

THE ROLE OF META-COGNITION IN SOCIAL ANXIETY

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LIST OF CONTENTS

| | Page |
|--|-----------|
| List of tables | 13 |
| List of figures | 15 |
| Abstract of thesis | 17 |
| Declaration | 18 |
| Copyright statement | 19 |
| Acknowledgment | 20 |
| Dedication | 21 |
| CHAPTER 1 | |
| Introduction | 22 |
| 1.1 The concept of social fear | 22 |
| 1.2. Diagnostic criteria for social phobia | 23 |
| 1.2.1. The Diagnostic and Statistical Manual – Second edition (DSM-II) | 23 |
| 1.2.2. The Diagnostic and Statistical Manual – Third edition (DSM-III) | 23 |
| 1.2.3. The Diagnostic and Statistical Manual – Fourth edition (DSM-IV) | 23 |
| 1.2.4. The Diagnostic and Statistical Manual – Fifth edition (DSM-V) | 24 |
| 1.2.5. The tenth revision of the International Classification of Diseases (ICD-10) | 25 |
| 1.3. Epidemiology, onset, comorbidity, and demographic factors in social phobia | 26 |
| 1.3.1. Prevalence and the impact of culture and age | 26 |
| 1.3.2. Onset | 28 |
| 1.3.3. Comorbidity | 28 |
| 1.3.4. Gender and demographic factors | 29 |
| 1.4. Nature versus nurture, and neurobiology: the aetiology of social anxiety disorder | 30 |
| 1.4.1. Genetic factors in social anxiety disorder | 30 |
| 1.4.2. Environmental factors in social anxiety disorder | 30 |
| 1.4.3. Personality traits in social anxiety disorder | 31 |
| 1.4.4. Neuropsychological factors | 32 |
| 1.5. The course of social phobia, its impact on quality of life, and its economic cost | 33 |
| 1.5.1. Lifetime course of social phobia | 33 |
| 1.5.2. Social phobia's impact on quality of life | 34 |
| 1.5.3. The economical burden of social phobia | 35 |
| 1.6. The maintenance of social phobia | 35 |
| 1.6.1. Learning theories of fear and phobias | 35 |
| 1.6.1.1. Empirical evidence for learning theories | 37 |
| 1.6.2. The social skills deficit hypothesis | 37 |

| | |
|--|----|
| 1.6.2.1. Empirical evidence for the social skills deficit model | 38 |
| 1.6.3. Beck et al.'s (1985) cognitive perspective of anxiety disorders | 39 |
| 1.6.3.1. Empirical support for Beck's cognitive model | 41 |
| 1.6.3.1.1. The role of early experiences in social anxiety disorder | 41 |
| 1.6.3.1.2. The role of core-beliefs in social phobia | 42 |
| 1.6.3.1.3. Interpretations, information processing, and maladaptive behaviours | 43 |
| 1.6.4. Clark and Wells' (1995) cognitive model of social phobia | 43 |
| 1.6.4.1. Empirical support for Clark and Wells' cognitive model | 45 |
| 1.6.4.1.1. Interpretations of bodily symptoms of anxiety | 45 |
| 1.6.4.1.2. Worry and anticipatory processing | 45 |
| 1.6.4.1.2.1. The nature of anticipatory processing in socially anxious individuals and its impact on state anxiety | 46 |
| 1.6.4.1.2.2. Anticipatory processing and memory bias in social anxiety | 47 |
| 1.6.4.1.2.3. A summary of the role of anticipatory processing in social anxiety | 48 |
| 1.6.4.1.3. Rumination and post-mortem processing | 49 |
| 1.6.4.1.3.1. The relationship between the post-mortem and social anxiety | 49 |
| 1.6.4.1.3.2. The post-mortem, other cognitions and state anxiety | 50 |
| 1.6.4.1.3.3. Post-mortem processing and memory biases | 52 |
| 1.6.4.1.3.4. A summary of the role of post-mortem processing in social anxiety | 52 |
| 1.6.4.1.4. Worry versus rumination: similarities and differences | 53 |
| 1.6.4.1.5. Self-focused attention and focusing on an inner image from an observer perspective | 55 |
| 1.6.4.1.5.1. Self-consciousness and social anxiety | 55 |
| 1.6.4.1.5.2. Self-focused attention in socially anxious individuals | 56 |
| 1.6.4.1.5.3. The observer perspective self-image | 57 |
| 1.6.4.1.5.3.1. The characteristics and origins of the observer perspective self-image | 58 |
| 1.6.4.1.5.3.2. The causal role of negative imagery in social anxiety | 59 |
| 1.6.4.1.5.3.3. The effect of the observer perspective self-image on affect, attributions, performance, and memory | 59 |
| 1.6.4.1.5.3.4. A summary of the role of the observer perspective self-image in social anxiety | 60 |
| 1.6.4.1.6. Avoidance of social situations and safety behaviours | 60 |
| 1.6.4.1.6.1. A summary of the role of behaviour coping strategies in social anxiety | 61 |
| 1.6.5. Rapee and Heimberg's (1997) cognitive model of social phobia | 62 |
| 1.6.5.1. Empirical support for Rapee and Heimberg's (1997) cognitive model | 63 |
| 1.6.5.1.1. Anxious predictions about social events | 63 |
| 1.6.5.1.2. Self-attributions in social situations | 63 |
| 1.6.5.1.3. Selective attention to the negative | 64 |
| 1.6.5.1.3.1. Data on the emotional Stroop task | 64 |

| | |
|---|----|
| 1.6.5.1.3.2. Data on the dot-probe task | 65 |
| 1.6.6. A meta-cognitive perspective | 67 |
| 1.6.6.1. The Self-Regulatory Executive Function Model (S-REF) | 69 |
| 1.6.6.2. Eliciting and measuring meta-cognitive knowledge | 71 |
| 1.6.6.3. Empirical evidence for the S-REF model (Wells & Matthews, 1994) | 72 |
| 1.7. Psychological therapy in social anxiety disorder | 73 |
| 1.7.1. Behaviourist therapeutic interventions | 73 |
| 1.7.2. Social skills training | 75 |
| 1.7.3. Cognitive-behavioural group therapy (CBGT) and its individual form | 75 |
| 1.7.4. A therapeutic protocol based on Clark and Wells' (1995) model | 77 |
| 1.7.5. A comparison between the treatments | 80 |
| 1.7.6. Meta-cognitive therapy | 83 |
| 1.8. Aims and objectives of the current PhD | 84 |
| 1.9. Participant numbers and Ethics | 86 |

CHAPTER 2

| | |
|---|-----------|
| Do meta-cognitions contribute to social anxiety? A preliminary study | 87 |
| 2.1. Introduction | 87 |
| 2.2. Method | 89 |
| 2.2.1. Participants | 89 |
| 2.2.2. Measures | 89 |
| 2.2.3. Procedure | 90 |
| 2.2.4. Overview of analysis | 90 |
| 2.3. Result | 92 |
| 2.3.1. An examination of the psychometric properties of PEPQ | 92 |
| 2.3.2. An examination of the psychometric properties of ASBQ | 93 |
| 2.3.3. Correlations between meta-cognitive beliefs, social anxiety, and the maintenance processes | 93 |
| 2.3.4. Predictors of social anxiety | 95 |
| 2.3.4.1. Optimal number of predictors of social anxiety | 96 |
| 2.3.5. Indirect effects of meta-cognitive beliefs on social anxiety | 97 |
| 2.3.5.1. Investigation of the indirect effect of positive meta-cognitive beliefs on social anxiety via anticipatory processing | 98 |
| 2.3.5.2. Investigation of the indirect effect of negative meta-cognitive beliefs on social anxiety via anticipatory processing | 99 |
| 2.3.5.3. Investigation of the indirect effect of positive meta-cognitive beliefs on social anxiety via post-mortem processing | 100 |

| | |
|--|-----|
| 2.3.5.4. Investigation of the indirect effect of negative meta-cognitive beliefs on social anxiety via post-mortem processing | 101 |
| 2.3.5.5. Investigation of the potential moderator effects of negative meta-cognitive beliefs on the relationship between anticipatory processing and the post-mortem, and social anxiety | 101 |
| 2.4. Discussion | 102 |

CHAPTER 3

Investigation of the nature of meta-cognitive beliefs in social anxiety and the construction of two new questionnaires

105

| | |
|---|-----|
| 3.1. Introduction | 105 |
| 3.2. Method | 106 |
| 3.2.1. Participants | 106 |
| 3.2.2. Semi-structured interviews | 107 |
| 3.2.3. Coding | 107 |
| 3.2.4. Procedure | 108 |
| 3.2.5. Overview of Analysis | 108 |
| 3.3. Results | 109 |
| 3.3.1. Inter-rater reliability | 109 |
| 3.3.2. Comparisons between the high and low social anxiety groups | 110 |
| 3.3.2.1. Frequency of cognitive processes | 110 |
| 3.3.2.2. Duration of cognitive processes | 111 |
| 3.3.2.3. Meta-cognitive beliefs about the cognitive processes | 112 |
| 3.3.2.3.1. Positive meta-cognitive beliefs | 112 |
| 3.3.2.3.2. Negative meta-cognitive beliefs | 112 |
| 3.3.2.3.3. Uncontrollability of cognitive processes | 113 |
| 3.3.2.4. Thought control strategies | 114 |
| 3.3.2.5. Time spent trying to control cognitive processes | 115 |
| 3.3.2.6. Stop signals | 116 |
| 3.3.3. Construction of new measures | 116 |
| 3.4. Discussion | 117 |

