

**Does changing the way a discrete choice  
experiment (DCE) is presented to  
respondents affect results? An investigation  
in the context of health using between-  
subject designs**

Wen Shi Alice Yu

Centre for Health Economics Research and Evaluation (CHERE)

University of Technology Sydney

Submitted in total fulfilment of the requirements of the degree of Doctor of Philosophy

Submitted December 2021

---

## Certification of Original Authorship

I, **Wen Shi Alice Yu** declare that this thesis, is submitted in fulfilment of the requirements for the award of **Doctor of Philosophy** in the **Business School** at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

This research is supported by the Australian Government Research Training Program.

**Signature:**

Production Note:  
Signature removed prior to publication.

**Date:**           **10/12/2021**

---

## Contents

|                                                                                          |           |
|------------------------------------------------------------------------------------------|-----------|
| Certification of Original Authorship .....                                               | ii        |
| Contents .....                                                                           | iii       |
| List of Tables .....                                                                     | x         |
| List of Figures .....                                                                    | xiv       |
| Acknowledgements .....                                                                   | xvi       |
| Thesis Abstract .....                                                                    | xviii     |
| <b>Chapter 1. Introduction.....</b>                                                      | <b>1</b>  |
| 1.1 The case for using stated preference techniques in health services research.....     | 1         |
| 1.2 Type of stated preference techniques used in health services research.....           | 2         |
| 1.2.1 Contingent valuation (CV) studies.....                                             | 3         |
| 1.2.2 Standard gamble (SG).....                                                          | 3         |
| 1.2.3 Time trade-off (TTO) .....                                                         | 4         |
| 1.2.4 Discrete choice experiments (DCEs).....                                            | 5         |
| 1.2.5 Related techniques to DCEs: conjoint analysis (CA) .....                           | 7         |
| 1.2.6 Related techniques to DCEs: best–worst scaling (BWS) DCEs .....                    | 7         |
| 1.3 DCEs in health services research.....                                                | 8         |
| 1.4 Aims of thesis .....                                                                 | 9         |
| 1.5 Overview of chapters .....                                                           | 10        |
| <b>Chapter 2. Methods.....</b>                                                           | <b>11</b> |
| 2.1 Definition of a DCE .....                                                            | 11        |
| 2.2 How to create a choice set.....                                                      | 12        |
| 2.2.1 Developing attributes and levels.....                                              | 12        |
| 2.2.2 Construction method of choice sets .....                                           | 13        |
| 2.3 DCEs and utility theory.....                                                         | 14        |
| 2.4 Analysis of DCE data .....                                                           | 15        |
| 2.4.1 Multinomial logit (MNL) model.....                                                 | 16        |
| Predicted choice probabilities.....                                                      | 16        |
| 2.4.2 Latent class analysis (LCA) .....                                                  | 17        |
| 2.4.3 Mixed logit (MXL) model .....                                                      | 17        |
| Interpretation of MXL model results: kernel density plots.....                           | 18        |
| 2.4.5 Scaled MNL (S-MNL) model .....                                                     | 18        |
| 2.5 Summary .....                                                                        | 19        |
| <b>Chapter 3. Different ways to present a DCE to respondents: A scoping review .....</b> | <b>20</b> |
| 3.1 Overview .....                                                                       | 20        |
| 3.2 Summary of previous reviews .....                                                    | 20        |
| 3.2.1 Aims of scoping review .....                                                       | 22        |
| 3.3 Framework used to investigate presentation differences in a DCE.....                 | 23        |

