *wisdom: Psychological perspectives*. (pp. 220–245). Cambridge University Press.

Csikszentmihalyi, M., & Rathunde, K. (1990). The psychology of wisdom: An evolutionary interpretation. In R. J. Sternberg (Ed.), *Wisdom: Its nature, origins, and development* (pp. 25-51). Cambridge University Press. https://doi.org/10.1017/CBO9781139173704.004

Dahlsgaard, K., Peterson, C., & Seligman, M. E. P. (2005). Shared virtue: The convergence of valued human strengths across culture and history. *Review of General Psychology 9*(3), 203–213. https://doi.org/10.1037/1089-2680.9.3.203

Damon, W. (2000). Setting the stage for the development of wisdom: Self-understanding and moral identity during adolescence. In W. S. Brown (Ed.), *Understanding wisdom: Sources, science, and society* (pp. 339–360). Templeton Foundation Press.

Daniels, L. R., Boehnlein, J., & McCallion, P. (2015). Aging, depression, and wisdom: A pilot study of life-review intervention and PTSD treatment with two groups of Vietnam veterans. *Journal of Gerontological Social Work, 58*(4), 420-436. http://doi.org/10.1080/01634372.2015.1013657

Dearborn, W. F. (1921). Intelligence and its measurement: A symposium--XII. *Journal of Educational Psychology, 12*(4), 210–212. https://doi.org/10.1037/h0065003

DeCoster, J. (1998). *Overview of Factor Analysis*. Retrieved June 11, 2020, from http://www.stat-help.com/factor.pdf

Denney, N. W., Dew, J. R., & Kroupa, S. L. (1995). Perceptions of wisdom: What is it and who has it? *Journal of Adult Development, 2*(1), 37–47.

http://doi.org/10.1007/BF02261740

DeVellis, R. F. (2017). *Scale development: Theory and applications* (4th ed.). SAGE Publications. https://trove.nla.gov.au/version/238842122

DeVon, H. A., Block, M. E., Moyle-Wright, P., Ernst, D. M., Hayden, S. J., Lazzara, D. J., Savoy, S. M., & Kostas-Polston, E. (2007). A psychometric toolbox for testing validity and reliability. *Journal of Nursing Scholarship, 39*(2), 155–164. https://doi.org/10.1111/j.1547-5069.2007.00161.x

DiGangi, J. A., Jason, L. A., Mendoza, L., Miller, S. A., & Contreras, R. (2013). The relationship between wisdom and abstinence behaviors in women in recovery from substance abuse. *The American journal of Drug and alcohol Abuse, 39*(1), 33 – 37. https://doi.org/10.3109/00952990.2012.702172

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*, *41*, 417–440. https://doi.org/10.1146/annurev.ps.41.020190.002221

Dittmann-Kohli, F., & Baltes, P. B. (1990). Toward a neofunctionalist conception of adult intellectual development: Wisdom as a prototypical case of intellectual growth. In C. N. Alexander, & E. J. Langer (Eds.), *Higher stages of human development*, (pp. 54–78). Oxford University Press. http://hdl.handle.net/21.11116/0000-0003-6149-E

Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the Big Five across the life span: Evidence from two national samples. *Psychology and Aging, 23*(3), 558–566. https://doi.org/10.1037/a0012897

Dortaj, F., Noghabi, R. K., Ferrari, M., Jahan, F., & Esmaeili, S. (2018). Investigating validity and reliability and factor analysis of Webster’s wisdom questionnaire in Iran. *Iranian Journal of Learning and Memory, 1*(1), 7–19. https://doi.org/10.22034/IEPA.2018.77421

Edmondson, R., & Woerner, M. H. (2019. Sociocultural foundations of wisdom. In R. J. Sternberg, & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 40–68).

Erikson, E. H. (1959). *Identity and the life cycle*. International University Press.

Erikson, E. H. (1963). *Childhood and society,* (2nd ed.). Norton.

Erikson, E. H. (1964). *Insight and responsibility.* Norton.

Erikson, E. H. (1968). *Identity: Youth, and crisis.* Norton.

Erikson, E. H. (1982). *The life cycle completed*: *A review*. Norton.

Erikson, E. H. (1986). *Vital involvement in old age*. Norton.

Erikson, E. H. (2008). The life cycle: Epigenesis of identity. In M. W. Schustack, & H. S. Friedman (Eds.), *The personality reader* (pp. 51-54). Pearson.

Etezadi, S., & Pushkar, D. (2013). Why are wise people happier? An explanatory model of wisdom and emotional well-being in older adults. *Journal of Happiness Studies*, *14*(3), 929–950. https://doi.org/10.1007/s10902-012-9362-2

Euser, S. M., Schram, M. T., Hofman, A., Westendorp, R. G., & Breteler, M. M. (2008). Measuring cognitive function with age: The influence of selection by health and survival. *Epidemiology*, *19*(3), 440–447. https://journals.lww.com/epidem/Fulltext/2008/05000/Measuring_Cognitive_Function_With_Age__The.16.aspx

Eysenck, H. J. (1982). Introduction. In H. J. Eysenck (Ed.), *A model for intelligence* (pp. 1–10). Springer-Verlag.

Eysenck, S. B. G., & Eysenck, H. J. (1964). *Manual of the Eysenck Personality Inventory*. University of London Press.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, *4*(3), 272–299. https://doi.org/10.1037/1082-989X.4.3.272

Fancher, R. E. (1987). *The intelligence men: Makers of the IQ controversy*. Norton.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.G. (2009). Statistical power analyses using G*Power 3.1.9.2: Tests for correlation and regression analyses. *Behaviour Research Methods, 41*, 1149–1160. https://doi.org/10.3758/BRM.41.4.1149

Fein, E. C. & Day, E. A. (2004). The PASS theory of intelligence and the acquisition of a complex skill: A criterion-related validation study of cognitive assessment system scores. *Personality and Individual Differences 37*(6), 1123–1136. https://doi.org/10.1016/j.paid.2003.11.017

Ferketich, S. (1990). Internal consistency estimates of reliability. *Research in Nursing*, *13*(6), 437–440. https://doi.org/10.1002/nur.4770130612

Ferrari, M., Kahn, A., Benayon, M., & Nero, J. (2011). Phronesis, sophia, and hochma: Developing wisdom in Islam and Judaism. *Research in Human Development, 8*(2), 128–148. https://doi.org/10.1080/15427609.2011.568869

Ferrari, M., & Potworowski, G. (2008). *Teaching for wisdom: Cross-cultural perspectives on fostering wisdom* (1st ed.). Springer.

Ferrer, E., Salthouse, T. A., Stewart, W. F., & Schwartz, B. S. (2004). Modeling age and retest processes in longitudinal studies of cognitive abilities. *Psychology and Aging*, *19*(2), 243–259. http://dx.doi.org/10.1037/0882-7974.19.2.243

Field, A. (2017). *Discovering statistics using IBM SPSS Statistics* (5th ed.). SAGE Publications.

Finch, C. E. (1991). Middle age: An evolving frontier in gerontology. *Neurobiology of Aging, 12*(1), 1–2. https://doi.org/10.1016/0197-4580(91)90031-e

Finch, C. E. (2009). The neurobiology of middle-age has arrived. *Neurobiology of Aging, 30*(4), 515–520. https://doi.org/10.1016/j.neurobiolaging.2008.11.011

Flora, D. B., & Flake, J. K. (2017). The purpose and practice of exploratory and confirmatory factor analysis in psychological research: Decisions for scale development and validation. *Canadian Journal of Behavioural Science, 49*(2), 78–88. https://doi.org/10.1037/cbs0000069

Flynn, J. R. (1987). Massive IQ gains in 14 nations: What IQ tests really measure. *Psychological Bulletin, 101*(2), 171–191. https://doi.org/10.1037/0033-2909.101.2.171

Flynn, J. R. (1999). Searching for justice: The discovery of IQ gains over time. *American Psychologist*, *54*(1), 5–20. https://doi.org/10.1037/0003-066X.54.1.5

Flynn, J. R. (2007). *What is Intelligence? Beyond the Flynn effect*. Cambridge University Press.

Fogarty, G. J. (1999). Intelligence: Theories and issues. In J. A. Athanasou (Ed.), *Adult educational psychology,* (pp. 183–206). Social Science Press. https://www.researchgate.net/publication/279474502_Intelligence_theories_and_issues

Fokkema, M., & Greiff, S. (2017. How performing PCA and CFA on the same data equals trouble overfitting in the assessment of internal structure and some editorial thoughts on it. *European Journal of Psychological Assessment, 33*(6), 399–402. https://doi.org/10.1027/1015-5759/a000460

Fowers, B. J. (2008). From continence to virtue: Recovering goodness, character unity, and character types for positive psychology. *Theory & Psychology, 18*(5), 629–653. https://doi.org/10.1177/0959354308093399

Frey, B. S., & Stutzer, A. (2010). *Happiness and economics: How the economy and institutions affect human well-being*. Princeton University Press.

Fung, S., Chow, E. O., & Cheung, C. (2020). Development and validation of a brief self-assessed wisdom scale. *BMC Geriatrics, 20*(54). https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-020-1456-9

Galvin, J. E., Powlishta, K. K., Wilkins, K., McKeel, D. W., Jr., Xiong, C., Grant, E., Storandt, M., & Morris, J. C. (2005). Predictors of preclinical Alzheimer disease and dementia: A clinicopathologic study. *Archives of Neurology,62*(5), 758–765. https://doi.org/10.1001/archneur.62.5.758

García-Campayo, J., del Hoyo, Y. L., Barceló-Soler, A., Navarro-Gil, M., Borao, L., Giarin, V., Tovar-Garcia, R. R., & Montero-Marin, J. (2018). Exploring the wisdom structure: Validation of the Spanish new short Three-Dimensional Wisdom Scale (3D-WS) and its explanatory power on psychological health-related variables. *Frontiers in Psychology, 9*, 692. https://doi.org/10.3389/fpsyg.2018.00692

Gardner, H. E. (1983). *Frames of mind: The theory of multiple intelligences.* Basic Books.

Gardner, H. E. (1993). *Multiple intelligences: The theory in practice*. Basic Books.

Gardner, H. E. (2006). *Multiple intelligences: New horizons in theory and practice.* Basic Books.

Gardner, H. E. (2011). *Frames of mind. The theory of multiple intelligences*. Basic Books.

Gardner, H.; Kornhaber, M.; Chen, J.-Q. (2018). The theory of multiple intelligences: Psychological and educational perspectives. In, *The nature of human intelligence*. (pp. 116–129). Cambridge University Press.

Gerstorf, D., Hülür, G., Drewelies, J., Eibich, P., Duezel, S., Demuth, I., Ghisletta, P., Steinhagen-Thiessen, E., Wagner, G. G., & Lindenberger, U. (2015). Secular changes in late-life cognition and well-being: Towards a long bright future with a short brisk ending? *Psychology and Aging*, *30*(2), 301-310. https://doi.org/10.1037/pag0000016

Gerstorf, D., Hülür, G., Drewelies, J., Willis, S. L., Schaie, K. W., & Ram, N. (2020). Adult development and aging in historical context. *American Psychologist*, *75*(4), 525–539. https://doi.org/10.1037/amp0000596

Glück, J. (2016). Psychology of wisdom. In N. A. Pachana (Ed.), *Encyclopedia of geropsychology*, (pp. 1970–1977). Springer. https://doi.org/10.1007/978-981-287-080-3-_155-1

Glück, J. (2018). Measuring wisdom. Existing approaches, continuing challenges, and new developments. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 73*(8), 1393–1403. https://doi.org/10.1093/geronb/gbx140

Glück, J. (2019. The development of wisdom during adulthood. In R. J. Sternberg, & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 323–346). Cambridge University Press. https://doi.org/10.1017/9781108568272.016

Glück, J., & Bluck, S. (2011). Laypeople's conceptions of wisdom and its development: Cognitive and integrative views. *The Journals of. Gerontology,* *Series B, Psychological Sciences and Social Sciences, 66*(3), 321–324. https://doi.org/10.1093/geronb/gbr011

Glück, J., & Bluck, S. (2013). The MORE life experience model: A theory of the development of personal wisdom. In M. Ferrari & N. Weststrate (Eds.), *The scientific study of personal wisdom: From contemplative traditions to neuroscience* (pp. 75–97). Springer. https://doi.org/10.1007/978-94-007-7987-7_4

Glück, J., Bluck, S., Baron, J., & Mcadams, D. P. (2005). The wisdom of experience: Autobiographical narratives across adulthood. *International Journal of Behavioral Development*, *29*(3), 197–208. http://doi.org/10.1177/01650250444000504

Glück, J., Bluck, S., & Weststrate, N. M. (2018). More on the MORE life experience model: What we have learned (so far). *The Journal of Value Inquiry, 53*(3), 349–370. https://doi.org/10.1007/s10790-018-9661-x

Glück, J., König, S., Naschenweng, K., Redzanowski, U., Dorner, L., Straßer, I., & Wiedermann, W. (2013). How to measure wisdom: Content, reliability, and validity of five measures. *Frontiers in Psychology, 4,* 405. https://doi.org/10.3389/fpsyg.2013.00405

Glück, J., Strasser, I., & Bluck, S. (2009). Gender differences in implicit theories of wisdom. *Research in Human Development, 6*(1), 27–44. https://doi.org/10.1080/15427600902779370

Goodman, C.M. (1987). The Delphi technique: A critique. *Journal of Advanced Nursing, 12*(6), 729–734. https://doi.org/10.1111/j.1365-2648.1987.tb01376.x

Goretzko, D., Pham, T. T. H., & Bühner, M. (2019). Exploratory factor analysis: Current use, methodological developments and recommendations for good practice. *Current Psychology*. https://doi.org/10.1007/s12144-019-00300-2

Gorsuch, R. L. (2014). *Factor analysis* (2nd ed.). Routledge.