CHAPTER 4

Development of measures of meta-cognitive beliefs in social anxiety: psychometric properties, and relationships with cognitive mechanisms and social anxiety 120

| | |
|---|-----|
| 4.1. Introduction | 120 |
| 4.2. Method | 122 |
| 4.2.1. Items | 122 |
| 4.2.2. Participants | 122 |
| 4.2.3. Measures | 123 |
| 4.2.4. Procedure | 124 |
| 4.2.5 Overview of analysis | 125 |
| 4.3. Results | 126 |
| 4.3.1. The Metacognitions about Focusing on an Image of the Self scale (MFIS) | 126 |
| 4.3.1.1. Factor analysis | 126 |
| 4.3.1.2. Item inter-correlations | 128 |
| 4.3.1.3. Internal consistency | 128 |
| 4.3.1.4. Normality tests | 128 |
| 4.3.1.5. Subscale inter-correlations | 128 |
| 4.3.1.6. Gender and Age | 129 |
| 4.3.1.7. Stability | 129 |
| 4.3.1.8. Convergent validity | 130 |
| 4.3.2. The Metacognitions about Anticipatory Processing Scale (MAPS) | 132 |
| 4.3.2.1. Factor analysis | 132 |
| 4.3.2.2. Item inter-correlations | 134 |
| 4.3.2.3. Internal consistency | 134 |
| 4.3.2.4. Normality tests | 134 |
| 4.3.2.5. Subscale inter-correlations | 134 |
| 4.3.2.6. Gender and Age | 134 |
| 4.3.2.7. Stability | 135 |
| 4.3.2.8. Convergent validity | 135 |
| 4.3.3. Relationships between meta-cognitive beliefs, cognitive mechanisms, and social anxiety | 136 |
| 4.3.3.1. Correlations | 136 |
| 4.3.3.2. Descriptive statistics of the high and low social anxiety groups | 137 |
| 4.3.3.3. Predictors of social anxiety (FNE) | 138 |
| 4.3.3.4. Confirmatory linear regressions | 143 |
| 4.3.3.5. Predictors of social anxiety (SIAS) | 144 |
| 4.3.3.6. Exploratory mediation analyses | 146 |

| | |
|--|-----|
| 4.3.3.6.1. The indirect effects of the MAPS subscales on social anxiety through anticipatory processing | 148 |
| 4.3.3.6.2. The indirect effects of the MFIS subscales on social anxiety through the observer perspective, and public self-consciousness | 149 |
| 4.3.3.6.3. The indirect effects of MCQ-30 subscales on social anxiety through anticipatory processing, the observer perspective, and public self-consciousness | 151 |
| 4.4. Discussion | 153 |
| 4.4.1. Metacognitions about an image of the self scale | 153 |
| 4.4.1.1. Reliability and stability | 153 |
| 4.4.1.2. The effects of age and gender on scale and subscales | 153 |
| 4.4.1.3. Convergent validity | 155 |
| 4.4.2. Metacognitions about anticipatory processing scale | 155 |
| 4.4.2.1. Reliability and stability | 155 |
| 4.4.2.2. The effects of age and gender on scale and subscales | 155 |
| 4.4.2.3. Convergent validity | 156 |
| 4.4.3. Meta-cognitive and cognitive predictors of social anxiety | 156 |
| 4.4.3.1. Correlations between meta-cognitive beliefs, social anxiety, and cognitive processes | 156 |
| 4.4.3.2. Predictors of social anxiety | 157 |
| 4.4.3.3. Mediated relationships between meta-cognitive beliefs and social anxiety | 158 |
| 4.4.3.4. Limitations | 159 |

CHAPTER 5

Relationships between meta-cognitive beliefs and attentional bias in high and low socially anxious individuals 160

| | |
|--|-----|
| 5.1. Introduction | 160 |
| 5.2. Method | 162 |
| 5.2.1. Participants | 162 |
| 5.2.2. Materials | 163 |
| 5.2.2.1. Questionnaires | 163 |
| 5.2.2.2. Words | 164 |
| 5.2.2.3. The dot-probe task | 165 |
| 5.2.3. Procedure | 166 |
| 5.2.4. Overview of analysis | 166 |
| 5.2.4.1. Exploration of the new measure, the dot-probe task, and of attentional bias means | 166 |
| 5.2.4.2. The vigilance-avoidance hypothesis | 167 |
| 5.2.4.3. The interaction effect hypothesis | 167 |

| | |
|--|------------|
| 5.2.4.4. Predictors of attentional bias | 169 |
| 5.3. Results | 169 |
| 5.3.1. Examination of the MFIS scale | 169 |
| 5.3.2. Manipulation check | 170 |
| 5.3.3. Outliers | 170 |
| 5.3.4. Description of the sample | 170 |
| 5.3.5. The vigilance avoidance hypothesis | 171 |
| 5.3.5.1. The effect of gender and depression on the vigilance-avoidance patterns in attentional bias for negative somatic words | 172 |
| 5.3.6. The potential interaction of social anxiety and meta-cognition on attentional bias | 173 |
| 5.3.6.1. A moderator effect of positive meta-cognitive beliefs about worry and social anxiety on attentional bias for negative somatic words in 500msec | 174 |
| 5.3.6.2. A moderator effect of positive meta-cognitive beliefs about the observer perspective self-image and social anxiety on attentional bias for positive evaluative words in 500msec | 174 |
| 5.3.7. Relationships between attentional bias, social anxiety, depression, state anxiety, and meta-cognitive beliefs | 175 |
| 5.3.8. Predictors of attentional biases | 176 |
| 5.3.8.1. Predictors of attentional bias in low socially anxious individuals | 176 |
| 5.3.8.1.1. The impact of gender | 176 |
| 5.3.8.1.2. The impact of trait anxiety | 177 |
| 5.3.8.1.3. The impact of meta-cognitive beliefs | 177 |
| 5.3.8.2. Predictors of attentional bias in high socially anxious individuals | 179 |
| 5.4. Discussion | 180 |
| 5.4.1. The effect of social anxiety on the vigilance-avoidance pattern for negative words | 180 |
| 5.4.2. The interaction effect of meta-cognitive beliefs and social anxiety on attentional bias | 181 |
| 5.4.3. Predictors of attentional bias | 182 |
| 5.4.4. Limitations | 183 |
| CHAPTER 6 | |
| The impact of meta-cognitive beliefs on state anxiety in high socially anxious individuals anticipating a speech | 185 |
| 6.1. Introduction | 185 |
| 6.2. Method | 187 |
| 6.2.1. Participants | 187 |
| 6.2.2. Materials | 187 |
| 6.2.3. Procedure | 188 |

| | |
|---|-----|
| 6.2.4. Overview of analysis | 189 |
| 6.3. Results | 190 |
| 6.3.1. Sample description | 190 |
| 6.3.2. Manipulation check | 190 |
| 6.3.3. Data screening | 191 |
| 6.3.4. Main effects on state anxiety | 191 |
| 6.3.5. Interaction effects on state anxiety | 192 |
| 6.3.5.1. Uncontrollability beliefs | 192 |
| 6.3.5.2. Positive meta-cognitive beliefs | 193 |
| 6.3.6. The effect of meta-cognitive beliefs and anticipatory processing on the observer perspective self-image | 196 |
| 6.3.7. Confidence about performance | 197 |
| 6.4. Discussion | 198 |
| 6.4.1. Main effects and interactions of anticipatory processing and distraction on state anxiety | 198 |
| 6.4.2. The impact of meta-cognitive beliefs on state anxiety | 199 |
| 6.4.3. Meta-cognitive beliefs and the observer perspective | 200 |
| 6.4.4. Participants' predictions about their performance | 200 |
| 6.4.5. Limitations | 201 |

CHAPTER 7

Detached mindfulness versus thought challenging in high socially anxious individuals: A comparison

202

| | |
|---|-----|
| 7.1. Introduction | 202 |
| 7.2. Method | 206 |
| 7.2.1. Design | 206 |
| 7.2.2. Participants | 206 |
| 7.2.3. Materials | 207 |
| 7.2.3.1. Questionnaires | 207 |
| 7.2.3.2. Dependent variables | 208 |
| 7.2.4. The filter task | 209 |
| 7.3. Procedure | 209 |
| 7.4. Overview of analysis | 210 |
| 7.5. Results | 211 |
| 7.5.1. Credibility check | 212 |
| 7.5.2. Differences between baseline and each manipulation | 212 |
| 7.5.3. Overall change due to each manipulation (N=12) | 213 |

| | |
|---|------------|
| 7.5.4. Further observations of the changes due to each manipulation with respect to each manipulation's order of delivery | 215 |
| 7.5.5. Perceived helpfulness | 215 |
| 7.6. Discussion | 216 |
| CHAPTER 8 | |
| General Discussion | 219 |
| 8.1. Overview of main hypotheses | 219 |
| 8.1.1. Meta-cognitive predictors of social anxiety | 220 |
| 8.1.2. Meta-cognitive beliefs about the cognitive mechanisms in social anxiety | 221 |
| 8.1.3. New measures of meta-cognition in social anxiety | 222 |
| 8.1.4. The interaction effect of meta-cognitive beliefs and social anxiety on attentional bias | 223 |
| 8.1.5. The effect of meta-cognitive beliefs on state anxiety in high socially anxious individuals engaging in anticipatory processing or distraction | 224 |
| 8.1.6. The investigation of a meta-cognitive therapeutic intervention versus a traditional cognitive-therapy technique | 224 |
| 8.2. Review of results and novelty of findings | 225 |
| 8.2.1. Do meta-cognitions contribute to social anxiety? A preliminary study | 225 |
| 8.2.2. Investigation of the nature of meta-cognitive beliefs in social anxiety and the construction of two new questionnaires | 227 |
| 8.2.3. The development of two measures of meta-cognitive beliefs in social anxiety: psychometric properties and relationships between beliefs, cognitive mechanisms, and social anxiety | 228 |
| 8.2.3.1. The Metacognitions about Focusing on an Image of the Self (MFIS) scale | 228 |
| 8.2.3.2. The Metacognitions about Anticipatory Processing Scale (MAPS) | 229 |
| 8.2.3.3. Relationships between the new measures, social anxiety, and the cognitive mechanisms implicated in social phobia | 229 |
| 8.2.4. Relationships between meta-cognitive beliefs and attentional bias in high and low socially anxious individuals | 232 |
| 8.2.5. The impact of meta-cognitive beliefs on state anxiety in high socially anxious individuals anticipating a speech | 234 |
| 8.2.6. Detached mindfulness versus thought challenging in high socially anxious individuals: A comparison | 236 |
| 8.3. Implications for the theoretical background of social anxiety disorder | 237 |
| 8.4. Clinical implications | 240 |
| 8.5. Limitations | 243 |
| 8.6. Future directions | 245 |

| | |
|--|-----|
| 8.6.1. On the generalisation of the results in clinical samples | 245 |
| 8.6.2. On the causal and maintaining factors of social anxiety disorder | 245 |
| 8.6.3. On the role of other elements of meta-cognition in social anxiety | 246 |
| 8.6.4. On the application of meta-cognitive therapy in social anxiety disorder | 246 |
| 8.7. Conclusion | 246 |