---

|                                                                                                                 |    |
|-----------------------------------------------------------------------------------------------------------------|----|
| 3.3.1 What is considered part of the presentation of the DCE? .....                                             | 23 |
| 3.3.2 Between-subjects design.....                                                                              | 23 |
| 3.3.3 Presentation difference in a DCE.....                                                                     | 24 |
| 3.3.4 Main types of presentation differences used in DCEs.....                                                  | 24 |
| 1. How information is presented to respondents in a DCE .....                                                   | 25 |
| 1a. How information is presented to respondents in a DCE: differences in text .....                             | 25 |
| 1b. How information is presented to respondents in a DCE: use of alternative presentation formats to text ..... | 26 |
| 2. Amount of information provided .....                                                                         | 27 |
| 3. Structure of choice sets .....                                                                               | 27 |
| 3.4 Methods.....                                                                                                | 27 |
| 3.4.1 Literature search strategy.....                                                                           | 27 |
| Inclusion criteria.....                                                                                         | 27 |
| Exclusion criteria.....                                                                                         | 28 |
| Search process .....                                                                                            | 28 |
| 3.4.2 Data extraction details .....                                                                             | 31 |
| 3.5 Results: characteristics of studies.....                                                                    | 31 |
| 3.5.1 General study details .....                                                                               | 31 |
| Country of study.....                                                                                           | 31 |
| Dissemination method of DCE.....                                                                                | 32 |
| Population of interest .....                                                                                    | 32 |
| Study sample size .....                                                                                         | 33 |
| 3.5.2 Study development details .....                                                                           | 33 |
| Use of qualitative methods .....                                                                                | 33 |
| Other methods used to develop study.....                                                                        | 34 |
| 3.5.3 Choice set presentation details .....                                                                     | 37 |
| Choice sets.....                                                                                                | 37 |
| Number of options and using opt out.....                                                                        | 38 |
| Number of attributes.....                                                                                       | 39 |
| Number of attributes vs number of choice sets per respondent .....                                              | 40 |
| 3.5.4 Choice set construction details .....                                                                     | 41 |
| 3.6 Results: Presentation differences and DCE outcomes.....                                                     | 44 |
| 3.6.1 Arms in study.....                                                                                        | 44 |
| 3.6.2 Which aspect/s of the DCE were different between arms? .....                                              | 46 |
| 3.6.3 How have presentation difference been used?.....                                                          | 47 |
| Summary of studies: differences in text .....                                                                   | 47 |
| Summary of studies: amount of information provided .....                                                        | 49 |
| Summary of studies: differences in presentation formats .....                                                   | 49 |
| Summary of studies: structure of choice sets.....                                                               | 49 |
| Summary of studies: multiple presentation difference types .....                                                | 49 |
| 3.6.4 Analysis of the impact of presentation differences.....                                                   | 50 |
| Models used to analysis DCE data.....                                                                           | 50 |
| Outcomes .....                                                                                                  | 51 |

---

|                                                                                                                                      |           |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 3.7 Discussion.....                                                                                                                  | 52        |
| 3.7.1 Summary of findings .....                                                                                                      | 52        |
| 3.7.2 Limitations of findings and directions for future research.....                                                                | 53        |
| 3.7.3 Implications of findings .....                                                                                                 | 55        |
| 3.7.4 Next steps .....                                                                                                               | 55        |
| <b>Chapter 4. Preferences for the assessment of chemotherapy induced peripheral neuropathy (CIPN): The patient perspective .....</b> | <b>57</b> |
| 4.1 Introduction .....                                                                                                               | 57        |
| 4.2 Background .....                                                                                                                 | 59        |
| 4.2.1 IN FOCUS Study .....                                                                                                           | 61        |
| 4.2.2 DCE theoretical framework.....                                                                                                 | 61        |
| 4.3 Methods .....                                                                                                                    | 62        |
| 4.3.1 Initial attributes and levels.....                                                                                             | 63        |
| 4.3.2 Refining attributes and levels: qualitative Interviews.....                                                                    | 64        |
| Sample for cognitive interviews .....                                                                                                | 65        |
| Creation of the DCE for cognitive interviews .....                                                                                   | 65        |
| Information provided to participants in cognitive interviews .....                                                                   | 66        |
| Creation of the survey for cognitive interviews .....                                                                                | 66        |
| Cognitive interview process .....                                                                                                    | 66        |
| Summary of results from cognitive interviews.....                                                                                    | 67        |
| 4.3.3 Refining attributes and levels: consultation with health economists and DCE experts.....                                       | 68        |
| Introduction.....                                                                                                                    | 68        |
| Key takeaways from consultation session.....                                                                                         | 69        |
| 4.3.4 Finalised attributes and levels .....                                                                                          | 69        |
| 4.3.5 Construction of choice sets.....                                                                                               | 70        |
| 4.3.6 Using simulations to assess the performance of choice sets constructed.....                                                    | 72        |
| Purpose of simulations.....                                                                                                          | 72        |
| Determining sets of priors .....                                                                                                     | 72        |
| Determining number of responses for simulations .....                                                                                | 72        |
| Assessment of simulations.....                                                                                                       | 73        |
| 4.3.7 Study 1: patient Sample .....                                                                                                  | 76        |
| Ethics approval.....                                                                                                                 | 76        |
| Piloting.....                                                                                                                        | 77        |
| Survey flow .....                                                                                                                    | 77        |
| Sample.....                                                                                                                          | 82        |
| Survey launch and issues.....                                                                                                        | 82        |
| Data analysis.....                                                                                                                   | 83        |
| 4.4 Study 1: Patient sample results.....                                                                                             | 83        |
| 4.4.1 General descriptive statistics of respondents .....                                                                            | 83        |
| Cancer-related descriptive statistics .....                                                                                          | 85        |
| Summary of attributes and levels with abbreviations .....                                                                            | 88        |