Gosling, S. M., Rentfrow, P. J., & Swann Jr, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*(6), 504–528. https://doi.org/10.1016/S0092-6566(03)00046-1

Gottfredson, L. S. (1997). Mainstream science on intelligence: An editorial with 52 signatories, history, and bibliography. *Intelligence*, *24*(1), 13–23. https://doi.org/10.1016/S0160-2896(97)90011-8

Gottfredson, L. S. (2016). A *g* theorist on why Kovacs and Conway's process overlap theory amplifies, not opposes, *g* theory. *Psychological Inquiry, 27*(3), 210–217. https://doi.org/10.1080/1047840X.2016.1203232

Gravetter, F. J., & Wallnau, L. B. (2004). *Statistics for behavioral sciences* (9th ed). Wadsworth.

Greene, J. A., & Brown, S. C. (2009). The Wisdom Development Scale: Further validity investigations. *The International Journal of Aging and Human Development, 68*(4), 289–320. https://doi.org/10.2190/AG.68.4.b

Greenwald, A. G., & Pratkanis, A. R. (1984). The self. In R. S. Wyer & T. K. Srull (Eds.), *Handbook of social cognition*, *Vol. 3* (pp.129–178). Erlbaum. https://faculty.washington.edu/agg/pdf/Gwald_Pratk_TheSelf_1984.OCR.pdf

Greiff, S., & Heene, M. (2017). Why psychological assessment needs to start worrying about model fit. *European Journal of Psychological Assessment, 33*(5), 313–317. https://doi.org/10.1027/1015-5759/a000450

Grossmann, I. (2017). Wisdom in context. *Perspectives on Psychological Science, 12*(2), 233–257. https://doi.org/10.1177/1745691616672066

Grossmann, I., Karasawa, M., Izumi, S., Na, J., Varnum, M. E. W., Kitayama, S., & Nisbett, R. E. (2012). Aging and wisdom: culture matters. *Psychological Science*, *23*(10), 1059–1066. http://doi.org/10.1177/0956797612446025

Grossmann, I., & Kross, E. (2014). Exploring Solomon's Paradox: Self-distancing eliminates the self-other asymmetry in wise reasoning about close in younger and older adults. *Psychological Science, 21*(8), 1571–1580. http://doi.org/10.1177/0956797614535400

Grossmann, I., & Kung, F. Y. H. (2019). Wisdom and culture. In S. Kitayama & D. Cohen (Eds.), *Handbook of cultural psychology* (2nd ed., pp. 343–364). Guilford Press.

Grossmann, I., Kung, F. Y. H., & Santos, H. C. (2019). Wisdom as state versus trait. In R. J. Sternberg, & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 249–273). Cambridge University Press. https://doi.org/10.1017/9781108568272.013

Grossmann, I., Na, J., Varnum, M. E. W., Kitayama, S., & Nisbett, R. E. (2013). A route to well-being: Intelligence versus wise reasoning. *Journal of Experimental Psychology: General*, *142*(3), 944–953. https://doi.org/10.1037/a0029560

Grossmann, I., Na, J., Varnum, M. E. W., Park, D. C., Kitayama, S., & Nisbett, R. E. (2010). Reasoning about social conflicts improves into old age. *Proceedings of the National Academy of Sciences of the United States of America*, *107*(16), 7246–7250. https://doi.org/10.1073/pnas.1001715107

Grossmann, I., Sahdra, B. K., & Ciarrochi, J. (2016). A Heart and A Mind: Self-distancing Facilitates the Association Between Heart Rate Variability, and Wise Reasoning. *Frontiers in Behavioral Neuroscience*, *10,* 68. http://doi.org/10.3389/fnbeh.2016.00068

Guilford, J. P. (1956). The structure of intellect. *Psychological Bulletin, 53*(4), 267–293. https://doi.org/10.1037/h0040755

Guilford, J. P. (1988). Some changes in the structure of intellect model. *Educational and Psychological Measurement, 48*(1), 1–4. https://doi.org/10.1177/001316448804800102

Haier, R. J. (2017). *The neuroscience of intelligence*. Cambridge University Press.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). Multivariate data analysis (7th ed.). Pearson Prentice-Hall.

Hart, C. M., Ritchie, T. D., Hepper, E. G., Gebauer, J. E. (2015). The Balanced Inventory of Desirable Responding Short form (BIDR-16). *SAGE Open, 5,* 4. https://doi.org/10.1177/2158244015621113

Hartman, P.S. (2000). *Women developing wisdom: Antecedents and correlates in a longitudinal sample.* Unpublished doctoral dissertation, University of Michigan.

Hartshorne, J. K., & Germine, L. T. (2015). When does cognitive functioning peak? The asynchronous rise and fall of different cognitive abilities across the life span. *Psychological Science, 26*(4), 433–443. https://doi.org/10.1177/0956797614567339

Hayat, S. Z., Khan, S., & Sadia, R. (2016). Resilience, wisdom, and life satisfaction in elderly living with families and in old-age homes. *Pakistan Journal of Psychological Research, 31*(2), 475–494. Retrieved June 11, 2020, from https://pdfs.semanticscholar.org/d7e5/7d88330f1e1f319e634743f6e170ccd3ff21.pdf

Hayduk, L. A., & Glaser, D. N. (2000). Jiving the four-step, waltzing around factor analysis, and other serious fun. *Structural Equation Modeling*, *7*(1), 1–35. https://doi.org/10.1207/S15328007SEM0701_01

Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd new ed.). Guilford Press.

Hayes, A. F., & Matthes, J. (2009). Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods, 41*(3), 924–936. https://doi.org/10.3758/BRM.41.3.924

Haynes, S. N., Richard, D. C. S., & Kubany, E. S. (1995). Content validity in psychological assessment: A functional approach to concepts and methods. *Psychological Assessment*, *7*(3), 238–247. http://dx.doi.org/10.1037/1040-3590.7.3.238

He, J., van de Vijver, F. J. R., Dominguez Espinosa, A. D., Ali, A., Dimitrova, R., Adams, B. G., Aydinli, A., Atitsogbe, K., Alonso-Arbiol, I., Bobowik, M., Fischer, R., Jordanov, V., Mastrotheodoros, S., Neto, F., Ponizovsky, Y. J., Reb, J., Sim, S., Sovet, L., Stefenel, D., ... Villieux, A. (2015). Socially desirable responding: Enhancement and denial in 20 countries. *Cross-Cultural Research*, *49*(3), 227–249. https://doi.org/10.1177/1069397114552781

Heckhausen, J., Dixon, R., & Baltes, P. (1989). Gains and losses in development throughout adulthood as perceived by different adult age groups.

Developmental Psychology, 25(1), 109–121. https://doi.org/10.1037/0012-1649.25.1.109

Hershey, D. A., & Farrell, A. H. (1997). Perceptions of wisdom associated with selected occupations and personality characteristics. *Current Psychology, 16*(2), 115–130. http://doi.org/10.1007/s12144-997-1019-7

Hinkin, T. R. (1995). A review of scale development practices in the study of organizations. *Journal of Management, 21*(5), 967–988. https://doi.org/10.1016/0149-2063(95)90050-0

Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods, 1*(1), 104–121. https://doi.org/10.1177/109442819800100106

Holliday, S. G., & Chandler, M. J. (1986). *Wisdom: Explorations in adult competence* (1st ed.). S. Karger.

Holland, C. A., & Rabbitt, P. M. A. (1991). Social and psychological gerontology: The course and causes of cognitive change with advancing age. *Reviews in Clinical Gerontology, 1*(1), 81–96. https://doi.org/10.1017/S0959259800002598

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30*(2), 179–185. https://doi.org/10.1007/BF02289447

Horn, J. L. (1982). The aging of human abilities. In B. B. Wolman, (Ed.), *Handbook of developmental psychology*, (pp. 847–870). Prentice-Hall.

Horn, J. L., & Blankson, N. (2005). Foundations for better understanding of cognitive abilities. In D. P. Flanagan & P. L. Harrison (Eds.), *Contemporary intellectual assessment: Theories, tests, and issues* (2nd ed., pp. 41–68). Guilford Press.

Horn, J. L., & Cattell, R. B. (1966). Refinement and test of the theory of fluid and crystallized general intelligences. *Journal of Educational Psychology, 57*(5), 253–270. https://doi.org/10.1037/h0023816

Horn, J. L., & Cattell, R. B. (1967). Age differences in fluid and crystallized intelligence. *Acta Psychologica, 26*(2), 107–129. https://doi.org/10.1016/0001-6918(67)90011-x

Horn, J. L., & McArdle, J. J. (1992). A practical and theoretical guide to measurement invariance in aging research. *Experimental Aging Research, 18*(3), 117–144. https://doi.org/10.1080/03610739208253916

Horn, J. L., McArdle, J. J., & Mason, R. (1983). When is invariance not invarient: A practical scientist's look at the ethereal concept of factor invariance. *Southern Psychologist, 1*(4), 179–188.

Howard, M. C. (2016). A review of exploratory factor analysis decisions and overview of current practices: What we are doing and how can we improve? *International Journal of Human–Computer Interaction, 32*(1), 51–62. https://doi.org/10.1080/10447318.2015.1087664

Hoyle, R. H. (1995). The structural equation modeling approach: Basic concepts and fundamental issues. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 1–15). SAGE Publications.

Hu, L.-T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76–99). SAGE Publications.

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural*

Equation Modeling: A Multidisciplinary Journal, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hughes, M. L., Agrigoroaei, S., Jeon, M., Bruzzese, M., Lachman, M. E. (2018). Change in cognitive performance from midlife into old age: Findings from the Midlife in the United States (MIDUS) study. *Journal of the International Neuropsychological Society, 24*(8), 805–820. https://doi.org/10.1017/S1355617718000425

Hülür, G., Ram, N., Willis, S. L., Schaie, K. W., & Gerstorf, D. (2016). Cognitive aging in the Seattle Longitudinal Study: Within-person associations of primary mental abilities with psychomotor speed and cognitive flexibility. *Journal of Intelligence, 4*(3), 1–17. https://doi.org/10.3390/jintelligence4030012

Hyde, J. S. (1981). How large are cognitive gender differences? A meta-analysis using ω^2 and d. *American Psychologist, 36*(8), 892–901. https://doi.org/10.1037/0003-066X.36.8.892

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist, 60*(6), 581–592. https://doi.org/10.1037/0003-066X.60.6.581

IBM Corp. (2020). *IBM SPSS Statistics for Windows, Version 26.0.* IBM Corp.

Ingalhalikar, M., Smith, A., Parker, D., Satterthwaite, T. D., Elliott, M. A., Ruparel, K., Hakonarson, H., Gur, R. E., Gur, R. C., & Verma, V. (2014). Sex differences in the structural connectome of the human brain. *Proceedings of the National Academy of Sciences of the United States of America, 111*(2):823–828. https://doi.org/10.1073/pnas.1316909110

Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. Basic Books.

Irwing, P., & Lynn, R. (2005). "Sex differences in means and variability on the progressive matrices in university students: A meta-analysis". *British Journal of Psychology, 96*(4), 505–524. https://doi.org/10.1348/000712605X53542

Jaeggi, S. M., Buschkuehl, M., Jonides, J., Perrig, W. J. (2008). Improving fluid intelligence with training on working memory. *Proceedings of the National Academy of Sciences of the United States of America, 105*(19), 6829–6833. https://doi.org/10.1073/pnas.0801268105

Jason, L. A., Reichler, A., King, C., Madsen, D., Camacho, J., & Marchese, W. (2001). The measurement of wisdom: A preliminary effort. *Journal of Community Psychology*, *29*(5), 585–598. http://doi.org/10.1002/jcop.1037

Jennrich, R. I., & Bentler, P. M. (2011). Exploratory bi-factor analysis. *Psychometrika, 76*(4), 537–549. https://doi.org/10.1007/s11336-011-9218-4

Jensen, A. R. (1997). The psychometrics of intelligence. In H. Nyborg (Ed.), *The scientific study of human nature: Tribute to Hans J. Eysenck at eighty* (pp. 221–239). Elsevier.