APPENDICES

| | |
|---|-----|
| Appendix 1.1 | 247 |
| Approvals obtained by the School of Psychological Sciences Research Ethics Committee | |
| Appendix 2.1 | 248 |
| Self-Image Perspective Scale | |
| Appendix 3.1 | 249 |
| Interview questions based on metacognitive profiling (Wells, 2002; Wells & Matthews, 1994) | |
| Appendix 3.2 | 252 |
| The rating sheets | |
| Appendix 3.3 | 255 |
| Instructions to the rater | |
| Appendix 3.4 | 257 |
| Percentage of agreement and Cohen's kappa statistics for each category of meta-cognitive beliefs | |
| Appendix 3.5 | 260 |
| Categories of meta-cognitive beliefs and examples of the respective beliefs | |
| Appendix 3.6 | 265 |
| Metacognitions of Anticipatory Processing Scale: Items and subscales | |
| Appendix 3.7 | 266 |
| Metacognitions of Focusing on a Self-Image Scale: items and subscales | |
| Appendix 4.1 | 267 |
| MFIS scale: structure matrix | |
| Appendix 4.2 | 268 |
| The Metacognitions about Focusing on an Image of the Self scale | |
| Appendix 4.3 | 270 |
| MAPS structure matrix | |
| Appendix 4.4 | 271 |
| The Metacognitions about Anticipatory Processing Scale | |

| | |
|--|---------------|
| Appendix 4.5 | 273 |
| Inter-correlations between meta-cognitive beliefs and social anxiety (FNE and SIAS), self-consciousness (private and public), anticipatory processing, and the observer perspective self-image, ** $p < 0.01$, * $p < 0.05$ | |
| Appendix 5.1 | 274 |
| Word pairs and frequency of use as used in the dot-probe task | |
| Appendix 5.2 | 277 |
| Reliability estimates (Cronbach's alpha) for the dot-probe task | |
| Appendix 5.3 | 278 |
| MFIS scale's Items | |
| Appendix 5.4 | 279 |
| Correlations between attentional bias, social anxiety, depression, state anxiety, and meta-cognitive beliefs, NE = negative evaluative, PE = positive evaluative, NS = negative somatic, PS = positive somatic | |
| Appendix 7.1 | 280 |
| Instructions for detached mindfulness and thought challenging | |
| Appendix 7.2 | 283 |
| Identified thoughts and belief levels at baseline | |
| REFERENCES | 284 |
| Total word count: | 76.595 |

LIST OF TABLES

| | |
|--|-----|
| Table 2.1: Inter-correlations between social anxiety, positive and negative meta-cognitive beliefs, anticipatory processing, focusing on the inner image, and the post-mortem, * $p < .05$, ** $p < .01$, $N=159$ | 94 |
| Table 2.2: Hierarchical regression coefficients with FNE as the dependent variable, positive and negative meta-cognitive beliefs at Step 1, and cognitive variables at Step 2 | 95 |
| Table 2.3: Stepwise regression analysis: Predictors of social anxiety (FNE) at the final step | 96 |
| Table 3.1: Means and standards deviations for Age, and Gender distribution | 107 |
| Table 4.1: Inter-correlations between the MFIS subscales | 128 |
| Table 4.2: Means and standard deviations of test and retest scores on the MFIS scale and subscales | 130 |
| Table 4.3: Spearman correlations between the MFIS subscales and scales selected to test convergent validity | 131 |
| Table 4.4: Correlations between the MAPS subscales | 134 |
| Table 4.5: Spearman correlations between the MAPS subscales, MCQ-30, and anticipatory processing, ** $p < 0.01$ | 136 |
| Table 4.6: High and low socially anxious individuals' mean scores and standard deviations on social anxiety (FNE and SIAS) and depression measures | 137 |
| Table 4.7: Logistic regression with social anxiety groups (FNE) as the dependent variable, depression at Block 1, public self-consciousness and the observer perspective at Block 2, and the meta-cognitive beliefs about focusing on the self-image at Block 3 | 139 |
| Table 4.8: Logistic regression with social anxiety groups (FNE) as the dependent variable, depression at block 1, anticipatory processing at Block 2, and meta-cognitive beliefs about anticipatory processing at Block 3 | 140 |
| Table 4.9: Logistic regression with FNE as the dependent variable, depression at Block 1, anticipatory processing, the observer perspective, and public self-consciousness at Block 2, and three MCQ-30 subscales at Block 3 | 142 |
| Table 4.10: The final step of the hierarchical linear regression analysis with FNE as the dependent variable, depression at Step 1, the observer perspective and public self-consciousness at Step 2, and MFIS subscales at Step 3 | 143 |
| Table 4.11: The final step of the hierarchical linear regression analysis with FNE as the dependent variable, depression at Step 1, anticipatory processing at Step 2, and MAPS subscales at Step 3 | 144 |

| | |
|---|-----|
| Table 4.12: Hierarchical regression analysis with SIAS as the dependent variable, depression at Step 1, the cognitive variables at Step 2, and the MFIS meta-cognitive variables at Step 3 | 145 |
| Table 4.13: Hierarchical regression analysis with SIAS as the dependent variable, depression at Step 1, anticipatory processing at Step 2, and the MAPS meta-cognitive variables at Step 3 | 146 |
| Table 5.1: Number of participants of FNE (social anxiety) X Meta-cognition groups; examples of the inequality of sample sizes | 168 |
| Table 5.2: Means and standard deviations of anxiety and mood in high and low social anxiety (FNE), N = 94 | 171 |
| Table 5.3: Means and standard deviations of attentional bias in high and low social anxiety groups, N = 94 | 171 |
| Table 5.4: Moderator effect of positive meta-cognitive beliefs (MCQ-30) and social anxiety on attentional bias for negative somatic words in 500msec | 174 |
| Table 5.5: Predictors of attentional bias for negative somatic words in 200msec | 178 |
| Table 5.6: Predictors of attentional bias for positive evaluative words in 500msec | 178 |
| Table 5.7: Predictors of attentional bias for positive somatic words in 200msec | 179 |
| Table 5.8: Predictors of attentional bias for positive somatic words in 500msec | 180 |
| Table 6.1: Means and standard deviations in state anxiety before and after the speech for high and low uncontrollability belief groups | 192 |
| Table 7.1: Participants' mean scores (and standard deviations) on social anxiety, social avoidance, and positive and negative self-statements during public speaking | 207 |
| Table 7.2: Normality check for the change scores that were treated as dependent variables, N=12 | 211 |
| Table 7.3: Differences between baseline scores and the scores after each condition at the time of first delivery, and corresponding effect sizes, N=6 | 213 |
| Table 7.4: Means and standard deviations of change due to each manipulation | 213 |
| Table 7.5: Results of the Wilcoxon paired tests that explored the difference between the change attributable to detached mindfulness and the change attributable to thought challenging in anxiety, belief levels, the observer perspective, and worry | 214 |

LIST OF FIGURES

| | |
|---|-----|
| Figure 2.1: Mediation analysis that shows the indirect effect of positive meta-cognitive beliefs on social anxiety via anticipatory processing | 98 |
| Figure 2.2: Mediation analysis that shows the indirect effect of negative meta-cognitive beliefs on social anxiety via anticipatory processing | 99 |
| Figure 2.3: Mediation analysis that shows the indirect effect of positive meta-cognitive beliefs on social anxiety via the post-mortem | 100 |
| Figure 2.4: Mediation analysis that shows the indirect effect of negative meta-cognitive beliefs on social anxiety via the post-mortem | 101 |
| Figure 2.5: Moderation analyses to test the hypothesis that negative meta-cognitive beliefs moderated the relationship between anticipatory processing and social anxiety, and between the post-mortem and social anxiety | 102 |
| Figure 3.1: Differences between high and low social anxiety groups in the frequency (out of ten social situations) of anticipatory processing, focusing on the inner image, and the post-mortem, * $p < .02$ | 111 |
| Figure 3.2: Differences between high and low social anxiety groups in the duration (in minutes) of anticipatory processing, focusing on the inner image, and the post-mortem, * $p < .05$ | 112 |
| Figure 3.3: Significant differences between high and low FNE groups in perceived controllability of the cognitive mechanisms, * $p < .01$ | 114 |
| Figure 3.4: Significant differences in the percentage of time spent trying to control anticipatory processing, focusing on the inner image, and the post-mortem between high and low social anxiety groups, * $p < .02$ | 115 |
| Figure 4.1: MFIS principal components Factor analysis with a 3-Factor solution: scree-plot | 127 |
| Figure 4.2: MAPS principal components factor analysis scree plot | 133 |
| Figure 4.3: The mediator effect of anticipatory processing on the relationship between MAPS uncontrollability/harm and social anxiety (FNE), c' path = direct effect of the independent variable on the dependent variable, c = effect of the independent variable on the dependent variable when controlling for the mediator | 148 |
| Figure 4.4: The mediator effect of anticipatory processing on the relationship between MAPS-positive and social anxiety (FNE), c' path = direct effect of the independent variable on the dependent variable, c = effect of the independent variable on the dependent variable when controlling for the mediator | 149 |
| Figure 4.5: Overall indirect and specific indirect effects of MFIS-positive on social anxiety (FNE) through public self-consciousness and the observer perspective self-image | 150 |

| | |
|---|-----|
| Figure 4.6: Specific indirect effects of MCQ-uncontrollability/danger on social anxiety (FNE) through anticipatory processing, public self-consciousness, and the observer perspective self-image | 151 |
| Figure 6.1: The interaction effect of time (pre to post speech) and uncontrollability beliefs (high and low levels) on state anxiety | 193 |
| Figure 6.2: Three-way interaction effect between high and low levels of positive meta-cognitive beliefs about focusing on the self-image, time (pre to post speech), and condition (anticipatory processing and distraction), * = significant difference | 195 |
| Figure 7.1: The hypothesised target areas of cognitive and meta-cognitive interventions according to the S-REF model (Wells & Matthews 1994) | 204 |
| Figure 7.2: Mean change in anxiety, belief, observer perspective, and worry due to detached mindfulness and thought challenging, comparison of means (* = significant differences), and corresponding effect sizes, N=12 | 214 |
| Figure 7.3: Mean changes after each manipulation in relation to the order that each manipulation was delivered (first or second), N=6 | 215 |
| Figure 8.1: The suggested relationships between meta-cognitive beliefs, cognitive mechanisms, and social anxiety as derived from the current studies | 239 |