---

|                                                                                                                                                                         |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 4.4.2 MNL model results .....                                                                                                                                           | 89         |
| 4.4.3 MXL model results .....                                                                                                                                           | 91         |
| 4.4.4 Examining MXL model results: choice probabilities .....                                                                                                           | 94         |
| 4.4.5 Examining MXL model results: kernel density plots .....                                                                                                           | 97         |
| 4.4.6 Summary of responses to evaluation questions.....                                                                                                                 | 100        |
| 4.5 Discussion of Study 1: patient sample results.....                                                                                                                  | 101        |
| 4.5.1 Statement of principal findings.....                                                                                                                              | 101        |
| 4.5.2 Strengths and weaknesses of the study.....                                                                                                                        | 102        |
| 4.5.3 Study implications for clinicians or policy makers .....                                                                                                          | 102        |
| 4.6 Next steps .....                                                                                                                                                    | 102        |
| <b>Chapter 5. Preferences for the assessment of chemotherapy induced peripheral neuropathy (CIPN): Contrasting the general population and patient perspectives.....</b> | <b>103</b> |
| 5.1 Background .....                                                                                                                                                    | 103        |
| 5.2 Study 2: Methods .....                                                                                                                                              | 105        |
| 5.2.1 Overview of Study 2 .....                                                                                                                                         | 105        |
| 5.2.2 Background information section of DCE .....                                                                                                                       | 107        |
| 5.2.3 Experimental arms .....                                                                                                                                           | 107        |
| 5.2.4 Summary of attributes, levels and choice sets .....                                                                                                               | 107        |
| 5.2.5 Development of survey .....                                                                                                                                       | 108        |
| 5.2.6 Ethics approval.....                                                                                                                                              | 108        |
| 5.2.7 Recruitment.....                                                                                                                                                  | 108        |
| 5.2.8 Planned sample size .....                                                                                                                                         | 109        |
| 5.2.9 Testing poolability of data from different sources.....                                                                                                           | 109        |
| 5.3 Study 2: Results .....                                                                                                                                              | 110        |
| 5.3.1 Sample characteristics .....                                                                                                                                      | 110        |
| 5.3.2 Analysis of general population sample.....                                                                                                                        | 113        |
| Overview of analyses .....                                                                                                                                              | 113        |
| MNL model results by arm.....                                                                                                                                           | 114        |
| Sensitivity analyses using the MNL model .....                                                                                                                          | 115        |
| S-MNL model results .....                                                                                                                                               | 115        |
| MNL model: testing preference differences by arm.....                                                                                                                   | 116        |
| Final MNL model: pooled data.....                                                                                                                                       | 118        |
| Latent class analysis (LCA): pooled data .....                                                                                                                          | 119        |
| MXL model results: pooled data .....                                                                                                                                    | 120        |
| 5.3.3 Responses to evaluation questions .....                                                                                                                           | 126        |
| 5.3.4 Experience with illness and cancer .....                                                                                                                          | 131        |
| 5.4 Comparison of Study 1 and Study 2: patient and general population preferences .                                                                                     | 134        |
| 5.4.1 Overview.....                                                                                                                                                     | 134        |
| 5.4.2 Investigating scale differences between samples.....                                                                                                              | 134        |
| 5.4.3 Comparison using ratios.....                                                                                                                                      | 136        |
| 5.4.4 Comparison by utility ranking of possible assessment tools .....                                                                                                  | 138        |