Jensen, A. R. (1998). *The G factor: The science of mental ability*. Greenwood-Praeger.

Jeste, D. V., Ardelt, M., Blazer, D., Kraemer, H. C., Vaillant, G. E., & Meeks, T. W. (2010). Expert Consensus on Characteristics of Wisdom: A Delphi Method Study. *The Gerontologist*, *50*(5), 668–680. http://doi.org/10.1093/geront/gnq022

Jeste, D. V. & Harris, J. C. (2010). Wisdom: A neuroscience perspective. *Journal of the American Medical Association, 304*(14), 1602-1603. ttps://doi.org/10.1001/jama.2010.1458

Jeste, D. V., Lee, E. E., Cassidy, C., Caspari, R., Gagneux, P., Glorioso, D., Miller, B. L., Semendeferi, K., Vogler, C., Nusbaum, H., & Blazer, D. (2019).The new science of practical wisdom. *Perspectives in Biology and Medicine, 62*(2), 216–236. https://doi.org/10.1353/pbm.2019.0011

Jeste, D. V., & Vahia, I. V. (2008). Comparison of the conceptualization of wisdom in ancient Indian literature with modern views: Focus on the Bhagavad Gita. *Psychiatry*, *71*(3), 197–209. http://doi.org/10.1521/psyc.2008.71.3.197

Jones, H. E., & Conrad, H. S. (1933). The growth and decline of intelligence: A study of a homogeneous group between the ages of ten and sixty. *Genetic Psychology Monographs, 13*, 223–298.

Johnson, P. O., & Fay, L. C. (1950). The Johnson-Neyman technique, its theory and application, *Psychometrika, 15*(4), 349–367. https://doi.org/10.1007/BF02288864

Johnson, W., & Bouchard, T. J. (2005). The structure of human intelligence: It is verbal, perceptual, and image rotation (VPR), not fluid and crystallized. *Intelligence*, *33*(4), 393–416. https://doi.org/10.1016/j.intell.2004.12.002

Jordan, J. (2005). The quest for wisdom in adulthood: A psychological perspective. In R. J. Sternberg & J. Jordan (Eds.), *A handbook of wisdom: Psychological perspectives* (p. 160–188). Cambridge University Press. https://doi.org/10.1017/CBO9780511610486.008

Jose, P.E. (2013). *Doing statistical mediation and moderation*. The Guilford Press.

Jung, C. G. (1964). *Man and his symbols*. Aldus Books.

Kahn, J. H. (2006). Factor analysis in counseling psychology research, training, and practice: Principles, advances, and applications. *The Counseling Psychologist, 34*(5), 684–718. https://doi.org/10.1177/0011000006286347

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational & Psychological Measurement*, *20*(1), 141-151. https://doi.org/10.1177/001316446002000116

Kan, K. -J., Kievit, R. A., Dolan, C. V., & van der Maas, H. L. J. (2011). On the interpretation of the CHC factor Gc. *Intelligence, 39*(5), 292–302. https://doi.org/10.1016/j.intell.2011.05.003

Kaufman, A. S. (2001). WAIS-III IQs, Horn’s theory, and generational changes from young adulthood to old age. *Intelligence*, *29*(2), 131–167. https://doi.org/10.1016/s0160-2896(00)00046-5

Kaufman, S. B. (2009). *Beyond general intelligence: The dual-process theory of human intelligence (Doctoral dissertation).* Yale University.

Kaufman, A. S., & Horn, J. L. (1996). Age changes on tests of fluid and crystallized ability for women and men on the Kaufman adolescent and adult intelligence test (KAIT) at ages 17–94 years. *Archives of Clinical Neuropsychology, 11*(2), 97–121. https://doi.org/10.1016/0887-6177(95)00003-8

Kaufman, A. S., Salthouse, T. A., Scheiber, C., & Chen, H. (2016). Age differences and educational attainment across the lifespan on three generations of Wechsler Adult Scales. *Journal of Psychoeducational Assessment*, *34*(5), 421–441. http://dx.doi.org/10.1177/0734282915619091

Keith, T. Z.; Reynolds, M. R.; Patel, P. G.; & Ridley, K. P. (2008). "Sex differences in latent cognitive abilities ages 6 to 59: Evidence from the Woodcock–Johnson III tests of cognitive abilities". *Intelligence, 36*(6), 502–525. doi:10.1016/j.intell.2007.11.001

Kekes, J. (1983). Wisdom. *American Philosophical Quarterly, 20*(3), 277–286.

Kekes, J. (1995). *Moral wisdom and good lives*. Cornell University Press.

Kenny, D. (2015). *How large a sample size do I need*? http://www.davidakenny.net/cm/fit.htm

Kievit, R. A., Davis, S. W., Griffiths, J., Correia, M. M., & Henson, R. N. (2016). A watershed model of individual differences in fluid intelligence. *Neuropsychologia*, 91, 186–198. https://doi.org/10.1016/j.neuropsychologia.2016.08.008

Kim, E. S., Kwok, O.-M., & Yoon, M. (2012). Testing factorial invariance in multilevel data: A Monte Carlo study. *Structural Equation Modeling: A Multidisciplinary Journal*, *19*(2), 250–267. https://doi.org/10.1080/10705511.2012.659623

Kim, J. H. (2020). Decision-theoretic hypothesis testing: A primer with R package OptSig. *The American Statistician, 00*(0), 1–10. https://doi.org/10.1080/00031305.2020.1750484

Kim, S., & Knight, B. G. (2015). Adaptation of the three-dimensional wisdom scale (3D-WS) for the Korean cultural context, *27*(2), 267–278. *International Psychogeriatric Association*. https://doi.org/10.1017/S1041610214002178

Kim, S., & Knight, B. G. (2017). The Effects of the MORE wisdom resources on spousal caregivers' life satisfaction: An application of the resilience model. *Clinical Gerontology, 40*(5), 413–427. https://doi.org/10.1080/07317115.2016.1209607

King James Bible. (1990). Thomas Nelson. (Original work published 1769)

Klein, R. M., Dilchert, S., Ones, D. S., Dages, K. D. (2015). Cognitive predictors and age-based adverse impact among business executive. *Journal of Applied Psychology, 100*(5), 1497–1510. https://doi.org/10.1037/a0038991

Kliegl, R., Smith, J., & Baltes, P. B. (1989). Testing-the-limits and the study of adult age differences in cognitive plasticity of a mnemonic skill. *Developmental Psychology, 25*(2), 247–256. https://doi.org/10.1037/0012-1649.25.2.247

Kline, P. (2016). *An easy guide to factor analysis*. Routledge.

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.

Knight, B. G., & Laidlaw, K. (2009). Translational theory: A wisdom-based model for psychological interventions to enhance well-being in later life. In V. Bengston, D. Gans, N. Putney, & M. Silverstein (Eds.), *Handbook of theories of aging* (2nd ed.) (pp. 693–706). Springer.

Knight, B. G., Mitchell, L. K., Laidlaw, K., Potts, S., Kim, S., & Wong, S. (2016). *Development of a questionnaire for performance-based wisdom: The Vignette Wisdom Scale.* Manuscript in preparation.

Koller, I., Levenson, M. R., & Glück, J. (2017). What do you think you are measuring? A mixed-methods procedure for assessing the content validity of test items and theory-based scaling. *Frontiers in Psychology, 8,* 126. https://doi.org/10.3389/fpsyg.2017.00126

Kohn, M. L., & Schooler, C. (1983). *Work and personality: An inquiry into the impact of social stratification*. Ablex.

Kohn, M. L., Zaborowski, W., Janicka, K., Mach, B. W., Khmelko, V., Slomczynski, K. M., Heyman, C., & Podobnik, B. (2000). Complexity of activities and personality under conditions of radical social change: A comparative analysis of Poland and Ukraine. *Social Psychology Quarterly, 63*(3), 187–208. https://doi.org/10.2307/2695868

Krafcik, D. (2015). Words from the wise: Exploring the lives, qualities, and opinions of wisdom exemplars. *Integral Review, 11*(2), 7–35. http://www.integral-review.org/documents/Krafcik,%20Vol.%2011,%20No.%202%20Special%20Issue%20on%20Wisdom.pdf

Kramer, D. A. (1990). Conceptualizing wisdom: The primacy of affect-cognition relations. In R. J. Sternberg (Ed.), *Wisdom: Its nature, origins, and development* (pp. 279-313). Cambridge University Press.

Kramer, D. A. (2000). Wisdom as a classical source of human strength: Conceptualization and empirical inquiry. *Journal of Social and Clinical Psychology*, *19*(1), 83–101. https://doi.org/10.1521/jscp.2000.19.1.83

Kung, F. Y. H., & Grossmann, I. (2018). *Culture and wisdom*. PsyArXiv. https://doi.org/10.31234/osf.io/vme6c

Kunzmann, U. (2019). *Performance-based measures of wisdom: State of the art and future directions.* In R. J. Sternberg & J. Glück (Eds.), *The Cambridge handbook of wisdom* (p. 277–296). Cambridge University Press. https://doi.org/10.1017/9781108568272.014

Kunzmann, U., & Baltes, P. B. (2005). The psychology of wisdom: Theoretical and empirical challenges. In R. J. Sternberg and J. Jordan (Eds.), *A handbook of wisdom: Psychological perspectives* (pp. 110–135). Cambridge University Press. https://doi.org/10.1017/CBO9780511610486.006

Kunzmann, U., Nowak, J., Thomas, S., & Nestler, S. (2018). Value relativism and perspective taking: Two distinct facets of wisdom-related knowledge. *The Journals of Gerontology, Series B: Psychological Sciences, 73*(8), 1384–1392. https://doi.org/10.1093/geronb/gbx136

Kupperman, J. J. (2005). Morality, ethics, and wisdom. In R. J. Sternberg & J. Jordan (Eds.), *A handbook of wisdom. Psychological perspectives* (pp. 245–271). Cambridge University Press.

Labouvie-Vief, G. (1990). Wisdom as integrated thought: Historical and developmental perspectives. In R.J. Sternberg (Ed.), *Wisdom: Its nature origins, and development* (pp. 52-86). Cambridge University Press.

Labouvie-Vief, G. (2003). Dynamic integration: Affect, cognition, and the self in adulthood. *Current Directions in Psychological Science, 12*(6), 201–206. https://doi.org/10.1046/j.0963-7214.2003.01262.x

Labouvie-Vief, G. (2009). Cognition and equilibrium regulation in development and aging. *Restorative Neurology and Neuroscience, 27*(5), 551–565. https://doi.org/10.3233/RNN-2009-0512

Labouvie-Vief, G., Diehl, M., Jain, E., & Zhang, F. (2007). Six-year change in affect optimization and affect complexity across the adult life span: A further examination. *Psychology and Aging, 22*(4), 738-751. https://doi.org/10.1037/0882-7974.22.4.738

Lao Tzu. (1995). *Tao Te Ching* (S. Mitchell, Trans.). Retrieved June 11, 2020, from http:albanycomplementaryhealth.com/wp-content/uploads/2016/07/TaoTeChing-LaoTzu-StephenMitchellTranslation-33p.pdf

Lapsley, D. K., & Murphy, M. N. (1985). Another look at the theoretical assumptions of adolescent egocentrism. *Developmental Review, 5*(3), 201–217. https://doi.org/10.1016/0273-2297(85)90009-7

Law, A., & Staudinger, U. M. (2016). Eudaimonia and wisdom. In J. Vittersø (Ed.), *Handbook of* Staudinger *eudemonic well-being*, (pp. 135–146). Springer.

Le, T. N. (2011). Life satisfaction, openness value, self-transcendence, and wisdom. *Journal of Happiness Studies, 12*(2), 171–182. https://doi.org/10.1007/s10902-010-9182-1

Lelkes, Y., Krosnick, J. A., Marx, D. M., Judd, C. M., & Park, B. (2012). Complete anonymity compromises the accuracy of self-reports. *Journal of Experimental Social Psychology*, 48, 1291–1299. doi:10.1016/j.jesp.2012.07.00

Leong, F. T. L., & Austin, J. T. (2005). *The Psychology Research Handbook: A Guide for Graduate Students and Research Assistants* (2nd ed.). SAGE Publications.

Levenson, M. R. (2009). Gender and wisdom: The roles of compassion and moral development. *Research in Human Development*, *6*(1), 45–59. https://doi.org/10.1080/15427600902782127

Levenson, M. R., & Aldwin, C. M. (2013). Mindfulness in psychology and religion. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of psychology and religion*, (2nd ed., pp. 580–594). Guilford.