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ABSTRACT

This PhD investigated the theoretical and clinical applications of a meta-cognitive model of psychological disorders in social anxiety. The main objective was to identify potential associations between meta-cognitive knowledge (i.e. meta-cognitive beliefs) and social anxiety. These associations could be direct or indirect via information-processing mechanisms, such as anticipatory processing (AP), focus of attention, and post-mortem processing (PM). The current thesis reports six studies (N = 686).

Study 1 explored cross-sectionally the potential contribution of meta-cognitive beliefs about general worry to social anxiety. The results showed that positive and uncontrollability beliefs along with AP were individual positive predictors of social anxiety. Furthermore, these beliefs had an indirect effect on social anxiety through anticipatory processing and the post-mortem. These results prompted further exploration of the nature of meta-cognitive beliefs in social anxiety. Study 2 employed semi-structured interviews to elicit meta-cognitive beliefs that could be specific to social anxiety. High and low socially anxious individuals reported beliefs about anticipatory processing, focusing on an observer perspective (OP) self-image, and the post-mortem. The high socially anxious group reported greater engagement in both AP and focusing on the OP, and spending greater time trying to control AP, OP, and the post-mortem. Moreover, the two groups differed in beliefs about these mechanisms, in coping strategies, and in stop signals. The beliefs elicited informed two new questionnaires that were investigated in Study 3. Each questionnaire revealed three subscales of positive and negative beliefs about AP and about the OP self-image, respectively. The subscales showed good reliability and stability. In addition, the new beliefs revealed further associations with social anxiety.

Study 4 investigated whether meta-cognitive beliefs could affect attentional bias in social anxiety. High and low socially anxious individuals completed a dot-probe task with emotional, social and physical words matched with neutral words. The results indicated a potential moderation effect of social anxiety and positive meta-cognitive beliefs on attentional bias. Moreover, meta-cognitive beliefs predicted attentional bias in both social anxiety groups.

The above results implicated meta-cognitive beliefs in the maintenance of social anxiety. Study 5 explored whether these beliefs could affect state anxiety in high socially anxious individuals that engaged in either AP or a distraction task prior to giving a speech. The results replicated previous findings that AP was associated with more anxiety compared with distraction. Additionally, uncontrollability beliefs were associated with increased state anxiety before the speech, while positive beliefs interfered with distraction and were associated with the maintenance of anxiety after the speech was over. Finally, Study 6 explored whether a meta-cognitive intervention could be effective in the treatment of social anxiety. In a cross-over design, high socially anxious individuals practiced detached mindfulness and thought challenging prior to giving a speech. The results showed that detached mindfulness was associated with greater reductions in negative beliefs, worry, and the OP. In conclusion, the results of a series of studies support the application of the meta-cognitive model to social anxiety.

DECLARATION

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning

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DEDICATIONS

“Κι όσα όνειρα πραγματικά,
έκανα στη ζωή μου,
δε ξέχασα πως τα φτερά,
μου δωσαν οι γονείς μου”
To my parents

To Dr. Alec Grant
my tutor, always

CHAPTER 1

Introduction

“...not only do we need people to benefit us when our fortunes are bad, but people whom we can benefit when our fortunes are good... for a human is a social being and his nature is to live in the company of others” (350 BC/2004, pp., 177).

1.2 The concept of social fear

The notion of social fear has puzzled scientists throughout history. Darwin (1872/1998) discussed how humans could express a fear of being noticed by others while not suffering a general lack of self-confidence in non-social situations. Furthermore, Darwin observed that blushing and a strong urge of concealment could accompany this fear. In effect, individuals would attempt to hide their faces and avoid direct eye contact, or would sustain inappropriate confrontational eye contact as a compensatory strategy.

Later, Jung (1923) observed two attitude types that were based on two conflicting fundamentals: introversion and extroversion. It was introversion that was considered to include shy and socially withdrawn people, though not exclusively. People with this type of attitude feared the external world, thought negatively about themselves, displayed discomfort in their social behaviours, and engaged in unnecessary precautions. Subsequently, Eysenck and Eysenck (1964) created a measure of personality traits based on an information processing approach. This approach suggested that introversion was characterised by withdrawal, introspection, cautiousness, and concern (Eysenck & Eysenck, 1964).

As discussed in subsequent sections, personality traits have been implicated in the aetiology of social anxiety. Nevertheless, the maintaining factors of social phobia remained largely unexplored or unsubstantiated. In effect, several advances have taken place in the fields of psychiatry and psychology that have enabled the classification of social anxiety from a mere personality trait to a distinct anxiety disorder. Following an exploration of the diagnosis, the aetiology and epidemiology, and the impact of social phobia, this thesis discusses several approaches that attempted to disentangle the maintaining mechanisms of the disorder.

The present thesis uses the terms “social phobia” and “social anxiety disorder” interchangeably.

1.2. Diagnostic criteria for social phobia

1.2.1. The Diagnostic and Statistical Manual – Second edition (DSM-II)

In psychiatry, social phobia was not considered a distinct disorder until 1980, when DSM-III (APA, 1980) included it amongst anxiety disorders. Nevertheless, DSM-II (APA, 1968) classified the diagnosis of “withdrawing reaction of childhood”. This disorder was characterised by shyness, detachment, and difficulty in forming interpersonal relationships in children and adolescents. However, shyness is considered a temperamental trait, hence more closely linked to avoidant personality disorder.

1.2.2. The Diagnostic and Statistical Manual – Third edition (DSM-III)

DSM-III (APA, 1980) incorporated specific diagnostic criteria for social phobia that included a central fear of being scrutinised or embarrassed and the relevant avoidant behaviour. Similar to other anxiety disorders, social phobic individuals were expected to recognise their fear as unreasonable. Moreover, consistent with the notion of phobias, social phobia was expected to be debilitating solely when the individuals were confronted with the object of their fear (the specific social situation). Furthermore, the disorder was considered relatively rare.

1.2.3. The Diagnostic and Statistical Manual – Fourth edition (DSM-IV)

DSM-IV (APA, 1994) introduced the term “social anxiety disorder” and expanded the diagnosis to include fear of one or more social situations. Moreover, the criteria incorporated the potential for panic attacks in social situations. Distress was expected to produce interruption of or great difficulty with daily activities, occupational or academic achievement, and social interactions. In addition, the manual applied the diagnosis in childhood and adolescence when the symptoms were present for over six months. Moreover, the generalised type of social phobia was introduced. This type presupposed a fear of most social situations and clinicians should consider the additional diagnosis of avoidant personality disorder (AVPD). However, the manual did not clarify what was meant by “most social situations”.

Additionally, the DSM-IV suggested in its text a vicious cycle comprising anticipatory anxiety, a focus on negative thoughts and bodily sensations, and negative social interpretations (APA, 1994). Finally, cultural issues were introduced, such as the fear of causing offence to others that is prominent in Japan.

Amongst other disorders, differential diagnosis concerned panic disorder with or without agoraphobia, while separation anxiety in children excluded the diagnosis of social anxiety disorder. Furthermore, the manual suggested that the diagnosis of AVPD could largely overlap with generalised social anxiety.

The revised version, DSM-IV-TR (APA, 2000), did not incorporate any changes in the diagnostic criteria of social phobia. There was an update in the text that concerned associated features and comorbidity.

1.2.4. The Diagnostic and Statistical Manual – Fifth edition (DSM-V)

Recent advances in the fields of psychopharmacology and psychology have led to findings that might alter the concept of social phobia in the new edition of the DSM (May 2013). For example, several scientists suggested the inclusion of subthreshold social anxiety disorder in order to emphasise the concept of social phobia as a unidimensional disorder (Filho et al., 2010). Stein et al. (2004) go as far as to suggest a unified concept of social anxiety spectrum disorders. This would include social fears, avoidance, body-focused concerns, affective dysfunction, and social deficits. For example, Body Dysmorphic Disorder and the new Olfactory Reference Syndrome, eating disorders, and personality disorders that have a severe impact on people's sociability (e.g., hyper-sociability in Williams disorder and hypo-sociability in schizoid personality disorder) could be included in this spectrum.

Based on two reviews of the evidence regarding the diagnostic criteria for social phobia (Bögels et al., 2010) and the relevant cultural issues (Lewis-Fernández et al., 2009), the following changes have been proposed:

- The use of the term social anxiety disorder (with “social phobia” in parenthesis)
- Removal of the criterion of recognition of the fear as unreasonable; instead, clinicians could estimate the fear as out of proportion by taking into account the person's cultural context
- Inclusion of the fear of offending others
- Removal of the generalised subtype and use of performance anxiety as a specifier. The fears would be grouped according to the social situations: social interactions, being observed, and performance tasks
- Inclusion of Selective Mutism as a behavioural expression (avoidance) of social anxiety disorder in infancy and early childhood
- Due to concerns about underestimating important interpersonal difficulties in personality disorders, AVPD was suggested to remain a separate diagnosis

- A duration (possibly of 6 months) that would apply to all ages
- Removal of the mention of panic attacks.
- Inclusion of a severity scale
- Finally, it was proposed to include a discussion of the potential relationship between Social Anxiety Disorder and Body Dysmorphic Disorder and between social phobia and the new classification of Olfactory Reference Syndrome.