---

|                                                                                                                     |            |
|---------------------------------------------------------------------------------------------------------------------|------------|
| 5.5 Discussion.....                                                                                                 | 140        |
| 5.5.1 Study 2: Summary of findings.....                                                                             | 140        |
| 5.5.2 Comparison of Study 1 and 2: summary of main findings .....                                                   | 141        |
| 5.5.3 Strengths and weaknesses of the study.....                                                                    | 142        |
| 5.5.4 Implications of findings and directions for future research.....                                              | 143        |
| <b>Chapter 6. Anchoring choice sets to immediate death or full health during the valuation of the EQ-5D-5L.....</b> | <b>146</b> |
| 6.1 Overview .....                                                                                                  | 146        |
| 6.2 Author involvement in the project.....                                                                          | 146        |
| 6.3 Background .....                                                                                                | 147        |
| 6.3.1 Incorporating health effects into economic evaluation.....                                                    | 147        |
| 6.3.2 Defining quality-adjusted life years (QALYs) .....                                                            | 147        |
| 6.3.3 The use of multi-attribute utility instruments (MAUIs).....                                                   | 149        |
| 6.3.4 The EQ-5D-5L .....                                                                                            | 149        |
| 6.3.5 Deriving QALY weights for the EQ-5D-5L.....                                                                   | 151        |
| 6.3.6 Using DCEs to derive QALY weights for the EQ-5D-5L.....                                                       | 152        |
| 6.4 Aims .....                                                                                                      | 154        |
| 6.4.1 Details of the project.....                                                                                   | 155        |
| 6.5 Methods .....                                                                                                   | 155        |
| 6.5.1 The data.....                                                                                                 | 155        |
| 6.5.2 Data collection: Peru .....                                                                                   | 155        |
| 6.5.3 Data Collection: Denmark .....                                                                                | 156        |
| 6.5.4 Arms in study .....                                                                                           | 156        |
| 6.5.5 List of attributes and levels .....                                                                           | 157        |
| 6.5.6 The task.....                                                                                                 | 158        |
| 6.5.7 Choice set construction method .....                                                                          | 160        |
| 6.6 Data Analysis .....                                                                                             | 160        |
| 6.6.1 Modified utility specification .....                                                                          | 160        |
| 6.6.2 MNL model with duration.....                                                                                  | 161        |
| 6.6.3 Reporting of MNL model parameter estimates: calculating QALY weights.....                                     | 161        |
| 6.6.4 MXL model with duration .....                                                                                 | 162        |
| 6.7 Data cleaning and screening of respondents .....                                                                | 163        |
| 6.7 Results.....                                                                                                    | 164        |
| 6.7.1 Poolability of arms across countries.....                                                                     | 164        |
| 6.7.2 MNL model results.....                                                                                        | 164        |
| Predicted health states utilities and position of ‘dead’ .....                                                      | 165        |
| 6.7.3 MNL model results: Cross country comparison .....                                                             | 168        |
| 6.7.4 MNL model results: significance of adjacent utility decrements.....                                           | 171        |
| 6.7.5 MXL model results .....                                                                                       | 172        |
| 6.8 Discussion.....                                                                                                 | 176        |
| 6.8.1 Summary of findings .....                                                                                     | 176        |
| 6.8.2 Limitations and direction for future research .....                                                           | 177        |

---

|                                                                                             |            |
|---------------------------------------------------------------------------------------------|------------|
| 6.8.3 Implications of findings .....                                                        | 178        |
| <b>Chapter 7. Discussion.....</b>                                                           | <b>179</b> |
| Introduction .....                                                                          | 179        |
| Chapter 3: Scoping review.....                                                              | 180        |
| Summary of findings .....                                                                   | 180        |
| Implications of findings .....                                                              | 181        |
| Chapters 4 and 5: Preferences for the assessment of CIPN .....                              | 182        |
| Summary of findings .....                                                                   | 182        |
| Implications of findings .....                                                              | 184        |
| Chapter 6: Anchoring to immediate death versus full health .....                            | 186        |
| Summary of findings .....                                                                   | 186        |
| Implications of findings .....                                                              | 187        |
| Limitations of findings and directions for future research.....                             | 188        |
| Conclusions .....                                                                           | 189        |
| What are the main ways a DCE can be presented to respondents?.....                          | 190        |
| Does changing how the DCE is presented to respondents lead to differences in results? ..... | 190        |
| Final remarks.....                                                                          | 191        |
| <b>References .....</b>                                                                     | <b>192</b> |
| <b>Appendices .....</b>                                                                     | <b>205</b> |
| Appendix 3A: Studies included in Scoping Review.....                                        | 205        |
| Appendix 3B: Definitions and scope of general study details extracted .....                 | 212        |
| Appendix 3C: Definitions and scope of study development details .....                       | 213        |
| Appendix 3D: Definitions and scope of validity check details.....                           | 214        |
| Appendix 3E: Definitions and scope of choice set presentation details .....                 | 215        |
| Appendix 3F: Definitions and scope of choice set construction details.....                  | 216        |
| Appendix 3G: Definitions and scope of arm details.....                                      | 217        |
| Appendix 3H: Definitions and scope of data analysis details .....                           | 218        |
| Appendix 4A: Ethics approval for qualitative interviews .....                               | 219        |
| Appendix 4B: Cognitive interview protocol, Interviews 1-4.....                              | 220        |
| Appendix 4C: Cognitive interview protocol, Interviews 5-6.....                              | 222        |
| Appendix 4D: Prompting questions.....                                                       | 225        |
| Appendix 4E: Summary of cognitive interviews.....                                           | 226        |
| Appendix 4F: Consultation session with health economists and DCE experts .....              | 229        |
| Appendix 4G: Sets of priors used in simulations .....                                       | 232        |
| Appendix 4H: Ethics approval No. ETH19-3464: copy of email .....                            | 234        |
| Appendix 4I: Copy of full survey .....                                                      | 236        |
| Appendix 4J: Copy of email newsletter by IN FOCUS.....                                      | 251        |
| Appendix 4K: Copy of the wording of email to relaunch survey on 1st of November 2019 .....  | 253        |
| Appendix 4L: Respondent comments .....                                                      | 254        |
| Appendix 5A: CIPN DCE general population sample copy of survey .....                        | 256        |