Levenson, M. R., Jennings, P. A., Aldwin, C. M., & Shiraishi, R. W. (2005). Self-transcendence: Conceptualization and measurement. *The International Journal of Aging & Human Development, 60*(2), 127–143. https://doi.org/10.2190/XRXM-FYRA-7U0X-GRC0

Levitt, H. M. (1999). The development of wisdom: An analysis of Tibetan Buddhist experience. *Journal of Humanistic Psychology, 39*(2), 86–105. https://doi.org/10.1177/0022167899392006

Li, S. C., Lindenberger, U., Hommel, B., Aschersleben, G., Prinz, W., & Baltes, P. B. (2004). Transformations in the couplings among intellectual abilities and constituent cognitive processes across the lifespan. *Psychological Science, 15*(3),155–163. https://doi.org/10.1111/j.0956-7976.2004.01503003.x

Li, R., & Singh, M. (2014). Sex differences in cognitive impairment and Alzheimer's disease. *Frontiers in Neuroendocrinology, 35*(3), 385–403. https://doi.org/10.1016/j.yfrne.2014.01.002

Lin, J. S., O'Connor, E., Rossom, R. C., Perdue, L. A., & Eckstrom., E. (2013). Screening for cognitive impairment in older adults: A systematic review for the U.S. Preventive Services Task Force. *Annals of Internal Medicine, 159*(9), 601 – 612. https://doi.org/10.7326/0003-4819-159-9-201311050-00730

Little, R. J. A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*(404), 1198-1202. https://doi.org/10.1080/01621459.1988.10478722

Löckenhoff, C. E., De Fruyt, F., Terracciano, A., McCrae, R. R., De Bolle, M., Costa, P. T., Jr; Aguilar-Vafaie, M. E., Ahn, C. K., Ahn, H. N., Alcalay, L., Allik, J., Avdeyeva, T. V., Barbaranelli, C., Benet-Martinez, V., Blatný, M., Bratko, D., Brunner-Sciarra, M., Cain, T. R., Crawford, J. T., … Yik, M. (2009). Perceptions of aging across 26 cultures and their culture-level associates. *Psychology and Aging, 24*(4), 941-954. https://doi.org/10.1037/a0016901

Lodge, J. K. (2013). *The concurrent validity of the Shipley-2 and the WAIS-IV.* (Unpublished doctoral dissertation). Wright State University School of Professional Psychology. Dayton: Ohio.

Lundervold, A. J., Wollschläger, D., & Wehling, E. (2014). Age and sex related changes in episodic memory function in middle aged and older adults.

Scandinavian Journal of Psychology, 55(3), 225–32. https://doi.org/10.1111/sjop.12114

Lynn, R. (1999). Sex differences in intelligence and brain size: A developmental theory. *Intelligence, 27*(1), 1–12. https://doi.org/10.1016/S0160-2896(99)00009-4

Lynn, R., & Irwing, P. (2002). Sex differences in general knowledge, semantic memory and reasoning ability. *British Journal of Psychology*, *93*(4), 545–556. https://doi.org/10.1348/000712602761381394

Lynn, R., & Irwing, P. (2004a). Sex differences on the progressive matrices: A meta-analysis. *Intelligence*, *32*(5), 481–498. https://doi.org/10.1016/j.intell.2004.06.008

Lynn, R., & Irwing, P. (2004b). Sex differences on the advanced progressive matrices in college students. *Personality and Individual Differences, 37*(1), 219–223. https://doi.org/10.1016/j.paid.2003.08.028

Lynn, R., & Irwing, P. (2008). Sex differences in mental arithmetic, digit span, and g defined as working memory capacity. *Intelligence*, *36*(3), 226–235. https://doi.org/10.1016/j.intell.2007.06.002

Lynn, R., Irwing, P., & Cammock, T. (2001). Sex differences in general knowledge. *Intelligence, 30*(1), 27–39. https://doi.org/10.1016/S0160-2896(01)00064-2

Mansfield, C. D., McLean, K. C., & Lilgendahl, J. P. (2010). Narrating traumas and transgressions: Links between narrative processing, wisdom, and well-being. *Narrative Inquiry, 20(2),* 246–273. https://doi.org/10.1075/ni.20.2.02man

Mansell, I., Bennett, G., Northway, R., Mead, D., & Moseley, L. (2004). The learning curve: The advantages and disadvantages in the use of focus groups as a method of data collection. *Nurse Researcher, 11*(4), 79–88. https://doi.org/10.7748/nr2004.07.11.4.79.c6217

Maroof, R., Khan, M. J. Z., Anwar, M., Anwar, A. (2015). A cross-sectional study of wisdom: A matter of age and gender. *Frontier Women University Journal of Social Sciences, 9*(2), 63–71. http://www.sbbwu.edu.pk/journal/Jan%202016/7.A%20Cross%20Sectional%20Study%20of%20Wisdom%20A%20Matter%20of%20Age%20and%20Gender.pdf

Marsh, H. W., Hau, K.-T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers of overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11*(3), 320–341. https://doi.org/10.1207/s15328007sem1103_2

McAdams, D. P., & de St. Aubin, E. (1992). A theory of generativity and its assessment through self-report, behavioral acts, and narrative themes in autobiography. *Journal of Personality and Social Psychology, 62*(6), 1003–1015. https://doi.org/10.1037/0022-3514.62.6.1003

McCrae, R. R., Costa, P. T., Jr., Ostendorf, F., Angleitner, A., Hřebíčková, M., Avia, M. D., Sanz, J., Sánchez-Bernardos, M. L., Kusdil, M. E., Woodfield, R., Saunders, P. R., & Smith, P. B. (2000). Nature over nurture: Temperament, personality, and life span development. *Journal of Personality and Social Psychology, 78*(1), 173–186. https://doi.org/10.1037/0022-3514.78.1.173

McGrew, K. (2009). CHC theory and the human cognitive abilities project: Standing on the shoulders of the giants of psychometric intelligence research. *Intelligence*, *37,* 1–10. https://doi.org/10.1016/j.intell.2008.08.004

McIntire, S. A., & Miller, L. A. (2007). *Foundations of psychological testing: A practical approach* (2nd ed.). SAGE Publications.

McKee, P., & Barber, C. E. (1999). On defining wisdom. *The International Journal of Aging and Human Development*, *49*(2), 149–164. http://doi.org/10.2190/8G32-BNV0-NVP9-7V6G

McKenna, B., & Rooney, D. (2019). Wise leadership. In R. J. Sternberg, & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 649–675). Cambridge University Press. https://doi.org/10.1017/9781108568272.030

Meacham, J. (1990). The loss of wisdom. In R. J. Sternberg (Ed.), *Wisdom: Its nature, origins, and development* (pp. 181–211). Cambridge University Press.

Meade, A. W., & Lautenschlager, G. J. (2004). A Comparison of Item Response Theory and Confirmatory Factor Analytic Methodologies for Establishing Measurement Equivalence/lnvariance. *Organizational Research Methods, 7*(4), 361–388. Retrieved June 18, 2020, from https://tarjomefa.com/wp-content/uploads/2019/10/F1430-TarjomeFa-English.pdf

Meeks, T. W., & Jeste, D. V. (2009). Neurobiology of wisdom: A literature overview. *Archives of General Psychiatry*, *66*(4), 355–365. https://doi.org/10.1001/archgenpsychiatry.2009.8

Menard, S. (1995). *Applied logistic regression analysis.* SAGE University Paper Series on Quantitative Applications in the Social Sciences, 07-106. SAGE Publications.

Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika 58*(4), 525–543. https://doi.org/10.1007/BF02294825

Merriam-Webster. (n.d.). *Merriam-Webster.com dictionary.* Retrieved March 19, 2020, from http://www.merriam-webster.com/

Meyers, L.S., Gamst, G., & Guarino, A. J. (2016). *Applied multivariate research: Design and interpretation* (3rd ed.). SAGE Publications.

Meyerson, P. & Tryon, W. W. (2003). Validating Internet research: A test of the psychometric equivalence of Internet and in-person samples. *Behavior Research Methods, Instruments, & Computers, 35*(4), 614–620. 10.3758/bf03195541

Mickler, C., & Staudinger, U. M. (2008). Personal wisdom: Validation and age-related differences of a performance measure. *Psychology and Aging*, *23*(4), 787–799.

Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research, 3*(1), 111–121. https://doi.org/10.21500/20112084.857

Miller, D. I., & Halpern, D. F. (2014). The new science of cognitive sex differences. *Trends in Cognitive Sciences, 18*(1), 37–45. https://doi.org/10.1016/j.tics.2013.10.011

Millsap, R. E. (2011). *Statistical approaches to measurement invariance*. Routledge.

Mitchell, L. K. (2016). *An exploration of wisdom in mid- to older-aged adults: An Australian context* [Unpublished doctoral dissertation]. University of Queensland, Brisbane, Australia.

Moberg, D. (2008). Mentoring and practical wisdom: Are mentors wiser or just more politically skilled? *Journal of Business Ethics, 83*, 835–843. https://doi.org/10.1007/s10551-008-9668-5

Mokkink, L. B., Terwee, C. B., Patrick, D. L., Alonso, J., Stratford, P. W., Knol, D. L., Bouter, L. M., & de Vet, C. W. (2010). The COSMIN checklist for assessing the methodological quality of studies on measurement properties of health status measurement instruments: An international Delphi study. *Quality of Life Research*, *19*, 539–549. https://doi.org/10.1007/s11136-010-9606-8

Montgomery, A., Barber, C., & McKee, P. (2002). A Phenomenological study of wisdom in later life. *The International Journal of Aging and Human Development*, *54*(2), 139–157. http://doi.org/10.2190/28E3-ANPT-UEED-92WF

Moody, H. R. (1986). Late life learning in the information society. In D. A. Peterson, J. E. Thornton, & J. E. Birren (Eds.), *Education and aging* (pp. 122–148). Prentice-Hall.

Moraitou, D., & Efklides, A. (2012). The Wise Thinking and Acting Questionnaire: The cognitive facet of wisdom and its relation with memory, affect, and hope. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being, 13*(5), 849–873. https://doi.org/10.1007/s10902-011-9295-1

Nederhof, A. J. (1985). Methods of coping with social desirability bias. A review. *European Journal of Social Psychology, 15*(3), 263–280. https://doi.org/10.1002/ejsp.2420150303

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality, 41*(1), 139-154. https://doi.org/10.1016/j.jrp.2006.03.004

Neisser, U. (1997). Rising scores on intelligence tests: Test scores are certainly going up all over the world, but whether intelligence itself has risen remains controversial. *American Scientist*, *85*(5), 440–447. https://www.jstor.org/stable/27856851

Neisser, U., Boodoo, G., Bouchard, T. J., Jr., Boykin, A. W., Brody, N., Ceci, S. J., Halpern, D. F., Loehlin, J. C., Perloff, R., Sternberg, R. J., & Urbina, S. (1996). Intelligence: Knowns and unknowns. *American Psychologist, 51*(2), 77–101. https://doi.org/10.1037/0003-066X.51.2.77

Netemeyer, R. G., Bearden, W.O., & Sharma, S. (2003). *Scaling procedures for self-report measures in the social sciences: Issues and applications.* SAGE Publications.

Nilsson, L.-G., Sternäng, O., Rönnlund, M., & Nyberg, L. (2009). Challenging the notion of an early-onset of cognitive decline. *Neurobiology of Aging, 30*(4), 521–524. https://doi.org/10.1016/j.neurobiolaging.2008.11.013.

Noam, G. G. (1996). Reconceptualizing maturity: The search for deeper meaning. In G. G. Noam, and K. W. Fischer (Eds.), *Development and vulnerability in close relationships* (pp. 135–172). Erlbaum.

Northouse, P. G. (2018*). Leadership: Theory and practice* (8th ed.). SAGE Publications.

Nunnally, J. C. (1993). *Psychometric theory* (3rd ed). McGraw-Hill.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory (*3rd ed.*)*. McGraw-Hill.

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior*

Research Methods, Instrumentation, and Computers, 32, 396-402. https://doi.org/10.3758/BF03200807

Olejnik, M. (1999). Wisdom as value orientation: A cross sectional study with a person-oriented approach. *Polish Psychological Bulletin, 30*, 99–114.

Orwoll, L., & Achenbaum, W. A. (1993). Gender and development of wisdom. *Human Development, 36*(5), 274–296. https://doi.org/10.1159/000278214

Orwoll, L., & Perlmutter, M. (1990). The study of wise persons: Integrating a personality perspective. In R. J. Sternberg, (Ed.), *Wisdom, its nature, origins, and development* (pp. 160–178). Cambridge University Press. https://doi.org/10.1017/CBO9781139173704.009

Osborne, J. W., & Costello, A. B. (2009). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Pan-Pacific Management Review, 12*(2), 131–146.

Pallant, J. F. (2016). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (6th ed.). Allen & Unwin.