1.2.5. The tenth revision of the International Classification of Diseases (ICD-10)

The ICD-10 (WHO, 1992) distinguished between discrete social phobia about specific social situations and diffuse social phobia about most social situations. Similar to the DSM-IV, the ICD-10 did not elaborate on the nature or the amount of social situations necessary for the diagnosis of the diffused type. However, the manual noted that these situations should be outside the family circle. This could be exclusive of social phobic individuals that experience discomfort in family gatherings and in close familial relationships.

In brief, the criteria for the diagnosis of social phobia were: 1) that the primary cause for the symptoms was anxiety as opposed to delusions and obsessive thoughts, 2) that the symptoms were primarily linked to social situations, and 3) social avoidance. A more detailed account of the symptoms of social phobia can be found in the ICD-10 diagnostic criteria for research protocols (WHO, 1993). This manual explicitly required a fear of attracting other people's attention and of being embarrassed, as well as significant avoidance. Furthermore, the manual listed specific symptoms of anxiety, such as blushing and shaking, as well as fear of vomiting, and required that the individual identified the fear as unreasonable.

The ICD-10 criteria of social phobia appear similar to the criteria of DSM-IV (1994). However, contrary to DSM-IV, the ICD-10 specified types of fear and physiological reactions. Furthermore, the ICD-10 employed separate classifications for adult and childhood social anxiety disorder. Such differences raised the question of whether prevalence rates could be influenced by the diagnostic criteria employed in each study. For example, Rocha et al. (2005) administered computerised clinical interviews to diagnose social phobia in a sample of 1,221 Brazilians aged over 18 years. The authors found that the percentage of the diagnoses based on the DSM-III-R criteria was significantly higher than that based on ICD-10 criteria regardless of gender.

1.3. Epidemiology, onset, comorbidity, and demographic factors in social phobia

Following the above, interpretation of epidemiological studies should take into account certain methodological issues. For example, some studies used DSM-III criteria while others used DSM-III-R and DSM-IV criteria. Even though all versions of the DSM appeared to focus on a central fear of embarrassment, nevertheless there were several differences (e.g., in terms of the generalised and specific types of social phobia, the requirement for insight, and more). Such differences could have influenced prevalence and comorbidity rates.

Furthermore, the use of community-based or clinical samples could have influenced the generalisability of results. Finally, several studies had not assessed demographic factors that could have affected prevalence rates (e.g., the inclusion of rural and urban areas). Nevertheless, most studies provided information about the age and gender of their samples.

1.3.1. Prevalence and the impact of culture and age

According to the DSM-IV (1994), social phobia has a lifetime prevalence of 3% to 13%. In line with this, a replication of the National Comorbidity Survey in the USA with a sample of 9,282 English speaking participants reported a lifetime prevalence of 12.1% (Kessler et al., 2005). Moreover, Stein and Kean (2000) found that in a USA community sample, lifetime prevalence of social phobia was 13% (7% for specific speaking fears and 5.9% for generalised social phobia), whereas overall one-year prevalence was 6.7%.

Nevertheless, in Europe the rates appear to be lower. In a European sample that included 18,980 individuals from the UK, Germany, Italy, Portugal, and Spain (1994-1999), social phobia (DSM-IV) occurred in 4.4% of the population (Ohayon & Schatzberg, 2010). Prevalence was slightly higher for specific fears (6% for fear of public speaking, writing, or eating in front of others, and 5.4% for fear of saying foolish things or being unable to answer questions).

Other studies have indicated that prevalence may be lower in Eastern and Asian countries. For example, a community-based study in Iran screened 25,180 individuals with DSM-IV (1994) criteria for social phobia. The authors (Mohammad-Reza, Ahmad, Mohammad, & Bitar, 2006) found that 0.82% fulfilled the criteria for social phobia. Furthermore, in a community-based study in Korea that utilised DSM-III criteria (1980), only 0.53% of the population had the disorder. However, DSM-III (APA, 1980) classified social phobia as fear of only one social situation.

Contrary to the above, a study (Pakriev, Vasar, Aluoja, Saarma, & Shlik, 1998) conducted in Udmurt Republic in a sample (N = 855) composed mainly from Udmurts and Russians reported a 45.6% lifetime prevalence of social phobia as diagnosed with DSM-III-R (44.2% one-month and 44.2% one-year prevalence).

Moreover, a study that utilised the Liebowitz Social Anxiety Scale's (Liebowitz, 1987) clinical cut-off points found that 4.5% of an Israeli military sample of engineers and physicians had clinical levels of social anxiety (Iancu et al., 2006). These results were consistent with the culture of the country that was more Western than Eastern.

Methodological limitations could account for these differences (e.g., the use of different diagnostic criteria and their validity and reliability across cultures). Moreover, the variation in prevalence rates could be indicative of cultural differences in the symptoms of social phobia. For example, in Asian countries, such as Japan, social phobia could be related to an excessive fear of offending others (Taijin Kyofusho) rather than to a fear of scrutiny. Furthermore, Melka et al. (2010) found that the structure of two broadly used questionnaires for social anxiety differed between a European-American (N = 900) and an African-American (N = 376) sample. However, even with the new structures, the European-American sample scored higher in both questionnaires compared with the African-American sample.

Additionally, there are some indications that prevalence could decrease with age (Ohayon & Schatzberg, 2010). Consistently, in an Iranian population, social anxiety disorder was more prevalent in the ages of 18-25 compared with older ages, regardless of gender (Mohammad-Reza et al., 2006). Nevertheless, no age effect was found in a Korean population (C. K. Lee et al., 1990), whereas other studies did not examine the potential influence of age (Iancu et al., 2006; Pakriev et al., 1998). Furthermore, in a sample of older people divided in groups of 70 years and of 78 years and above, prevalence was 3.5% (Karlsson et al., 2009). However, 1.9% of the sample had social anxiety disorder that fulfilled all the diagnostic criteria of DSM-IV (1994) and an additional 1.6% fulfilled the criteria expect the required insight (recognising the fear as unreasonable or excessive). There were no gender and age differences.

Following the above, it could be that social anxiety disorder is not as prevalent in the older ages as in the younger ages. However, if age had an impact on the criterion for insight, it could be that social anxiety is equally prevalent in the elderly as in the younger ages.

1.3.2. Onset

DSM-IV (1994) reported that social phobia occurs in mid-teens and sometimes in childhood. This is mainly because during these ages people are expected to develop social skills. In line with this, one study (Heimberg, Stein, Hiripi, & Kessler, 2000) separated a community USA sample in categories based on people's dates of birth. Then, it estimated the respective ages of onset for social anxiety disorder and for specific social fears. The authors found that the prevalence of comorbid social anxiety disorder was greater in the younger cohorts compared with the older cohorts. However, this was not significant for fear of speaking. Regarding speaking fears, onset was most frequent in teenage years and most rare after 20 years of age. However, in general social fears, onset was mainly at pre-teen years and continued to occur after 20 years of age (mid-20s). This study suggested that in recent times, there has been an increase in the diagnosis of social anxiety disorder. However, onset remained related to pre-teen years.

1.3.3. Comorbidity

In terms of comorbidity, social anxiety disorder has been found to co-exist mostly with depression, generalised anxiety disorder, specific phobias, panic disorder, and agoraphobia. In a European sample (Ohayon & Schatzberg, 2010), 19.5% of social phobic individuals had comorbid major depressive disorder and 38.3% had other anxiety disorders, such as posttraumatic-stress disorder, generalised anxiety disorder, and panic disorder. In an Iranian sample (Mohammad-Reza et al., 2006), the most common comorbid disorder was specific phobias that occurred in 66.7% of the social phobic population.

In addition to anxiety and mood disorders, social phobia was associated with substance use problems. In a longitudinal study with a USA sample diagnosed with DSM-III-R criteria, social anxiety disorder at childhood and adolescence was predictive of alcohol and cannabis dependence at 30 years of age. This was independent of gender, mood disorders, conduct disorder, other anxiety disorders, and alcohol use at time one. In particular, children and adolescents with social anxiety disorder were 1.56 times more likely to develop alcohol dependence and 1.94 times more likely to develop cannabis dependence than non socially anxious individuals (Buckner et al., 2008). This study suggested that social anxiety disorder could be a risk factor for substance dependence but not for substance abuse. This could be because socially anxious individuals depended on substances to reduce their anxiety in social situations rather than generally.

Furthermore, social phobia has been related to suicidal thinking. In the Netherlands, 4,796 individuals with obsessive-compulsive disorder, simple phobias, social anxiety disorder, agoraphobia, and panic disorder (DSM-III-R) were screened for suicidal ideation and suicidal attempts. Twenty-five percent of the socially anxious individuals reported suicidal ideation and 27.7% reported suicidal attempts (Sareen et al., 2005). This study found that social anxiety disorder was a risk factor for suicidal ideation, however the relationship between social anxiety and suicidal attempts seemed to be mediated by comorbid disorders (Sareen et al., 2005). Nevertheless, the study did not assess and control for avoidant personality disorder. Personality disorders are more likely to be linked to suicidal ideation and attempts; hence, it remains uncertain whether these results were related to social anxiety alone or to social anxiety with avoidant personality disorder.

The high comorbidity rates discussed above could be attributed to personality traits. A study on twins from a community sample based in USA found that personality traits, such as neuroticism, extraversion, and novelty seeking, had an impact on the comorbidity of internalising and externalising disorders (Khan, Jacobson, Gardner, Prescott, & Kendler, 2005). In particular, the authors found that neuroticism accounted for 20%-45% of the comorbidity in internalising disorders, such as social phobia. These results remained when controlling for gender (Khan et al., 2005). This study suggested that personality traits could affect comorbidity, however the study did not report whether the twin participants were monozygotic or dizygotic and whether there was a genetic impact on comorbidity.