---

|                                                                                                           |     |
|-----------------------------------------------------------------------------------------------------------|-----|
| Appendix 5B: CIPN DCE general population sample ethics approval (copy of letter)...                       | 274 |
| Appendix 5C: Excluded respondents comment box text.....                                                   | 275 |
| Appendix 5D: Sensitivity analysis: MNL model results with fastest 10% removed by arm<br>.....             | 276 |
| Appendix 5E: Sensitivity analysis: Arm 2 with 4 respondents that could not view the<br>video removed..... | 277 |
| Appendix 5F: S-MNL results general population arms combined .....                                         | 278 |
| Appendix 6A: Durations used in choice sets .....                                                          | 279 |
| Appendix 6B: Test for poolability of arms by country .....                                                | 280 |
| Appendix 6C: MNL parameter estimates on latent scale.....                                                 | 281 |

---

## List of Tables

|                                                                      |    |
|----------------------------------------------------------------------|----|
| Table 3.1 Search terms.....                                          | 29 |
| Table 3.2 Searches by research database .....                        | 29 |
| Table 3.3 Studies included by year.....                              | 31 |
| Table 3.4 Country of study .....                                     | 32 |
| Table 3.5 Dissemination method of DCE.....                           | 32 |
| Table 3.6 Population of interest.....                                | 33 |
| Table 3.7 Study sample size summary.....                             | 33 |
| Table 3.8 No. of qualitative methods used .....                      | 34 |
| Table 3.9 Type of qualitative methods used.....                      | 34 |
| Table 3.10 Rationale for qualitative methods.....                    | 34 |
| Table 3.11 No. of methods used .....                                 | 35 |
| Table 3.12 Type of method used .....                                 | 35 |
| Table 3.13 Rationale for method use .....                            | 35 |
| Table 3.14 Types of validity checks .....                            | 36 |
| Table 3.15 Total number of choice sets.....                          | 37 |
| Table 3.16 No. of choice sets per respondent.....                    | 38 |
| Table 3.17 How were choice sets assigned?.....                       | 38 |
| Table 3.18 No. of options .....                                      | 39 |
| Table 3.19 What is the construction method designed to model?.....   | 42 |
| Table 3.20 What was the construction method optimised for?.....      | 42 |
| Table 3.21 What software was used for construction? .....            | 43 |
| Table 3.22 Method to construct choice sets .....                     | 43 |
| Table 3.23 Method of construction: other .....                       | 43 |
| Table 3.24 No. of arms in study .....                                | 44 |
| Table 3.25 How were arms assigned?.....                              | 45 |
| Table 3.26 By convenience: details.....                              | 45 |
| Table 3.27 By criteria: details .....                                | 45 |
| Table 3.28 No. of aspects of the DCE different between arms.....     | 46 |
| Table 3.29 List of parts different between arms.....                 | 46 |
| Table 3.30 No. of presentation differences used per study .....      | 47 |
| Table 3.31 Frequency of different presentation difference types..... | 47 |