Park, D. C., Lautenschlager, G., Hedden, T., Davidson, N. S., Smith, A. D., & Smith, P. K. (2002).) Models of visuospatial and verbal memory across the adult life span. *Psychology and Aging, 17*(2), 299–320. https://doi.org/10.1037/0882-7974.17.2.299

Pascual-Leone, J. (2000). Mental attention, conscious, and the progressive emergence of wisdom. *Journal of Adult Development, 7*(4), 241–254. https://doi.org/10.1023/A:1009563428260

Pasupathi, M., Staudinger, U. M., & Baltes, P. B. (2001). Seeds of wisdom: Adolescents’ knowledge and judgment about difficult life problems.

Developmental Psychology, 37(3), 351–361. https://doi.org/10.1037/0012-1649.37.3.351

Paulhus, D. L. (1984). Two-component models of socially desirable responding. *Journal of Personality and Social Psychology, 46*(3), 598–609. https://doi.org/10.1037/0022-3514.46.3.598

Paulhus, D. L. (1991). Measurement and control of response bias. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 17–59). Academic Press.

Pedhazur, E. J., & Schmelkin, L. P. (1991). *Measurement, design, and analysis: An integrated approach*. Erlbaum.

Perry, C. L., Komro, K. A., Jones, R. M., Munson, K., Williams, C. L., & Jason, L. (2002). The measurement of wisdom and its relationship to adolescent substance use and problem behaviors. *Journal of Child & Adolescent Substance Abuse*, *12*(1), 45–63. http://doi.org/10.1300/J029v12n01_03

Peter, J. P. (1981). Construct validity: A review of basic issues and marketing practices. *Journal of Marketing Research*, *18*(2), 133–145. https://doi.org/10.2307/3150948

Piaget, J., & Inhelder, B. (1973). *Memory and intelligence*. Routledge and Kegan Paul.

Plews-Ogan, M., Owens, J. F., & May, N. (2012). *Choosing wisdom: Strategies and inspiration for growing through life-changing difficulties.* Templeton Press.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing 809 and comparing indirect effects in multiple mediator models. *Behavior Research 810 Methods, 40*(3), 879-891. https://doi.org/10.3758/BRM.40.3.879

Rabbitt, P. M. A., Diggle, P., Smith, D., Holland, F., & McInnes, L. (2001). Identifying and separating the effects of practice and of cognitive ageing during a large longitudinal study of elderly community residents. *Neuropsychologia,* 39, 532– 43.

Randall, N. (1987). Shoeless Joe: Fantasy and the Humor of Fellow-Feeling. *MFS Modern Fiction Studies, 33*(1), 173–182. Johns Hopkins University Press. https://doi.org/10.1353/mfs.0.1220

Randall, W. L., & Kenyon, G. M. (2002). Reminiscence as reading our lives: Toward a wisdom environment. In J. Webster & B. Haight (Eds.), Critical advances in reminiscence: Theoretical, empirical, and clinical perspectives (pp. 233– 253). Springer.

Raven, J. C. (1941). Standardisation of Progressive Matrices, 1938. *British Journal of Medical Psychology, 19*(1), 137–150. https://doi.org/10.1111/j.2044-8341.1941.tb00316.x

Raz, N., & Lindenberger, U. (2011). Only time will tell: Cross-sectional studies offer no solution to the age–brain–cognition triangle: Comment on Salthouse (2011). *Psychological Bulletin, 137*(5), 790–795. https://doi.org/10.1037/a0024503

Redzanowski, U., & Glück, J. (2013). Who knows who is wise? Self and peer ratings of wisdom. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 68*(3), 391–394. https://doi.org/10.1093/geronb/gbs079

Rice, S., Winter, S. R., Doherty, S., & Milner, M. (2017). Advantages and Disadvantages of Using Internet-Based Survey Methods in Aviation-Related Research. *Journal of Aviation Technology and Engineering, 7*(1), 58–65. https://doi.org/10.7771/2159-6670.1160

Richardson, M. J., Pasupathi, M. (2005). Young and growing wiser. In R. J. Sternberg & J. Jordan (Eds.), *A handbook of wisdom: Psychological perspectives*, (pp. 139–159). Cambridge University Press.

Riegel, K. F. (1973). Dialectic operation: The final period of cognitive development. *Human Development*, *16*(5), 346–370. https://doi.org/10.1159/000271287

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*, *132*(1), 1–25. https://doi.org/10.1037/0033-2909.132.1.1

Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin*, *27*(2), 151–161. https://doi.org/10.1177/0146167201272002

Robins, R. W., Tracy, J. L., Trzesniewski, K. H., Potter, J., & Gosling, S. D. (2001). Personality correlates of self-esteem. *Journal of Research in Personality, 35*(4), 463–482. https://doi.org/10.1006/jrpe.2001.2324

Robinson, D. N. (1990). Wisdom through the ages. In R. J. Sternberg (Ed.), *Wisdom: Its nature, origins, and development* (pp. 13–24). Cambridge University Press.

Rogosa, D. (1980). Comparing nonparallel regression lines. *Psychological Bulletin, 88*(2), 307–321.https://doi.org/10.1037/0033-2909.88.2.307

Rönnlund, M., Nyberg, L., Bäckman, L., & Nilsson, L.-G. (2005). Stability, growth, and decline in adult life span development of declarative memory: Cross-sectional and longitudinal data from a population-based study. *Psychology and Aging*, *20*(1), 3–18. http://dx.doi.org/10.1037/0882-7974.20.1.3

Rossiter, J. R. (2008). Content validity of measures of abstract constructs in management and organizational research. *British Journal of Management, 19*(4), 380–388. https://doi.org/10.1111/j.1467-8551.2008.00587.x

Rubin, D. C., & Schulkind, M. D. (1997). Distribution of important and word-cued autobiographical memories in 20-, 35-, and 70-year-old adults. *Psychology and Aging, 12*(3), 524–535. https://doi.org/10.1037/0882-7974.12.3.524

Runyan, R. C., Ge, B., Dong, B., & Swinney, J. L. (2012). Entrepreneurial orientation in cross-cultural research: Assessing measurement invariance in the construct. *Entrepreneurship Theory and Practice, 36*(4), 819–836. https://doi.org/10.1111/j.1540-6520.2010.00436.x

Sackman, H. (1975). *Delphi critique*. Lexington Books.

Saczinski, J. S., Willis, S. L., & Schaie, K.W. (2002). Strategy use in reasoning training with older adults. *Aging, Neuropsychology, and Cognition, 9*(1), 48–60. https://doi.org/10.1076/anec.9.1.48.836

Salovey, P., & Grewal, D. (2005). The science of emotional intelligence. *Current Directions in Psychological Sciences*, *14*(6), 281–285. https://doi.org/10.1111/j.0963-7214.2005.00381.x

Salovey, P., & Mayer, J. D. (1989-1990). Emotional intelligence. *Imagination, Cognition and Personality, 9*(3), 185–211. https://doi.org/10.2190/DUGG-P24E-52WK-6CDG

Salthouse, T. A. (1982). *Adult cognition: An experimental psychology of human aging*. Springer-Verlag.

Salthouse, T. A. (1996). The processing-speed theory of adult age differences in cognition. *Psychological Review, 103*(3), 403–428 https://doi.org/10.1037/0033-295X.103.3.403

Salthouse, T. A. (2000). Aging and measures of processing speed. *Biological Psychology*, *54*(1-3), 35–54. https://doi.org/10.1016/S0301-0511(00)00052-1

Salthouse, T.A. (2005). Relations between cognitive abilities and measures of executive functioning. *Neuropsychology, 19*(4), 532–545. https://doi.org/10.1037/0894-4105.19.4.532

Salthouse, T. A. (2006). Mental exercise and mental aging. *Perspectives on Psychological Science, 1*(1), 68–87. https://doi.org/10.1111/j.1745-6916.2006.00005.x

Salthouse, T. A. (2009). When does age-related cognitive decline begin? *Neurobiology of Aging, 30*(4), 507–514. https://doi.org/10.1016/j.neurobiolaging.2008.09.023

Salthouse, T. A. (2010). Influence of age on practice effects in longitudinal neurocognitive change. *Neuropsychology*, *24*(4), 563–572. http://dx.doi.org/10.1037/a0019026

Salthouse, T. A. (2018). Why is cognitive change more negative with increased age? *Neuropsychology, 32*(1), 110–120. http://dx.doi.org/10.1037/neu0000397

Salthouse, T. A. (2019. Trajectories of normal cognitive aging. *Psychology and Aging, 34*(1), 17–24. http://dx.doi.org/10.1037/pag0000288

Schaie, K. W. (1958). Rigidity-flexibility and intelligence: A cross-sectional study of the adult life-span from 20 to 70. *Psychological Monograph: General and Applied, 72*(9), 1–26. https://doi.org/10.1037/h0093788

Schaie, K. W. (1965). A general model for the study of developmental problem. *Psychological Bulletin*, *64*, 92–107. https://doi.org/10.1037/h0022371

Schaie, K. W. (1983). The Seattle Longitudinal Study: A twenty-one year exploration of psychometric intelligence in adulthood. In K. W. Schaie (Ed.), *Longitudinal studies of adult psychological development* (pp. 64–135). Guilford Press.

Schaie, K.W. (1985). *Manual for the Schaie-Thurstone Adult Mental Abilities Test* (*STAMAT*). Consulting Psychologists Press.

Schaie, K. W. (1994). The course of adult intellectual development. *American Psychologist*, *49*(4), 304–313. https://doi.org/10.1037/0003-066X.49.4.304

Schaie, K. W. (1996). *Intellectual development in adulthood: The Seattle longitudinal study*. Cambridge University Press.

Schaie, K. W. (2005). *Developmental influences on adult intellectual development: The Seattle longitudinal study*. Oxford University Press.

Schaie, K. W. (2009). "When does age-related cognitive decline begin?" Salthouse again reifies the "cross-sectional fallacy." *Neurobiology of Aging, 30*(4), 528–529. https://doi.org/10.1016/j.neurobiolaging.2008.12.012

Schaie, K.W. (2011). Historical processes and cognitive aging. In K.W. Schaie & S. L. Willis (Eds.), *Handbook of the psychology of aging* (7th ed., pp. 41–55). Elsevier.

Schaie, K.W. (2013). *Developmental influences on adult intelligence: The Seattle Longitudinal Study* (2nd ed.). Oxford University Press.

Schaie, K. W. (2016). Seattle Longitudinal Study findings. In S. K. Whitbourne (Ed.), *The encyclopedia of adulthood and aging* (pp. 1–4). John Wiley & Sons.

Schaie, K. W., & Hertzog, C. (1986). Towards a comprehensive model of adult intellectual development: Contributions of the Seattle Longitudinal Study. In R. J. Sternberg (Ed.), *Advances in the psychology of human intelligence* (Vol. 3, pp. 79–118). Erlbaum.

Schaie, K. W., & Willis, S. L. (1986). Can intellectual decline in the elderly be reversed? *Developmental Psychology, 22*(2), 223–232. https://doi.org/10.1037/0012-1649.22.2.223

Schaie, K. W., & Willis, S. L. (2010). The Seattle longitudinal study of adult cognitive development. *International Society for the Study of Behavioural Development Bulletin, 57*, 24–29. Retrieved June 11, 2020, from https://www.researchgate.net/publication/236088378_The_Seattle_Longitudinal_Study_of_Adult_Cognitive_Development

Schaie, K. W., Willis, S. L., & Caskie, G. I. L. (2004). The Seattle longitudinal study: Relationship between personality and cognition. *Aging Neuropsychology and Cognitions, 11*(2-3), 304–324. https://doi.org/10.1080/13825580490511134

Schaie, K. W., Willis, S. L., & Pennak, S. (2005). An historical framework for cohort differences in intelligence. *Research in Human Development, 2*(1-2), 43–67. https://doi.org/10.1207/s15427617rhd0201&2_3

Scheibe, S., Kunzmann, U., & Baltes, P. B. (2007). Wisdom, life longings, and optimal development. In J. A. Blackburn, & C. N. Dulmus (Eds.), *Handbook of gerontology: Evidence-based approaches to theory, practice, and policy* (pp. 117–142). Wiley.

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research, 8*(2), 23–74.

Schmidt, S. (2009). Shall we really do it again? The powerful concept of replication is neglected in the social sciences. *Review of General Psychology, 13*(2), 90–100. https://doi.org/10.1037/a0015108

Schönbrodt, F. D., & Perugini, M. (2013). At what sample size do correlations stabilize? *Journal of Research in Personality*, *47*(5). 609–612. http://dx.doi.org/10.1016/j.jrp.2013.05.009

Schultz, P. W., & Searleman, A. (2002). Rigidity of thought and behavior: 100 years of research. *Genetic, Social, and General Psychology Monographs*, *128*(2), 165–207.

Schwab, D. (1980). Construct validity in organizational behavior. *Research in Organizational Behavior, 2*(1), 3–43.