1.3.4. Gender and demographic factors

The DSM-IV (1994) reported that in community-based samples, social anxiety disorder is more common in female than in male individuals. However, in clinical populations, the manual suggested that there are either equal numbers or more men.

Consistent with this, in a sample in Seoul, 1.03% women and no men had social phobia based on DSM-III (1980) criteria. Moreover, being female was found to be positively associated with social phobia (Acarturk, de Graaf, van Straten, Have, & Cuijpers, 2008; M. B. Stein & Kean, 2000). However, other studies failed to find a gender effect in general populations (Iancu et al., 2006; Pakriev et al., 1998) and in a sample of Swedish elderly people (Karlsson et al., 2009). Furthermore, cultural and social influences could have contributed to gender differences in prevalence rates.

In terms of demographic factors, social anxiety has shown greater prevalence rates in urban areas compared with rural areas in an Iranian military population (Mohammad-Reza et al., 2006). Other factors that have been positively associated with social anxiety were

absenteeism from school and lack of educational attainment (Heimberg et al., 2000; lancu et al., 2006). Nevertheless, further research with more consistent methodologies needs to examine the effect of demographic factors on social anxiety and social anxiety disorder.

1.4. Nature versus nurture, and neurobiology: the aetiology of social anxiety disorder

1.4.1. Genetic factors in social anxiety disorder

An increasing number of studies on monozygotic and dizygotic twins has offered support for the notion that social phobia is heritable. For example in Canada, Stein et al. (2002) conducted a cross-sectional questionnaire study with a large sample (N = 437) of monozygotic and dizygotic twins. Results indicated that genetic influences accounted for 42% of the variance in fear of negative evaluation, and that genetic factors influenced the relationship between fear of negative evaluation and emotional dysregulation, suspiciousness, and restricted expression. Environmental factors contributed to these relationships as well. Moreover, Gelernter et al. (2004) found that chromosome 16 had a strong link with social phobia.

1.4.2. Environmental factors in social anxiety disorder

In support of an environmental impact on social phobia, a German longitudinal study that included follow-up sessions for over ten years found that social phobia in parents was a risk factor for the development of social phobia in children (Knappe, Lieb et al., 2009). This study's objective was to explore the contribution of parental psychopathology and of parenting to the development of offspring social phobia. Hence, genetic factors were not considered. However, other anxiety disorders, depression, and alcohol abuse in parents were associated with increased likelihood for offspring social phobia.

In terms of parenting, overprotection, rejection, and reduced emotional warmth were associated with offspring social phobia (Knappe, Lieb et al., 2009). However, this result did not clarify whether it was psychopathology, overprotection, or the interaction of both that had an impact on social phobia in children. In other analyses (Knappe, Beesdo et al., 2009), the authors found that in parents who did not have social phobia, emotional warmth was an individual inverse predictor of subthreshold and of persistent social phobia in children. However when the parents had social phobia, overprotection was associated with persistent offspring social phobia. When controlling for parental psychopathology, offspring social phobia was associated with family communication, affective over-involvement, and general family functioning (Knappe, Lieb et al., 2009). In a cross-

sectional design that recruited adolescent participants between the ages of 14 and 17, Lieb et al. (2010) found similar results with the difference that lack of emotional warmth failed to reach significance. Hence, several elements of family functioning appeared to influence social anxiety disorder in children.

Furthermore, parenting behaviours were linked to interpretations of others in social situations. In particular, Taylor and Alden (2005) explored social phobic individuals' interpretations of their own and a confederate's performance in a five-minute conversation task that was either positive or ambiguous. The authors found that there was no influence of parenting styles in self-judgments. However, in the ambiguous condition, parental hostility was negatively associated with how friendly social phobic individuals perceived the confederate to be. In the positive condition, no such association was found.

1.4.3. Personality traits in social anxiety disorder

In addition to genetic and environmental factors, personality traits were found to play a role in social phobia. In a study that explored parental anxiety and overprotection along with certain personality traits, behavioural inhibition and neuroticism were predictive of social phobia in a sample of depressive patients (Gladstone, Parker, Mitchell, Wilhem, & Malhi, 2005). In further support of the role of behavioural inhibition in social anxiety, Schofield et al. (2009) found that the social rather than the non-social elements of behavioural inhibition were largely related to social anxiety. The authors found some specificity of behavioural inhibition in social anxiety. However, behavioural inhibition significantly correlated with depression and anxious arousal as well. Finally, consistent with the study of Gladstone et al. (2005), this study found that social anxiety and anxious arousal mediated the relationship between depression and behavioural inhibition (Schofield et al., 2009). Nevertheless, the latter study employed an undergraduate sample while both studies were cross-sectional and based on retrospective accounts of behavioural inhibition.

In a longitudinal design, Chronis-Tuscano et al. (2009) followed-up on 178 infants from the age of four months to the age of seven years. The experimenters collected data by observing the children in a laboratory task and by administering questionnaires and interviews to mothers. This study found that mothers' reports of high behavioural inhibition in their offspring positively predicted lifetime social anxiety disorder and marginally predicted other lifetime anxiety disorders (Chronis-Tuscano et al., 2009). Nevertheless, this study did not find a relationship between the observed behavioural inhibition and social anxiety. Perhaps the behavioural task was unable to capture all aspects of behavioural inhibition. Nevertheless, further research is required to explore the suggested

relationships between behavioural inhibition and social phobia. Overall, behavioural inhibition could be a risk factor for social phobia, along with parenting styles, and parental psychopathology.

Nevertheless, this trait is not exclusively linked to social anxiety. In effect, there is some indication that behavioural inhibition could be a risk factor for other disorders, such as obsessive-compulsive disorder (Coles, Schofield, & Pietrefesa, 2006).

In summary, genetic, environmental, and parenting factors appear to have an impact on the development of social phobia in children and adolescents. However, the relevant findings were limited by the cross-sectional design of some of the studies that did not allow for the assumption of causality. Even in the longitudinal studies, it could not be inferred with certainty whether the variables examined, such as elements of parenting, preceded or followed the occurrence of the disorder. Furthermore, differences in the criteria employed for threshold and sub-threshold social phobia may have influenced the findings. Finally, most of the parents with social phobia that participated in the studies were mothers. Hence, gender's influence in parental psychopathology may have played a role in the relationship between parental mental health and children's social phobia.

1.4.4. Neuropsychological factors

The understanding of the neurobiology and neuroanatomy of social phobia could lead to important discoveries regarding its cause and maintenance. Therefore, research in the field is growing.

First, effective use of certain psychotropic medication in the treatment of social phobia has implicated certain neurotransmitter paths in the maintenance of the disorder (Tillfors, 2004). In particular, the effectiveness of selective serotonin reuptake inhibitors (SSRI) has suggested the involvement of serotonin in social anxiety. Additionally, the use of serotonin–norepinephrine reuptake inhibitors (SNRI) has suggested involvement of norepinephrine (noradrenalin). Moreover, monoamine oxidase inhibitors have implicated both serotonin and dopamine in the neurobiological profile of the disorder.

Second, social phobic individuals have shown increased activity in the limbic system that regulates emotional responses towards threatening stimuli. For example, in a study that employed functional Magnetic Resonance Imaging (MRI), Lorberbaum et al. (2004) found that compared with non-anxious people, generalised socially anxious people that were anticipating a speech showed increased activity in the amygdala, parahippocampus, and paralimbic regions. In further support, a 3-dimensional MRI study (Irle et al., 2010)

compared social phobic individuals with healthy controls. The authors found that adult males with generalised social phobia had smaller amygdala and hippocampal volumes compared with the control group when controlling for the total brain volume. Furthermore, the decreased volume of the right hippocampal area was positively correlated with social anxiety symptoms, while the volume of the right amygdala predicted state anxiety (Irle et al., 2010). Finally, Campbell et al. (2007) found that compared with children whose parents had no anxiety disorders, children of social phobic parents indicated more brain activity in the frontal region of the brain while in a non-active state. The authors suggested that high activity in the overall frontal area of the brain could be associated with the extent to which emotions are experienced (Campbell et al., 2007).

In summary, social anxiety disorder has been linked to abnormal serotonin and dopamine functioning, as well as with increased activity in and decreased volume of areas of the limbic system. Nevertheless, these systems have been implicated in various emotional disorders. Hence, further research is necessary in order to determine neurobiological factors in social anxiety disorder in particular.

1.5. The course of social phobia, its impact on quality of life, and its economic cost

1.5.1. Lifetime course of social phobia

Studies in populations of 18-64 years of age have indicated that social phobia can be chronic with mean duration 19 (Acarturk et al., 2008) or 20 years (Wittchen, Fuetsch, Sonntag, Müller, & Liebowitz, 2000). However, in a qualitative interview study of 39 individuals with DSM-IV social phobia (mean age was 47 years), the reported duration was 29 years (Chartier, Hazen, & Stein, 1998).

In addition to its chronic nature, social phobia has shown low probability rates of recovery. In a longitudinal study that took place in the USA, 182 individuals with DSM-IV diagnosis of social phobia (18 to 65 years old) participated in a study with follow-up periods of six months, 12 months, and yearly for the subsequent five years. The results indicated a low probability of recovery with 62 participants achieving remission. All the people who reported remission were receiving some type of treatment (medication, psychotherapy, or combined). This could indicate that social phobia is unlikely to improve in the absence of treatment. Another study that examined 140 individuals with DSM-III-R social phobia (of which 127 were in some type of treatment) reported even lower probability rates for recovery (.11 for full recovery, .25 for partial recovery, and .43 for minimal recovery) regardless of the type of social phobia (Reich, Goldenberg, Vasile, Goisman, & Keller, 1994).

Furthermore, social phobic individuals have reported that the disorder has a stable course. Through a series of open interviews, Chartier et al. (1998) found that individuals with social phobia experienced their symptoms as stable with no apparent “on-off” patterns. However, the qualitative design of the study did not allow for generalisation of the findings. Rather, it indicated the need for replication and further investigation.