---

|                                                                                                                              |     |
|------------------------------------------------------------------------------------------------------------------------------|-----|
| Table 3.32 No. of models used .....                                                                                          | 50  |
| Table 3.33 List of models used.....                                                                                          | 51  |
| Table 3.34 Other modelling procedures used.....                                                                              | 51  |
| Table 3.35 Any differences in DCE results by arm? .....                                                                      | 52  |
| Table 4.1 CIPN DCE: initial attributes and levels .....                                                                      | 63  |
| Table 4.2 Project 1: vignette for choice sets .....                                                                          | 70  |
| Table 4.3 Project 1: finalised attributes and levels.....                                                                    | 71  |
| Table 4.4 Summary of respondent numbers used .....                                                                           | 72  |
| Table 4.5 Standardised bias summary.....                                                                                     | 76  |
| Table 4.6 Education level of respondents .....                                                                               | 84  |
| Table 4.7 Summary of assignment to block.....                                                                                | 84  |
| Table 4.8 Number of females and males by assigned block.....                                                                 | 84  |
| Table 4.9 Mean and median completion times by block to the nearest minute (mins) ...                                         | 85  |
| Table 4.10 Years since first cancer diagnosis .....                                                                          | 86  |
| Table 4.11 Cancer type (can select more than one) .....                                                                      | 86  |
| Table 4.12 Type of chemotherapy drugs received (can select more than one).....                                               | 87  |
| Table 4.13 List of attributes with abbreviations.....                                                                        | 88  |
| Table 4.14 Summary of MNL model results .....                                                                                | 89  |
| Table 4.15 Predicted choice probabilities (MNL).....                                                                         | 90  |
| Table 4.16 MXL model 1 .....                                                                                                 | 91  |
| Table 4.17 MXL model variations: AIC and BIC summary .....                                                                   | 92  |
| Table 4.18 Final MXL model .....                                                                                             | 94  |
| Table 4.19 Choice probabilities: attributes with no heterogeneity.....                                                       | 95  |
| Table 4.20 Choice probabilities: attributes with heterogeneity .....                                                         | 96  |
| Table 4.21 Responses to question ‘How did you decide whether Assessment A or B was<br>better in each choice question?’ ..... | 100 |
| Table 5.1 Survey status.....                                                                                                 | 111 |
| Table 5.2 Frequency of gender and age of respondents .....                                                                   | 111 |
| Table 5.3 Education level.....                                                                                               | 112 |
| Table 5.4 Block assignment.....                                                                                              | 112 |
| Table 5.5 Completion time .....                                                                                              | 113 |
| Table 5.6 MNL results by arm .....                                                                                           | 114 |
| Table 5.7 S-MNL model results.....                                                                                           | 116 |

---

|                                                                                                                              |     |
|------------------------------------------------------------------------------------------------------------------------------|-----|
| Table 5.8 MNL results with dummy indicator for arm.....                                                                      | 117 |
| Table 5.9 MNL results.....                                                                                                   | 118 |
| Table 5.10 LCA results .....                                                                                                 | 120 |
| Table 5.11 MXL model with all parameters entered as random .....                                                             | 121 |
| Table 5.12 Summary of AIC and BIC.....                                                                                       | 122 |
| Table 5.13 Final MIXL model for pooled data.....                                                                             | 122 |
| Table 5.14 Helpfulness of introductory information .....                                                                     | 126 |
| Table 5.15 Arm 2 video quality rating .....                                                                                  | 127 |
| Table 5.16 Level of agreement with helpfulness of the physical test type explanations....                                    | 127 |
| Table 5.17 Testing for whether level of agreement with helpfulness of physical test<br>explanations is dependent on arm..... | 128 |
| Table 5.18 Level of agreement with ability to imagine symptoms.....                                                          | 128 |
| Table 5.19 Level of agreement with ability to imagine impacts on daily activities .....                                      | 129 |
| Table 5.20 Testing for whether ability to imagine is dependent on arm .....                                                  | 129 |
| Table 5.21 Strategy for choosing preferred assessment .....                                                                  | 130 |
| Table 5.22 Level of agreement: ease of identifying differences between assessment<br>tools .....                             | 130 |
| Table 5.23 Level of agreement: ease of choosing a preferred assessment tool.....                                             | 130 |
| Table 5.24 Testing for whether ease of identifying/choosing is dependent on arm.....                                         | 131 |
| Table 5.25 Frequency of conditions.....                                                                                      | 132 |
| Table 5.26 Frequency of cancer diagnosis type .....                                                                          | 132 |
| Table 5.27 Someone you know with cancer? .....                                                                               | 132 |
| Table 5.28 What was their cancer diagnosis?.....                                                                             | 133 |
| Table 5.29 S-MNL: patient and general population samples .....                                                               | 135 |
| Table 5.30 Ratios of parameters .....                                                                                        | 137 |
| Table 5.31 Ratios of MRS.....                                                                                                | 137 |
| Table 6.1 EQ-5D-5L levels with health state 13245 underlined and bolded for<br>illustration .....                            | 151 |
| Table 6.2 Arms in study.....                                                                                                 | 157 |
| Table 6.3 List of attributes and levels .....                                                                                | 157 |
| Table 6.4 Arm death_arm: mock-up of health state A vs B (different durations) .....                                          | 159 |
| Table 6.5 Arm death_arm: mock-up of health state B vs C (anchored to immediate<br>death) .....                               | 159 |