Schwartz, B., & Sharpe, K. E. (2019). Practical wisdom. What Aristotle might add to psychology. In R. J., Sternberg & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 226–248). Cambridge University Press. https://doi.org/10.1017/9781108568272.012

Sharma, A., & Dewangan, R. L. (2017). Can wisdom be fostered: Time to test the model of wisdom. *Cogent Psychology*, *4*(1), Article 1381456. https://doi.org/10.1080/23311908.2017.1381456

Sharp, I. (2001). *Culture shock! Australia*. Graphic Arts Center Publishing.

Shaughnessy, J. J., Zechmeister, E. B., & Zechmeister, J. S. (2012). *Research methods in psychology* (9th ed.). McGraw-Hill.

Shipley, W. C. (1940). A self-administered scale for measuring intellectual impairment and deterioration. *Journal of Psychology, 9*(2), 371–377. https://doi.org/10.1080/00223980.1940.9917704

Shipley, W. C. (1953). The Shipley institute of living scale for measuring intellectual impairment. In A. Weidner (Ed.), *Contributions to medical psychology: Theory and diagnostic methods* (pp. 751–756). Ronald Press.

Shultz, K. S., Whitney, D. J., & Zickar, M. J. (2014). Measurement Theory in Action Case Studies and Exercises (2nd ed.). Routledge. https://doi.org/10.4324/9781315869834

Singh-Manoux, A., Kivimaki, M., Glymour, M. M., Elbaz, A., Berr, C., Ebmeier, K. P., Ferrie, J. E., & Dugravot, A. (2012). Timing of onset of cognitive decline: Results from Whitehall II prospective cohort study. *British Medical Journal, 344*, d7622. http://dx.doi.org/10.1136/bmj.d7622

Sliwinski, M., Lipton, R. B., Buschke, H., & Stewart, W. (1996). The effects of preclinical dementia on estimates of normal cognitive functioning in aging. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 51*(4), 217–225. https://doi.org/10.1093/geronb/51B.4.P217

Smith, J., & Baltes, P. B. (1990). Wisdom-related knowledge: Age/cohort differences in response to life-planning problems. *Developmental Psychology, 26*(3), 494–505. https://doi.org/10.1037/0012-1649.26.3.494

Smith, J., Staudinger, U. M., & Baltes, P. B. (1994). Occupational settings facilitating wisdom-related knowledge: The sample case of clinical psychologists. *Journal of Consulting and Clinical Psychology, 62*(5), 989–999. https://doi.org/10.1037/0022-006X.62.5.989

Smith, N. D. 1998. Wisdom. In E. Craig (Ed.), *The Routledge encyclopedia of philosophy*, (pp. 752–755). Routledge.

Snyderman, M., & Rothman, S. (1987). Survey of expert opinion on intelligence and aptitude testing. *American Psychologist, 42*(2), 137–144. https://doi.org/10.1037/0003-066X.42.2.137

Soper, D. S. (2020). *A-priori sample size calculator for structural equation models* [Software]. Retrieved April 10, 2020, from: http://www.danielsoper.com/statcalc

Sörbom, D. (1974). A general method for studying differences in factor means and factor structures between groups. *British Journal of Mathematical and Statistical. Psychology, 27*(2), 229–239. https://doi.org/10.1111/j.2044-8317.1974.tb00543.x

Spearman, C. (1904). "General intelligence" objectively determined and measured. *American Journal of Psychology, 15*(2), 201–292. https://doi.org/10.2307/1412107

Sperling, R. A., Aisen, P. S., Beckett, L. A., Bennett, D. A., Craft, S., Fagan, A. M., Iwatsubo, T., Jack, C. R., Jr., Kaye, J., Montine, T. J., Park, D. C., Reiman, E. M., Rowe, C. C., Siemers, E., Stern, Y., Yaffe, K., Carrillo, M. C., Thies, B., Morrison-Bogorad, M., … Phelps, C. H. (2011). Toward defining the preclinical stages of Alzheimer’s disease: Recommendations from the National Institute on Aging-Alzheimer’s Association workgroups on diagnostic guidelines for Alzheimer’s disease. *Alzheimer’s & Dementia*. *The Journal of the Alzheimer’s Association, 7*(3):280–292. https://doi.org/10.1016/j.jalz.2011.03.003

Staudinger, U. M. (1996). Wisdom and social-interactive foundation of the mind. In P. B. Baltes & U. M. Staudinger (Eds.), *Interactive minds: Life-span perspectives on the social foundation of cognition* (pp. 276-315). Cambridge University Press.

Staudinger, U. M. (1999). Older and wiser? Integrating results on the relationship between age and wisdom-related performance. *International Journal of*

Behavioral Development, 23(3), 641–664. https://doi.org/10.1080/016502599383739

Staudinger, U. M. (2001). Life reflection: A social-cognitive analysis of life review. *Review of General psychology, 5*(2), 148–160. https://doi.org/10.1037/1089-2680.5.2.148

Staudinger, U. M. (2013). The need to distinguish general from personal wisdom: A short history and empirical evidence. In M. Ferrari and N. M. Weststrate (Eds.), *The scientific study of personal wisdom: From contemplative traditions to neuroscience* (pp. 3–19). Springer.

Staudinger, U. M. (2019). The distinction between personal and general wisdom. In R. J. Sternberg, & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 182–201). Cambridge University Press.

Staudinger, U. M., & Baltes, P. B. (1996). Interactive minds: A facilitative setting for wisdom-related performance? *Journal of Personality and Social Psychology*, *71*(4), 746–762. https://doi.org/10.1037/0022-3514.71.4.746

Staudinger, U. M., & Glück, J. (2011a). Psychological wisdom research: Commonalities and differences in a growing field. *Annual Review of Psychology*, *62*, 215–241. https://doi.org/10.1146/annurev.psych.121208.131659

Staudinger, U. M., & Glück, J. (2011b). Intelligence and wisdom. In R. J. Sternberg & S. B. Kaufman (Eds.), *The Cambridge handbook of intelligence* (pp. 827–846). Cambridge University Press.

Staudinger, U. M., & Kunzmann, U. (2005). Positive Adult Personality Development: Adjustment and/or growth? *European Psychologist, 10*(4), 320–29. https://doi.org/10.1027/1016-9040.10.4.320

Staudinger, U. M., Lopez, D. F., & Baltes, P. B. (1997). The psychometric location of wisdom-related performance: Intelligence, personality, and more? *Personality and Social Psychology Bulletin*, *23*(11), 1200–1214. https://doi.org/10.1177/01461672972311007

Staudinger, U. M., Maciel, A. G., Smith, J., & Baltes, P. B. (1998). What predicts wisdom-related performance? A first look at personality, intelligence, and facilitative experiential contexts. *European Journal of Personality, 12*(1), 1–17. https://doi.org/10.1002/(SICI)1099-0984(199801/02)12:1<1::AID-PER285>3.0.CO;2-9

Staudinger, U. M., & Pasupathi, M. (2003). Correlates of wisdom-related performance in adolescence and adulthood: Age-graded differences in "paths" toward desirable development. *Journal of Research on Adolescence, 13,* 239–268. https://doi.org/10.1111/1532-7795.1303001

Staudinger, U. M., Smith, J., & Baltes, P. B. (1992). Wisdom-related knowledge in a life review task: Age differences and the role of professional specialization. *Psychology and Aging*, *7*(2), 271–281. https://10.1037//0882-7974.7.2.271

Staudinger, U. M., Smith, J., & Baltes, P. B. (1994). *Manual for the assessment of wisdom-related knowledge*. Max-Planck-Institut für Bildungsforschung.

Steinmayr, R., Beauducel, A., & Spinath, B. (2010). Do sex differences in a faceted model of fluid and crystallized intelligence depend on the method applied? *Intelligence, 38*(1), 100–110. https://doi.org/10.1016/j.intell.2009.08.001

Steinmayr, R., Bergold, S., Margraf-Stiksrud, J., & Freund, P. A. (2015). Gender differences on general knowledge tests: Are they due to differential item functioning? *Intelligence, 50,* 164–174. https://doi.org/10.1016/j.intell.2015.04.001

Stephan, Y. (2009). Openness to experience and active older adults' life satisfaction: A trait and facet-level analysis. *Personality and Individual Differences, 47*(6), 637–641. https://doi.org/10.1016/j.paid.2009.05.025

Sternberg, R. J. (1985a). *Beyond IQ. A triarchic theory of human intelligence*. Cambridge University Press.

Sternberg, R. J. (1985b). Implicit theories of intelligence, creativity, and wisdom. *Journal of Personality and Social Psychology, 49*(3), 607–627. https://doi.org/10.1037/0022-3514.49.3.607

Sternberg, R. J. (1986). Intelligence, wisdom, and creativity: Three is better than one. *Educational Psychologist, 21*(3), 175–190. https://doi.org/10.1207/s15326985ep2103_2

Sternberg, R. J. (1990). *Wisdom: Its nature, origins, and development*. Cambridge University Press.

Sternberg, R. J. (1992). Metaphors of mind underlying the testing of intelligence. In J. C. Rosen & P. McReynolds (Eds.), *Advances in psychological assessment* (pp. 1–39). Springer. https://doi.org/10.1007, /978-1-4757-9101-3_1

Sternberg, R. J. (1997a). *Successful intelligence: How practical and creative intelligence determine success in life.* Plume.

Sternberg, R. J. (1997b). The concept of intelligence and its role in lifelong learning and success. *American Psychologist*, *52*(10), 1030–1037. https://doi.org/10.1037/0003-066X.52.10.1030

Sternberg, R. J. (1998). A balance theory of wisdom. *Review of General Psychology, 2*(4), 347–365. http://dx.doi.org/10.1037/1089-2680.2.4.347

Sternberg, R. J. (2000). Intelligence and wisdom. In R. J. Sternberg (Ed.), *Handbook of intelligence* (pp. 631–649). Cambridge University Press.

Sternberg, R.J. (2001). Why schools should teach for wisdom: The balance theory of wisdom in educational settings. *Educational Psychologist, 36*(4), 227–245. https://doi.org/10.1207/S15326985EP3604_2

Sternberg, R. J. (2003). *Wisdom, intelligence, and creativity synthesized*. Cambridge University Press.

Sternberg, R. J. (2005a). Older but not wiser? The relationship between age and wisdom. *Ageing International, 30*, 5–26. https://doi.org/10.1007/BF02681005

Sternberg, R. J. (2005b). The theory of successful intelligence. *Interamerican Journal of Psychology, 39*(2), 189–202. http://www.actef.es/sternberg.pdf

Sternberg, R. J. (2013). Personal wisdom in the balance. In M. Ferrari & N. M. Weststrate (Eds.), *The scientific study of personal wisdom: From contemplative traditions to neuroscience* (pp. 53-74). Springer. https://doi.org/10.1007/978-94-007-7987-7_3

Sternberg, R. J. (2015). Successful intelligence: A model for testing intelligence beyond IQ tests. *European Journal of Education and Psychology, 8*(2), 76–84. https://doi.org/10.1016/j.ejeps.2015.09.004

Sternberg, R. J. (2019a). A theory of adaptive intelligence and its relation to general intelligence. *Journal of Intelligence,7*(4), 23. https://doi.org/10.3390/jintelligence7040023

Sternberg, R. J. (2019b). Race to Samarra: The critical importance of wisdom in the world today. In R. J. Sternberg, & J. Glück (Eds.), *The Cambridge handbook* *of wisdom* (pp. 3–9). Cambridge University Press. https://doi.org/10.1017/9781108568272.002

Sternberg, R. J., & Detterman, D. K. (1986). *What is intelligence? Contemporary viewpoints on its nature and definition.* Ablex. https://trove.nla.gov.au/version/21896331

Sternberg, R. J., & Gardner, M. K. (1982). A componential interpretation of the general factor in human intelligence. In H. J. Eysenck (Ed.), *A model for intelligence* (pp. 231–254). Springer-Verlag.

Sternberg, R. J., & Glück, J. (2019). Wisdom, morality, and ethics. In R. J. Sternberg, & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 551–574). Cambridge University Press. https://doi.org/10.1017/9781108568272.026

Sternberg, R. J., & Grigorenko, E. L. (2002). *The general factor of intelligence: How general is it*? Erlbaum.

Sternberg, R. J., & Grigorenko, E. L. (2003). Teaching for successful intelligence: Principles, procedures, and practices. *Journal for the Education of the Gifted, 27*(2–3), 207–228. http://doi.org/10.1177/016235320302700206

Sternberg, R. J., & Jordan, J. (2005). *A handbook of wisdom: Psychological perspectives*. Cambridge University Press.

Sternberg, R. J., Nusbaum, H. C., & Glück, J. (2019). *Applying wisdom to contemporary world problems*. Palgrave Macmillan. http://doi.org/10.1007/978-3-030-20287-3

Sternberg, R. J., Reznitskaya, A., & Jarvin, L. (2007). Teaching for wisdom: What matters is not just what students know, but how they use. *The London Review of Education, 5*(2), 143–158. https://doi.org/10.1080/14748460701440830

Stevens, J. P. (2009). *Applied multivariate statistics for the social sciences* (5th ed.). Routledge.