1.5.2. Social phobia’s impact on quality of life

Following the above, the persistent course of social phobia could have an enduring impact on people’s quality of life. Two studies (Wittchen & Beloch, 1996; Wittchen et al., 2000) have shown that social phobic people were more likely to be single or divorced and unemployed compared with a control group of non-social phobic individuals with herpetic infections. Furthermore, Wittchen et al. (2000) conducted a study that compared groups of social phobia, comorbid social phobia, subthreshold social phobia, and non-phobic people with recurrent herpetic infections. The results showed that compared with the control group, the social phobia groups reported greater alcohol use, nicotine dependence, and consumption of cigarettes and were more severely impaired in terms of their general health, social functioning, general mental health, and vitality. The number of social fears positively correlated with the severity of the difficulties. In line with this, another study (Acarturk et al., 2008) on 7,076 people of 18-64 years found that the number of fears was associated positively with decreased quality of life and with more help-seeking behaviour.

Additionally, Stein and Kean (2000) found that social phobia was associated with problems in daily activities and in interpersonal relationships, and with reduced productivity for at least one day within the past month. These results remained when controlling for age, gender, and social status. Lifetime social phobia was associated with failing a grade, dropping school early, and reduced income.

In addition to a negative impact on people’s daily activities, relationships, and occupational life, social phobia might also influence people’s sexual life. For example, one study showed that 47% of a group with premature ejaculation disorder had DSM-III-R social phobia, compared with 9% of the control group. This difference was significant. Further analysis revealed that social phobia and the level of education were individual predictors of premature ejaculation disorder (Tignol, Martin-Guehl, Aouizerate, Grabot, & Auriacombe, 2006). Hence, there is some indication that social phobia could be a risk factor for difficulties in sexual functioning.

The impact of social anxiety on quality of life could be compared with that of other disorders. In a cross-sectional psychometric study that recruited 17 people with generalised anxiety disorder, 23 people with panic disorder, and 27 people with social phobia, Barrera and Norton (2009) found that all groups reported greater dissatisfaction with their quality of life compared with a non-anxious community sample. The diagnosis had no effect on quality of life.

1.5.3. The economical burden of social phobia

In terms of the economical burden associated with social phobia, a study in the Netherlands indicated that DSM-III-R social phobia was associated with higher costs than those of non-clinical conditions. These costs were attributed to indirect non-medical costs, such as days off work. Increased number of fears was associated with greater costs. Depression and simple phobias accounted for direct medical costs (e.g., visits to the physician) and for direct non-medical costs, such as transportation (Acarturk et al., 2009). More research needs to provide estimations of economic costs relevant to each country's economy.

1.6. The maintenance of social phobia

The following section explores various approaches that attempted to unravel the maintaining factors of social phobia. First, learning theories of fear and phobias are considered, followed by the social skill deficit hypothesis. Then, the thesis expands on the cognitive models of Beck et al. (1985), Clark and Wells (1995), and Rapee and Heimberg (1997). Finally, this section focuses on a meta-cognitive perspective (Wells and Matthews, 1994) of emotional disorders and its potential implications in social anxiety.

1.6.1. Learning theories of fear and phobias

According to classical conditioning (Pavlov, 1927), human behaviours could be viewed as learnt responses to external stimuli. This theory was derived from experimenting on the digestive system of dogs and was based on the discovery that a dog's instinctive response (salivation) to a relevant stimulus (food) could be elicited by an unrelated stimulus (a sound), as long as the latter was combined with the former for a sufficient amount of time. In brief, according to classical conditioning, a conditioned stimulus elicits a physiological response. An unconditioned stimulus is one that has no such potential. However, if the two stimuli are combined for a prolonged period of time, the physiological response can become conditioned to the unconditioned stimulus.

For example, in the well known case of little Albert, Watson and Rayner (1920) conditioned the child's aversive response towards a loud noise (conditioned stimulus) to furry animal toys (unconditioned stimuli). More specifically, the experimenters presented Albert with furry toys (a rat, a rabbit, and a dog). On Albert's effort to approach the toys, a loud sound was produced behind the child's head. Albert's aversive response to the sound was conditioned to the furry toys, and was generalised to real animals and other furry objects (such as a coat and Watson's hair) after approximately 20 days. The experimenters assumed that these responses would be chronic but had no means of testing that, given that Albert was removed from the experimental centre. This experiment provided support for the notion that conditioning theory can explain human fear responses. However, the experimenters did not have the opportunity to try to reverse these effects.

Thorndike (1933) observed that animals (and humans) tried different things before settling to the response that was most beneficial. This approach led to the integration of the concepts of reward and punishment. Skinner (1938) explored the concepts of positive and negative reinforcement, and of punishment and extinction (operant conditioning). Reward was expected to reinforce behaviour, while punishment to reverse or eliminate it. However, Mowrer (1960) argued that even though reward could reinforce behaviour, punishment often failed to reduce it. He proposed that neurotic behaviours were the result of avoidance. In particular, according to the two-factor learning theory (Mowrer, 1960), emotions, such as fear and guilt, mediated the stimulus-response sequence. Therefore, a conditioned stimulus could evoke an emotional response, such as fear. This emotion would then become a stimulus and evoke avoidance behaviours. Such behaviours maintained neurosis. Therefore, according to this model, elimination of avoidance behaviours should reduce neurosis and enable problem solving.

Nevertheless, Seligman (1971) argued that certain unconditioned stimuli failed to produce fear responses when combined with conditioned stimuli. This was contradictory to conditioning theory that assumed that any event (any stimulus) could become an unconditioned stimulus. Noticeably, Seligman (1971) provided as an example the case of little Albert to illustrate that the fear was conditioned to the furry toys but not to Watson who was conducting the experiment. According to Seligman's (1971) preparedness theory, this was because certain fears are prepared to be conditioned due to their importance in the evolution of the species. For example, some stimuli were threatening to our survival (e.g., snakes, certain sounds, etc), while other stimuli might have been irrelevant or even beneficial. The latter could be linked to fears termed unprepared and contra-prepared, respectively. These fears were assumed to be more difficult to develop and easier to overcome. Consistent with this approach, Ohman and Mineka (2001) argued

that phobias were “prepared conditioning fears” characterised by: 1) selectivity (only certain input were able to elicit the response), 2) automaticity, 3) encapsulation (the fear response would take place and complete its circle regardless of interference), and 4) a specialised neural circuit.

Although compellingly straightforward, the above approaches failed to account for neurotic or fear responses that had no obvious link to an initial traumatic event or experience. Moreover, the above learning theories overlooked the role of cognition and information processing mechanisms in human behaviour. Additionally, learning theories failed to account for the cases where stressful and traumatic events failed to lead to the development of phobias. Accordingly, Rachman (1977) discussed a three pathway theory according to which a fear can result from aversive experiences, explicit acquisition, or the transmission of information.

Regardless of their narrowness, learning theories led to the development of behavioural interventions that were broadly applied in the field of mental health, including dealing with social fears. These are discussed in section 1.7 that evaluates the evidence of the therapeutic interventions applied in social phobia.

1.6.1.1. Empirical evidence for learning theories

A detailed account of the empirical support for the above behavioural approaches is outside the scope of this thesis. Suffice to note that most of these theories derived from experiments on animals, such as dogs, rats, and monkeys. Behaviourists believed that to understand human behaviour, psychology should focus only on observable (objective) behaviours, such as instincts and habits. Therefore, their experiments were based on controlled laboratory conditions. This could account for the difficulty in generalising their findings to complex human behaviour in natural environments.

1.6.2. The social skills deficit hypothesis

One account of the maintenance of social phobia proposed that the disorder is attributable to social skills deficits (Curran, 1979). According to this approach, social phobic individuals lack adequate social skills; hence, their performance is impaired in social situations. This triggers the fear that others will negatively evaluate their performance, hence increasing anxiety and the need to avoid social situations. Social skill deficits could be the result of dysfunctional personality traits (e.g., shyness and behavioural inhibition) or of environmental factors.

Social skills refer to verbal and non-verbal communication. For example, socially anxious individuals might not engage in appropriate eye contact and might experience difficulties in initiating and sustaining a conversation (Culbert, Klump, Jonathan, Dean, & Steven, 2007). Hence, social skills training involves role play and in-vivo exposure that promote the practice of social behaviours (e.g., making appropriate eye contact, asking questions, disclosing information about the self, etc), as well as assertiveness training (Wilkinson & Canter, 1982).

1.6.2.1. Empirical evidence for the social skills deficit model

In line with this approach, several studies found that socially anxious individuals have social skill impairments. The situations explored were mainly conversations with confederates and speeches. For example, in conversations with a stranger, male socially anxious individuals displayed less appropriate gazing than low socially anxious controls (Beidel, Turner, & Dancu, 1985). Moreover, Baker and Edelmann (2002) compared people with social phobia, people with other anxiety disorders, and non-clinical controls that participated in a conversation with a female confederate. The authors found that the social phobia group engaged in less eye contact than the control group, and in more gesturing than people with other anxieties and controls. Additionally, social phobic individuals were perceived as less adequate in speech fluency and overall performance, compared with the control group. Nevertheless, some social phobic participants performed as well as the most efficient people from the non-clinical control group and some non-clinical participants performed to the same level as the least efficient participants of the social phobia group.

In further support of this approach, Wenzel et al. (2005) found that compared with non-anxious controls, socially anxious individuals exhibited more behaviours labelled as “very negative” (e.g., blaming) in a discussion of a problem with their romantic partner. Furthermore, the social anxiety group displayed fewer positive behaviours (e.g., complimenting) than the control group regardless of whether the discussion was about a problem, a neutral issue, or a positive characteristic of their relationship.