---

|                                                                                                            |     |
|------------------------------------------------------------------------------------------------------------|-----|
| Table 6.6 Total number of respondents by arm and country .....                                             | 164 |
| Table 6.7 Total number of choice sets by arm.....                                                          | 164 |
| Table 6.8 MNL results.....                                                                                 | 165 |
| Table 6.9 Example of calculation of utility weight using the PIT state .....                               | 166 |
| Table 6.10 Example of calculation of utility weight with constrained values.....                           | 166 |
| Table 6.11 Summary of health state utilities for Peruvian respondents.....                                 | 167 |
| Table 6.12 Dummy coding for five level attribute.....                                                      | 171 |
| Table 6.13 Incremental dummy coding for five level attribute .....                                         | 171 |
| Table 6.14 MNL model results: significance of adjacent utility decrements .....                            | 172 |
| Table 6.15 Peru: AIC and BIC.....                                                                          | 173 |
| Table 6.16 Denmark: AIC and BIC .....                                                                      | 173 |
| Table 6.17 Peru: MXL model latent scale results.....                                                       | 174 |
| Table 6.18 Denmark: MXL model raw parameter estimates .....                                                | 175 |
| Appendix Table 1 Arm death_arm duration combinations for health state A and B.....                         | 279 |
| Appendix Table 2 Arm fullhealth_arm duration combinations for health states A and B..                      | 279 |
| Appendix Table 3 Arm fullhealth_arm frequency of durations for health states B vs C<br>(full health) ..... | 279 |
| Appendix Table 4 MNL parameter estimates on latent scale .....                                             | 281 |

---

## List of Figures

|                                                                                                           |     |
|-----------------------------------------------------------------------------------------------------------|-----|
| Figure 3.1 Main types of presentation differences .....                                                   | 25  |
| Figure 3.2 Screening process flow diagram.....                                                            | 30  |
| Figure 3.3 No. of attributes presented to respondents .....                                               | 39  |
| Figure 3.4 Scatterplot: No. of choice sets vs. attributes* .....                                          | 41  |
| Figure 4.1 Project outline.....                                                                           | 59  |
| Figure 4.2 Developing the DCE flow chart.....                                                             | 63  |
| Figure 4.3 Boxplots of betas and standard errors.....                                                     | 74  |
| Figure 4.4 Screenshot: explanation of peripheral neuropathy .....                                         | 78  |
| Figure 4.5 Screenshot: information about attributes Part 1 .....                                          | 78  |
| Figure 4.6 Screenshot: information about attributes: Part 2.....                                          | 79  |
| Figure 4.7 Screenshot: types of physical tests Part 1.....                                                | 79  |
| Figure 4.8 Screenshot: types of physical tests Part 2.....                                                | 80  |
| Figure 4.9 Screenshot: types of physical tests Part 3.....                                                | 80  |
| Figure 4.10 Screenshot: types of physical tests Part 4.....                                               | 81  |
| Figure 4.11 Example choice set.....                                                                       | 81  |
| Figure 4.12 Age of respondents (years).....                                                               | 85  |
| Figure 4.13 Kernel density plot of the conditional mean distribution for Det 2 .....                      | 97  |
| Figure 4.14 Kernel density plot of the conditional mean distribution for CT 4.....                        | 98  |
| Figure 4.15 Overlaid kernel density plot of distribution of conditional means for Res 2<br>and Res 3..... | 98  |
| Figure 5.1 Outline of CIPN DCE Project: Study 1 and 2 .....                                               | 104 |
| Figure 5.2 Survey flow for arms 1 and 2 in Study 2.....                                                   | 106 |
| Figure 5.3 Boxplots of completion time by arm (in minutes).....                                           | 113 |
| Figure 5.4 Plot of Det 2 density and conditional mean values .....                                        | 124 |
| Figure 5.5 Plot of CT 4 density and conditional mean values .....                                         | 124 |
| Figure 5.6 Plot of Res2 density and conditional mean values .....                                         | 125 |
| Figure 5.7 Plot of Q 4 density and conditional mean values .....                                          | 125 |
| Figure 5.8 Plot of PhyT 3 and 4 density and conditional means.....                                        | 126 |

---

|                                                                   |     |
|-------------------------------------------------------------------|-----|
| Figure 5.9 Scatterplot of utility values.....                     | 139 |
| Figure 6.1 Scatterplot of health state utilities by country*..... | 168 |
| Figure 6.2 Peru: kernel density plots of utilities.....           | 170 |
| Figure 6.3 Denmark: kernel density plots of utilities .....       | 170 |

---

## Acknowledgements

I would like to thank my three supervisors Professor Deborah Street, Professor Rosalie Viney and Professor Stephen Goodall for their guidance and advice throughout my PhD journey. This thesis would not have been possible without them. I am grateful to Debbie for her patience, effort and dedication to make sure I never felt at a loss during my PhD. I have truly been fortunate to have Debbie there to teach and advise me on generator developed designs. She has been a stellar main supervisor, I couldn't ask for more.