Strahan, R., & Gerbasi, K. C. (1972). Short, homogeneous versions of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology, 28*(2), 191–193. https://doi.org/10.1002/1097-4679(197204)28:2<191::AID-JCLP2270280220>3.0.CO;2-G

Suárez-Álvarez, J., Pedrosa, I., Lozano, L. M., García-Cueto, E., Cuesta, M., & Muñiz, J. (2018). Using reversed items in Likert scales: A questionable practice. *Psicothema, 30*(2), 149–158. https://doi.org/10.7334/psicothema2018.33

Suh, E., Diener, E., Oishi, S., & Triandis, H. C. (1998). The shifting basis of life satisfaction judgements across cultures: Emotions versus norms. *Journal of Personality and Social Psychology*, *74*(2), 482–493. https://doi.org/10.1037/0022-3514.74.2.482

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.

Takahashi, M., & Bordia, P. (2000). The concept of wisdom: A cross-cultural comparison. *International Journal of Psychology*, *35*(1), 1–9. https://doi.org/10.1080/002075900399475

Takahashi, M., & Overton, W. F. (2002). Wisdom: A culturally inclusive developmental perspective. *International Journal of Behavioral Development*, *26*(3), 269–277. https://doi.org/10.1080/01650250143000139

Takahashi, M., & Overton, W. F. (2005). Cultural foundations of wisdom: An integrated developmental approach. In R. Sternberg, & J. Jordan (Eds.), *A* *handbook of wisdom: Psychological perspectives* (pp.32–60). New York, NY: Cambridge University Press.

Tan, L., & Grace, R. C. (2008). Social desirability and sexual offenders: A review. *Sexual Abuse, 20*(1), 61–67. https://doi.org/10.1177/1079063208314820

Taranto, M. A. (1989). Facets of Wisdom: A Theoretical Synthesis. *The International Journal of Aging and Human Development, 29*(1), 1–21. http://doi.org/10.2190/N76X-9E3V-P1FN-H8D8

Taylor, M., Bates, G., & Webster, J. D. (2011). Comparing the psychometric properties of two measures of wisdom: Predicting forgiveness and psychological well-being with the Self-Assessed Wisdom Scale (SAWS) and the Three-Dimensional Wisdom Scale (3D-WS). *Experimental Aging Research, 37*(2), 129–141. https://doi.org/10.1080/0361073X.2011.554508

Terwee, C. B., Bota, S. D. M., de Boera, M. R., van der Windta, D. A. W. M., Knola, D. L., Dekkera, J., Boutera, L. M., & de Veta, H. C. W. (2017). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology 60*(1), 34–42. https://doi.org/10.1016/j.jclinepi.2006.03.012

Thomas, M. L., Bangen, K. J., Ardelt, M., & Jeste, D. V. (2017). Development of a 12-item abbreviated Three-Dimensional Wisdom Scale (3D-WS-12): Item selection and psychometric properties. *Assessment, 24*(1), 71–82. https://doi.org/10.1177/1073191115595714

Thomas, M. L., Bangen, K. J., Palmer, B. W., Martin, A. S., Avanzino, J. A., Depp, C. A., Glorioso, D., Daly, R. E., & Jeste, D. V. (2019). A new scale for assessing wisdom based on common domains and a neurobiological model:

The San Diego Wisdom Scale (SD-WISE). *Journal of Psychiatric Research, 108*, 40–47. https://doi.org/10.1016/j.jpsychires.2017.09.005

Thomas, S., & Kunzmann, U. (2013). Age differences in wisdom-related Knowledge: Does the age-relevance of the task matter? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 69*(6), 897–905. https://doi.org/10.1093/geronb/gbt076

Thompson, J. J., Blair, M. R., & Henrey, A. J. (2014). Over the hill at 24: Persistent age-related cognitive-motor decline in reaction times in an ecologically valid video game task begins in early adulthood. *PLoS ONE, 9,* e94215. http://dx.doi.org/10.1371/journal.pone.0094215

Thornhill, J. (1992). *Making Australia*. Millennium Books.

Thurstone, L. L. (1924). *The nature of intelligence.* Harcourt Brace.

Thurstone, L. L. (1938). *Primary mental abilities.* University of Chicago Press.

Tiberius, V. (2008). *The reflective life: Living wisely with our limits*. Oxford University Press.

Torres-Marín, J., Navarro-Carrillo, G., Carretero-Dios, H. (2017). Is the use of humor associated with anger management? The assessment of individual differences in humor styles in Spain. *Personality and Individual Differences, 120*(1), 193–201. https://doi.org/10.1016/j.paid.2017.08.040

Trochim, W. M. K. (2001). *The research methods knowledge base* (2nd ed.). Atomic Dog Publishing.

Trowbridge, R. H. (2005). *The scientific approach to wisdom* [Unpublished doctoral dissertation]. Union Institute and University, Cincinnati, Ohio.

United Nations Educational, Scientific and Cultural Organization. (2000). *World education report*. UNESCO.

Urrutia, A., de Espanes, G. M., Ferrari, C., Borgna, G., Alderete, A. M., & Villar, F. (2016). Development and validation of the brief scale of self-assessed wisdom (EBAS) in Argentinian older adults. *Universitas Psychologica, 15*(2), 205–216. http://dx.doi.org/10.11144/Javeriana.upsy15-2.dveba

Vaillant, G. E. (2002). *Aging well: Surprising guideposts to a happier life from the landmark Harvard study of adult development*. Little, Brown, and Company.

Vaillant, G. E. (2012). *Adaptation to life*. Harvard University Press.

van Sonderen, E., Sanderman, R., & Coyne, J. C., (2013). Ineffectiveness of reverse wording of questionnaire items: Let's learn from cows in the rain. *PLoS One, 8*, e68967. https://doi.org/10.1371/journal.pone.0068967

Velicer, W. F. (1976). Determining the number of components from the matrix of partial correlations. *Psychometrika, 41*(3), 321–327. https://doi.org/10.1007/BF02293557

Velicer, W. F., & Fava, J. L. (1998). Affects of variable and subject sampling on factor pattern recovery. *Psychological Methods, 3*(2), 231–251. https://doi.org/10.1037/1082-989X.3.2.231

Velicer, W. F., & Jackson, D. N. (1990). Component Analysis Versus Common Factor-Analysis - Some Further Observations. *Multivariate Behavioral Research*, *25*(1), 97-114. https://doi.org/10.1207/s15327906mbr2501_12

Vohra-Gupta, S., Russell, A., & Lo, E. (2007). Meditation: The adoption of Eastern thought to Western social practices. *Journal of Religion & Spirituality in Social Work: Social Thought, 26*(2), 49–61. https://doi.org/10.1300/J377v26n02_03

Waltz, C. F., Strickland, O.L., & Lenz, E. R. (2016). *Measurement in nursing and health research* (5th ed.). Springer.

Wasserman, J. D. (2012). A history of intelligence assessment. In D. P. Flanagan & P. L. Harrison (Eds.), *Contemporary intellectual assessment: Theories, tests, and issues* (3rd ed., pp. 3–55). Guilford Press.

Watkins, M. W. (2000). *Monte Carlo PCA for parallel analysis* [computer software]. Ed & Psych Associates.

Webster, J. D. (2003). An exploratory analysis of a self-assessed wisdom scale. *Journal of Adult Development, 10*(1), 13–22. http://doi.org/10.1023/A:1020782619051

Webster, J. D. (2007). Measuring the character strength of wisdom. *The International Journal of Aging & Human Development, 56*(2), 163–183. https://doi.org/10.2190/AG.65.2.d

Webster, J. D. (2010). Wisdom and positive psychosocial values in young adulthood. *Journal of Adult Development, 17*(2), 70–80. https://doi.org/10.1007/s10804-009-9081-z

Webster, J. D. (2014). *Time to be wise: Temporal perspective and wisdom*. Enschade: Ipskamp Drukkers Printers. University of Twente. https://www.utwente.nl/bms/pgt/bestanden/webstermanuscript.pdf

Webster, J. D. (2019). Self-report wisdom measures: Strengths, limitations, and future directions. In R. J. Sternberg, & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 297–320). Cambridge University Press. https://doi.org/10.1017/9781108568272.015

Webster, J. D., Taylor, M., & Bates, G. (2011). Conceptualizing and measuring wisdom: A reply to Ardelt. *Experimental Aging Research, 37*(2), 256–259. https://doi.org/10.1080/0361073X.2011.554514

Webster, J. D., Westerhof, G. J., & Bohlmeijer, E. T. (2014). Wisdom and mental health across the lifespan. *The Journals of Gerontology, Series B, Psychological Sciences and Social Sciences, 69*(2), 209–218. https://doi.org/10.1093/geronb/gbs121

Wechsler, D. (1939). *The measurement of adult intelligence*. Williams and Wilkins.

Wechsler, D. (1944). *The measurement of adult* intelligence (3rd ed.). Williams and Wilkins.

Wechsler, D. (1958). *The measurement and appraisal of adult intelligence* (5th ed.). Williams and Wilkins.

Wechsler, S. M., de Cassia Nakano, T., da Silva Domingues, S. F., Rosa, H. R., da Silva, R. B. F., da Silva-Filho, J. H., & da Silva Moita Minervino, C. A. (2014). Gender differences on tests of crystallized intelligence. *European Journal of Education and Psychology, 7*(1), 57–70. https://doi.org/10.30552/ejep.v7i1.98

Weijters, B., Baumgartner, H., & Schillewaert, N. (2013). Reversed item bias: An integrative model. *Psychological Methods, 18*(3), 320–334. https://doi.org/10.1037/a0032121

Westen, D., & Rosenthal, R. (2003). Quantifying construct validity: Two simple measures. *Journal of Personality and Social Psychology, 84*(3), 608–618. Hard-earned wisdom:

Westland, J. C. (2010). Lower bounds on sample size in structural equation modeling. *Electronic Commerce Research and Applications, 9*(6), 476–487. https://doi.org/10.1016/j.elerap.2010.07.003

Weststrate, N. M., Bluck, S., & Glück, J. (2019). Wisdom of the crowd: Exploring people's conceptions of wisdom. In R. J. Sternberg & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 97–121). Cambridge University Press. https://doi.org/10.1017/9781108568272.006

Weststrate, N. M., Ferrari, M., Fournier, M. A., & McLean, K. C. (2018). “It was the best worst day of my life”: Narrative content, structure, and process in wisdom-fostering life event memories. *The Journals of Gerontology, Series B: Psychological Sciences and Social Science, 73*(8), 1359–1373. https://doi.org/10.1093/geronb/gby005

Weststrate, N. M., & Glück, J. (2017). Exploratory processing of difficult life experience is positively associated with wisdom. *Developmental Psychology,53*(4), 800–814. https://doi.org/10.1037/0022-3514.84.3.608

Williams, P. B., Mangelsdorf, H. H., Kontra, C., Nusbaum, H. C., Hoeckner, B. (2016). The relationship between mental and somatic practices and wisdom. *PLoS ONE, 11*(2), Article e0149369. http://doi.org/10.1371/journal.pone.0149369

Wilson, T. A. (n.d.). *AZQuotes.com*. Retrieved June 11, 2020, from AZQuotes.com Web site: https://www.azquotes.com/quote/317766

Wink, P., & Dillon, M. (2013). Religion, spirituality, and personal wisdom: A tale of two types. In M. Ferrari & N. Weststrate (Eds.), *The scientific study of personal wisdom: From contemplative traditions to neuroscience* (pp. 165–189). Springer. http://doi.org/10.1007/978-94-007-7987-7_8

Wink, P., & Helson, R. (1997). Practical and transcendent wisdom: Their nature and some longitudinal findings. *Journal of Adult Development*, *4*(1), 1–15. http://doi.org/10.1007/BF02511845

Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample size requirements for structural equation models: An evaluation of power, bias, and solution propriety. *Educational Psychological Measurement*, *73*(6), 913–934. https://doi.org/10.1177/0013164413495237

Worthington, R., & Whittaker, T. (2006). Scale development research: A content analysis and recommendations for best practices. *Counseling Psychologist*, *34*(6), 806–838. https://doi.org/10.1177/0011000006288127

Yang, S.-Y. (2001). Conceptions of wisdom among Taiwanese Chinese. *Journal of Cross-Cultural Psychology, 32*(6), 662–680. https://doi.org/10.1177/0022022101032006002

Yang, S.-Y. (2011). East meets West: Cross-cultural perspectives on wisdom and adult education. *New Directions for Adult and Continuing Education, 2011*(131), 45-54. https://doi.org/10.1002/ace.420

Yang, S.-Y. (2013). From personal striving to positive influence: Exploring wisdom in real-life contexts. In M. Ferrari, & N. M. Weststrate (Eds.), *The Scientific study of personal wisdom: From contemplative traditions to neuroscience* (pp. 115–135). Springer. https://doi.org/10.1007/978-94-007-7987-7_6