Thank you to Rosalie for her insight and ability to see the bigger picture of my research, even when I couldn't. Her words are gold, and I cannot express how grateful I am to have her as part of my supervisory panel. Stephen, thank you for your steady advice throughout my PhD and for keeping the supervisor panel meetings from veering too far off topic. I am forever thankful that I had the opportunity to see Stephen present on DCEs at my very first full time workplace. This led me to discover the Centre for Health Economics Research and Evaluation (CHERE, UTS) and opened the door to the wonderful world of DCEs and health research with impact. It has been a dream to have Debbie, Rosalie and Stephen as my supervisors.

I would also like to acknowledge and thank the women with experience of breast cancer from the Breast Cancer Network Australia (BCNA) who volunteered to participate in my qualitative interviews. Also thank you to the INFOCUS Study for assisting in the recruitment of my cancer patient sample for one of my DCEs. Thank you to all the people with experience of cancer who completed my DCE. Special thanks to Associate Professor Susanna Park (University of Sydney) from the INFOCUS Study for her help with recruitment and clinical advice on my DCE. I would also like to thank Senior Lecturer Dr Alison Pearce (University of Sydney), for her advice on conducting qualitative interviews and letting me observe a few she conducted for her own DCE (with the permission of the participant).

There are also several people at CHERE, UTS who have supported me at various points during my PhD that I would like to thank. This includes Associate Professor Brendan Mulhern for all his valuable advice and knowledge with regards to EuroQol and valuation of the EQ-5D-5L. Thank you to Senior Research Fellow Patsy Kenny, for her advice and help with my ethics application. Research Fellows and PhD candidates

---

Kathleen Manipis and Elena Meshcheriakova, thank you both for your company and empathy especially during the last year of my PhD and COVID-19 lockdowns have been a tough time for everyone, but especially when you are writing a PhD. These two ladies have been there down in the trenches with me. The Zoom Hives have been immensely helpful, if only to share in some laughter and tears while we have been writing our theses.

And last but not least, I would like to thank my partner, Timothy Lou, for his enthusiasm and excitement for me when I decided to start my PhD and for his unwavering support during the journey.

---

## Thesis Abstract

Discrete choice experiments (DCEs) are a popular stated preference technique used in health. A major challenge in health related DCEs is that they often involve terminology and concepts that may be unfamiliar to respondent. Therefore, it is important for DCEs to include explanations of the concepts and terminology used where needed. This raises questions about the different ways information in a DCE is presented to respondents. Most importantly, does the type of information and level of information provided in a DCE impact results?

In order to answer this question, this thesis included a scoping review and three empirical studies that add to the literature. The scoping review summarised DCE studies that investigated the impact of either the amount of information or the presentation style of the DCE or both on the choices of respondents. Studies were included if they allocated respondents to two or more arms to test the impact of differences in the information provided to respondents, either explicitly (e.g., providing more detailed information in one arm than in the other) or implicitly (e.g., by having more options in each choice set). The review showed that the impact of presentation differences on DCE findings was not consistent across studies and this begs the question of whether it is desirable or possible to design DCEs with conclusions that are robust to how the DCE is presented to respondents.

The first empirical study investigated patient preferences for features of an assessment tool for peripheral neuropathy, a possible side effect of cancer treatment. The second study investigated the same topic but this time in a general population sample. The aim was to investigate the differences in preferences between the two samples. Another aim was to understand whether increasing the level of information provided to the general population sample had an impact on results. This was investigated by splitting the general population sample into two arms, where one arm received more information compared to the other. The presentation format was also different between arms, with one arm receiving static images and the other a short video as well as GIFs i.e. moving images on loop. The study found that providing extra information and the use of different presentation formats did not lead to significant preference differences between the two general population arms. The patient and general population were

---

found to have similar preferences. Although differences were noted in terms of scale. The scale difference was found to be somewhat smaller between the general population arm that received more information and the patient sample compared to that between the general population arm that received only basic information and the patient sample.

The third empirical study investigated different anchoring methods and its impact on the valuation of the EQ-5D-5L, a widely used quality of life measurement instrument. Respondents were shown choice sets that included three options; two health states and a third option which was *immediate death* or *full health* i.e. the anchoring option. The study found that health state utilities were sensitive to the wording used in the third option of the choice sets; in particular, choice sets with *immediate death* as the third option consistently produced a narrower range of utilities than did those with *full health* as the third option.

Evidence from this thesis demonstrates that information in a DCE may impact the resulting preferences, but that the extent of this impact varies by context.