Yang, S.-Y., & Intezari, A. (2019). Non-Western lay conceptions of wisdom. In R. J. Sternberg, & J. Glück (Eds.), *The Cambridge handbook of wisdom* (pp. 429–452). Cambridge University Press. https://doi.org/10.1017/9781108568272.020

Yarkoni, T., & Westfall, J. (2017). Choosing prediction over explanation in psychology. Lessons from machine learning. *Perspectives in Psychological Science, 12*(6), 1100–1122. https://doi.org/10.1177/1745691617693393

Zacher, H., McKenna, B., & Rooney, D. (2013). Effects of self-reported wisdom on happiness: Not much more than emotional intelligence? *Journal of Happiness Studies, 14*(6), 1697–1716. https://doi.org/10.1007/s10902-012-9404-9

Zacher, H., McKenna, B., Rooney, D., & Gold, S. (2015). Wisdom in the military context. *Military Psychology, 27*(3), 142–154. https://doi.org/10.1037/mil0000070

Zacher, H., Pearce, L. K., Rooney, D., & McKenna, B. (2014). Leaders’ personal wisdom and leader-member exchange quality: The role of individualized consideration. *Journal of Business Ethics, 121*, 171–187. https://doi.org/10.1007/s10551-013-1692-4

Zacher, H., Rosing, K., Henning, T., & Frese, M. (2011). Establishing the next generation at work. Leader generativity as moderator of the relationship between leader age, leader-member exchange, and leadership success. *Psychology and Aging, 26*(1), 241–252. https://doi.org/10.1037/a0021429

Zelinski, E. M., & Burnight, K. P. (1997). Sixteen-year longitudinal and time lag changes in memory and cognition in older adults. *Psychology and Aging, 12*(3), 503–513. https://doi.org/10.1037/0882-7974.12.3.503

Zelinski, E. M., & Kennison, R. F. (2007). Not your father's test scores: Cohort reduces psychometric aging effects. *Psychology and Aging*, *22*(3), 546–557. https://doi.org/10.1037/0882-7974.22.3.546

Zumbo, B. D. (2006). Validity: Foundational issues and statistical methodology. In C. R. Rao & S. Sinharay (Eds.), *Handbook of statistics: Psychometrics* (Vol. 26, pp. 45–79). Elsevier. https://doi.org/10.1016/S0169-7161(06)26003-6

Appendix A: The SAWS Inventory

This brief questionnaire is designed to investigate how people of different ages perceive themselves with respect to life experiences and whether or not these perceptions change as we grow older. You are asked to rate all of the following statements using the scale below. Remember, there are no "right", or "wrong" answers and your responses will remain anonymous. Do not rush but, work steadily as we are interested in your first impressions. Please record your responses by circling only one number on the rating scale to the left of each statement. From 1 = *strongly disagree through* 6 = *strongly agree.*

Prototypical Characteristics and Items for the Five Dimensions of the SAWS

Subscale	Items
Experience	Q1. I have overcome many painful life events in my life
	Q6. I have had to make many important life decisions
	Q11. I have dealt with a great many different kinds of people during my lifetime
	Q16. I have experienced many moral dilemmas
	Q21. I have seen much of the negative side of life (e.g., dishonesty, hypocrisy).
	Q26. I have lived through many difficult life transitions
	Q31. I've personally discovered that "you can't always tell a book from its cover".
	Q36. I've learned valuable life lessons from others
Emotional Regulation	Q2. It is easy for me to adjust my emotions to the situation at hand.
	Q7. Emotions do not overwhelm me when I make personal decision.
	Q12. I am "tuned" into my own emotions.
	Q17. I am very good at reading my emotional states.

Subscale	Items
	Q22. I can freely express my emotions without feeling like I might lose control.
	Q27. I am good at identifying subtle emotions within myself.
	Q32. I can regulate my emotions when the situation calls for it.
	Q37. It seems I have a talent for reading other people's emotions.
Reminiscence/ Reflectiveness	Q3. I often think about connections between my past and present.
	Q8. I often think about my personal past.
	Q13. I reminisce quite frequently.
	Q18. Reviewing my past helps me gain perspective on current concerns.
	Q23. I often recall earlier times in my life to see how I've changes since then.
	Q28. Recalling my earlier days helps me gain insight into important life matters.
	Q33. I often find memories of my past can be important coping strategies.
	Q38. Reliving past accomplishments in memory increases my confidence for today.
Humour	Q4. I can chuckle at personal embarrassments.
	Q9. There can be amusing elements even in very difficult life situations.
	Q14. I try and find a humorous side when coping with a major life transition.
	Q19. I am easily aroused to laughter.
	Q24. At this point in my life, I find it easy to laugh at my mistakes.
	Q29. I often use humor to put others at ease.
	Q34. Now I find that I can really appreciate life's little ironies.
	Q39. I can make fun of myself to comfort others.

Subscale	Items
Openness	Q5. I like to read books, which challenge me to think differently about issues.
	Q10. I enjoy listening to a variety of musical styles besides my favourite kind.
	Q15. I enjoy sampling a wide variety of different ethnic foods.
	Q20. I often look for new things to try.
	Q25. Controversial works of art play an important and valuable role in society.
	Q30. I like being around persons whose views are strongly different from mine.
	Q35. I'm very curious about other religious and/or philosophical belief systems.
	Q40. I've often wondered about life and what lies beyond.

Note. Adaptation from "An exploratory analysis of a Self-Assessed Wisdom Scale" by J. D. Webster, 2003, *Journal of Adult Development*, *10*, p. 16; Text in italics denote SAWS subscales; Q1-Q40 = questions 1-40.

Appendix B: The SAWS-12 Inventory

Experience:

- I have overcome many painful events in my life.
- I have had to make many important life decisions.
- I have lived through many difficult life transitions.

Awareness of Own Emotions:

- I am "tuned" in to my own emotions
- I am very good at reading my emotional states.
- I am good at identifying subtle emotions within myself.

Reminiscence/Reflection:

- I often recall earlier times in my life to see how I've changed since then.
- Recalling my earlier days helps me gain insight into important life matters.
- I often find memories of my past can be important coping resources.

Openness:

- I enjoy sampling a wide variety of different ethnic foods.
- I often look for new things to try.
- I'm very curious about other religions and/or philosophical belief systems.

Scoring involves summing over all items, using raw scores, to obtain a total SAWS-12 score.

Appendix C: The 3D-WS-12 Inventory

How much are the following statements true of yourself? Response options range from 1 = *strongly agree or definitely true of myself through* 5 = *strongly disagree or not true of myself.*

Cognitive Dimension of Wisdom:

- A problem has little attraction for me if I don't think it has a solution.
- I try to anticipate and avoid situations where there is a likely chance, I will have to think in depth about something
- I prefer just to let things happen rather than try to understand why they turned out that way.
- I am hesitant about making important decisions after thinking about them.

Reflective Dimension of Wisdom:

- When I am confused by a problem, one of the first things I do is survey the situation and consider all the relevant pieces of information (reversed).
- Sometimes I get so charged up emotionally that I am unable to consider many ways of dealing with my problems.
- When I look back on what has happened to me, I can't help feeling resentful.
- I either get very angry or depressed if things go wrong.

Affective (Compassionate) Dimension of Wisdom:

- I can be comfortable with all kinds of people (reversed).
- Sometimes I feel a real compassion for everyone (reversed).
- I don't like to get involved in listening to another person's troubles.
- I'm easily irritated by people who argue with me.

Appendix D: Shipley Institute of Living Scale: Vocabulary Inventory

In the test below, the first word in each line is printed in capital letters. Opposite are four other words. Click to select the one word which means the same thing, or most nearly the same thing, as the first word. A sample has been worked out for you below with the same or nearly same meaning underlined. If you don't know, guess. Be sure to select the one word in each line that means the same thing as the first word.

Shipley Institute of Living Scale: Vocabulary

LARGE	red	<u>big</u>	silent	wet
		Begin Test Here		
(1) TALK	draw	eat	speak	sleep
(2) PERMIT	allow	sew	cut	drive
(3) PARDON	forgive	pound	divide	tell
(4) COUCH	pin	eraser	sofa	glass
(5) REMEMBER	swim	recall	number	defy
(6) TUMBLE	drink	dress	fall	think
(7) HIDEOUS	silvery	tilted	young	dreadful
(8) CORDIAL	swift	muddy	leafy	hearty
(9) EVIDENT	green	obvious	skeptical	afraid
(10) IMPOSTOR	conductor	officer	book	pretender
(11) MERIT	deserve	distrust	fight	separate
(12) FASCINATE	welcome	fix	stir	enchant
(13) INDICATE	defy	excite	signify	bicker
(14) IGNORANT	red	sharp	uninformed	precise
(15) FORTIFY	submerge	strengthen	vent	deaden
(16) RENOWN	length	head	fame	loyalty

Shipley Institute of Living Scale: Vocabulary

(17) NARRATE	yield	buy	associate	tell
(18) MASSIVE	bright	large	speedy	low
(19) HILARITY	laughter	speed	grace	malice
(20) SMIRCHED	stolen	pointed	remade	soiled
(21) SQUANDER	tease	belittle	cut	waste
(22) CAPTION	drum	ballast	heading	ape
(23) FACILITATE	help	turn	strip	bewilder
(24) JOCOSE	humorous	paltry	fervid	plain
(25) APPRISE	reduce	strew	inform	delight
(26) RUE	eat	lament	dominate	cure
(27) DENIZEN	senator	inhabitant	fish	atom
(28) DIVEST	dispossess	intrude	rally	pledge
(29) AMULET	charm	orphan	dingo	pond
(30) INEXORABLE	untidy	involatile	rigid	sparse
(31) SERRATED	dried	notched	armed	blunt
(32) LISSOM	moldy	loose	supple	convex
(33) MOLLIFY	mitigate	direct	pertain	abuse
(34) PLAGIARIZE	appropriate	intend	resolve	maintain
(35) ORIFICE	brush	hole	building	lute
(36) QUERULOUS	maniacal	curious	devout	complaining
(37) PARIAH	outcast	priest	lentil	locker
(38) ABET	waken	ensue	incite	placate
(39) TEMERITY	rashness	timidity	desire	kindness
(40) PRISTINE	vain	sound	first	level

Appendix E: The Letter Series Inventory

Now work the following problems for practice. Decide what the NEXT letter should be in each series and select the correct letter in the answer column.

a b a b a b a b

Answers:

- (•) a
- ( ) b
- ( ) c
- ( ) d
- ( ) e

This series goes like this: ab ab ab. The NEXT letter in the series should be 'a'. The letter 'a' should be chosen in the answer column. Now study the series of letters below. Decide what the NEXT letter should be.

c a d a e a f a

Answers:

- ( ) c
- ( ) d
- ( ) e
- ( ) f
- ( ) g

The series goes like this: ca da ea fa. The answer is the letter 'g'.

1. c a d a e a f a

- a
- c
- f
- g
- h

2. a b c x y z d e f x y z g h i

- j
- k
- l
- x
- y

3. e f c g h c i j c k l c m n c

- c
- d
- m
- n
- o

4. a a c c e e g g i i

- h
- i
- j
- k
- l

5. a b c a b c d a b c d e

- a
- b
- c
- d
- e

6. a b c n o d e f n o g h i n o

- i
- j
- k
- n
- o

7. a c g i k m

- k

○ l

○ m

○ n

○ o

8. g h j k m n p q s t v w

○ u

○ v

○ w

○ x

○ y

9. a a b b c d d e e f g g h

○ h

○ i

○ j

○ k

○ l

10. v v v v v w w w w x x x y

○ u

○ v

- w
- x
- y

Appendix F: Social Desirability M–C 2 (10) Inventory

Read each item and decide whether it is true or false for you. Try to work rapidly.

1. I never hesitate to go out of my way to help someone in trouble.

2. I have never intensely disliked anyone.

3. When I don't know something, I don't at all mind admitting it.

4. I am always courteous, even to people who are disagreeable.

5. I would never think of letting someone else be punished for my wrong doings.

6. I sometimes feel resentful when I don't get my way.

7. There have been times when I felt like rebelling against people in authority even though I knew they were right.

8. I can remember "playing sick" to get out of something.

9. There have been times when I was quite jealous of the good fortune of others.

10. I am sometimes irritated by people who ask favours of me.

Appendix G: Conference Presentations

Leeman, T. M., Knight, B. G., Fein, E. C., & Winterbotham, S. (June 2019). *Re-evaluation of the factor structure of the Self-Assessed Wisdom Scale (SAWS) to create an abbreviated form*. Presentation at the Innovations and Advances in Ageing Well Conference, Auckland, New Zealand.

Appendix H: List of Publications

Leeman, T. M., Knight, B. G., Fein, E. C., Winterbotham, S., & Webster, J. D. (in press). An evaluation of the factor structure of the Self-Assessed Wisdom Scale (SAWS) and the creation of the SAWS-15 as a short measure for personal wisdom. *International Psychogeriatrics*.