However, other studies failed to find social skills deficits in socially anxious and social phobic individuals (Farrell, Mariotto, Conger, Curran, & Wallander, 1979; Newton, Kindness, & McFadyen, 1983). It could be that different social situations are associated with different impairments. For example, one study found that social skills deficits were observed in a conversation task, whereas a speech task was associated with negative interpretations (Voncken & Bögels, 2008). Nevertheless, the following models offer an alternative explanation for the maintenance of social anxiety: maladaptive cognitions.

1.6.3. Beck et al.'s (1985) cognitive perspective of anxiety disorders

Beck et al. (1985) suggested that emotional disorders are maintained by the interaction of cognitive, emotional and behavioural events fuelled by self-knowledge stored in long term memory. This knowledge stems from previous experiences and forms a cognitive set of assumptions and rules for living (schemas). These schemas incorporate rigid and inflexible beliefs about the self, others, and the world. Upon exposure to threat, the cognitive set is activated, and the assumptions and rules are triggered leading to negative appraisals, selective attention to the negative, negative feelings, and behavioural responses (fight, flight or freeze).

In particular, Beck et al. (1985) categorised social anxiety in evaluative anxieties characterised by a central fear of negative evaluation. According to this theory, one of the factors that aggravate the fear is social status. This refers to the individual's perception of the self's and the evaluator's status. Perceiving one's status as inferior is likely to produce more anxiety and avoidance, whereas perceiving one's status as superior is likely to increase self-confidence. The socially anxious individual is likely to perceive her/his social status as inferior.

Furthermore, the model focused on people's estimations about their skill and on self-confidence. Such perceptions were negative and were suggested to inhibit appropriate action, to exaggerate anxious predictions and catastrophising, and to increase avoidance behaviours. In contrast to the social skills deficit theory's assumption that social phobic people actually lack social skills, Beck et al.'s (1985) model highlighted the belief that one's own social skills are inadequate. Other maladaptive cognitions included exaggerations of physical symptoms, a fear of being trapped, and anticipations of negative judgments by others.

Another important factor was the appraisal of the consequences of negative social experiences. Beck et al. (1985) broadly referred to this as "punishment". This concept included anticipations of disasters and of potential harm to the "social self" as well as estimations of the likelihood that these catastrophes could happen. These beliefs are discussed in more detail in Section 1.6.5 (Rapee and Heimberg's model, 1997)

Furthermore, the model discussed certain rigid rules that dictate how one should behave (speak, stand, etc) at all times. These rules serve to decrease the likelihood that "punishment" takes place. Hence, the individual believes that the rules should be adhered to in all social situations and under all circumstances.

Moreover, the social phobic individual was suggested to have certain conceptions of her/his “public self” or “social image”. Such conceptions involved the individuals’ opinions about what other people think of them. According to the model, on experiencing this “social image”, the person feels that her/his shortcomings are exposed. Such exposure is associated with feelings of shame (Beck et al. 1985). This “social image” is distinguished from the “observer perspective self-image” proposed by Clark and Wells (1995). The latter involves a self-impression or visual image of the self as if viewed by other people’s eyes. This image is fuelled mainly by one’s current physical sensations, and is negative and distorted. The observer perspective self-image is discussed in Section 1.6.4.

Moreover, Beck et al.’s (1985) model discussed the influence of automatic, primitive responses to threat. In social anxiety, the model implicates the parasympathetic system and physiological responses of “freezing”, such as going blank. These reactions inhibit normal thinking and can interfere negatively with performance.

Finally, the model focused on the individuals’ “protective” behaviours, such as avoidance, escape, and hiding. These behaviours offer short-term relief but in the long-term, they reinforce negative interpretations and negative behaviours.

In brief, this approach suggested that several cognitive, physical, and behavioural factors maintain social anxiety. The cognitive factors included rigid rules, predictions about potential social catastrophes, misinterpretations of bodily sensations, and interpretations of one’s social status as inferior. The physical factors included primitive physiological responses to threat, such as freezing, as well as physiological symptoms of anxiety. Finally, the behavioural factors involved avoidance, escape, and counter-productive protective behaviours. Following the above, this approach created several scientific hypotheses that are discussed below.

1.6.3.1. Empirical support for Beck's cognitive model

1.6.3.1.1. The role of early experiences in social anxiety disorder

Beck et al.'s (1985) approach suggested that early experiences (e.g., family circumstances, school experiences, etc.) played a role in the development of schemas.

In support of this, previous sections discussed the potential impact of parenting (especially of overprotection and lack of emotional warmth) on the development of offspring social anxiety disorder. Moreover, in a comparison between 50 social phobic individuals without comorbid disorders and 120 non-anxious controls, Bandelow et al. (2004) found that separation from one or both parents was an individual predictor of social anxiety disorder. Furthermore, social phobic individuals were more likely to report traumatic experiences, including violence and sexual abuse, parental marital problems, and unemployment of the mother compared with non-anxious controls.

Additionally, in a series of semi-structured interviews with 22 social phobic people, 21 individuals reported that in social situations, they experienced a self-image that was linked to a specific memory (Hackmann, Clark, & McManus, 2000). All the reported memories were negative and had taken place in school or in family situations. Twelve participants reported that they subsequently became anxious and 17 that their anxiety worsened after the event. The memories were mainly about being criticised or about being the focus of attention, as well as about parental indifference or having been bullied (Hackmann et al., 2000). In addition, in a sample of people with major depressive disorder, Gladstone et al. (2006) found that participants who had been bullied were more likely to have comorbid social anxiety disorder and agoraphobia compared with participants with no such experience. Nevertheless, in this study (Gladstone et al., 2006), behavioural inhibition was the only individual predictor of social phobia. Therefore, it could be that temperamental inclinations, such as behavioural inhibition, are risk factors for the disorder, while early experiences, such as bullying, are triggers.

Following the above, more research is necessary to explore whether certain experiences are linked to social anxiety disorder. Consistent with the generic cognitive approach (Beck et al., 1985), several traumatic or stressful memories were linked to the onset or the maintenance of social anxiety disorder. Nevertheless, the extent to which these experiences were associated with the development of maladaptive schemas remains unclear. Hackmann et al. (2000) indicated that memories could be linked to the self-image that social phobic individuals experience in social situations. However, this study was based on retrospective memories that could have been biased. Therefore, further studies

are required to examine whether certain experiences are associated with maladaptive schemas and self-impressions in social anxiety.

1.6.3.1.2. The role of core-beliefs in social phobia

Another hypothesis that derived from Beck et al.'s (1985) approach was that maladaptive self-beliefs and assumptions played a role in the maintenance of anxiety disorders. The model suggested that such beliefs reinforce negative automatic thoughts, negative feelings, avoidance, and safety behaviours. However, not much research has investigated these hypotheses.

One study (Hinrichsen, Waller, & Emanuelli, 2004) explored the potential relationship between unconditional core-beliefs (e.g., "I am worthless") and social anxiety disorder in people suffering from eating disorders. The authors found that individuals with comorbid social anxiety reported stronger core beliefs themed around abandonment and emotional inhibition compared with participants without social phobia. On the contrary, participants with comorbid agoraphobia reported mainly beliefs about vulnerability to harm. This study offered preliminary support to the notion that core beliefs contribute to social anxiety in people with eating disorders.

In social anxiety, one cross-sectional study explored the relationships between core beliefs (early maladaptive schemas), social phobia, and other disorders (Pinto-Gouveia, Castilho, Galhardo, & Cunha, 2006). The results showed that the social phobia group and a mixed group of other anxiety disorders (panic disorder and obsessive-compulsive disorder) scored higher on most schemas compared with the control group (general population). However, social phobic individuals scored higher than the group with other anxieties on schemas that themed around social disconnection and rejection (e.g., shame, guilt/failure, social undesirability, social isolation, and mistrust/abuse). Moreover, shame, mistrust/abuse, emotional deprivation, and unrelenting standards predicted fear of negative evaluation (Pinto-Gouveia et al., 2006).

This study suggested a role of early maladaptive schemas in social anxiety. However, more research is necessary to investigate the potential contribution of these schemas on the cognitive and behavioural mechanisms of social anxiety disorder. Furthermore, this study found an age difference between the social phobia and the control group that was not controlled for in the analyses. Finally, combining two anxiety disorders in one group may have confounded the results.

1.6.3.1.3. Interpretations, information processing, and maladaptive behaviours

Beck et al.'s (1985) approach incorporated research that investigated various beliefs and interpretations in social anxiety. As discussed above, some of these beliefs referred to negative consequences of social events and to the importance that social phobic individuals attribute to social evaluation. A contemporary model of social phobia (Rapee and Heimberg, 1997) has distinguished these beliefs as central to the activation of the maintaining cycles of social anxiety. This model produced certain hypotheses about the role of such beliefs in social phobia. Section 1.6.5 discusses these hypotheses and the relevant empirical evidence. Moreover, section 1.6.5 elaborates on the suggestion that attentional bias plays a role in social anxiety. Beck et al. (1985) related such bias to the activation of schemas. However, Rapee and Heimberg (1997) view this as part of the individual's effort to make an accurate judgment of her/his social performance and of the likelihood that this will reach other people's standards.

Furthermore, Beck et al.'s (1985) approach referred to misinterpretations of bodily sensations. Clark and Wells' (1995) model (discussed below) defined these within the framework of self-processing, hence illuminating the mechanisms that could lead to such interpretations. Section 1.6.4 evaluates the relevant evidence base.

Finally, all the models discussed here emphasise the important role of avoidance behaviours in maintaining social anxiety. The relevant evidence is presented in Section 1.6.4.

1.6.4. Clark and Wells' (1995) cognitive model of social phobia

The investigation of information processing mechanisms in anxiety disorders led to the development of more sophisticated models of social phobia. For example, drawing on a meta-cognitive model of emotional disorders (Wells & Matthews, 1994), Clark and Wells' (1995) cognitive model of social phobia placed emphasis on processes, such as rumination, worry, and self-focused attention.

More specifically, in addition to maladaptive conditional and unconditional beliefs, and high standards, this model implicated three cognitive mechanisms in the maintenance of social anxiety disorder. These are anticipatory processing, focusing on an inner image from an observer perspective, and post-mortem processing.

The model assumes that socially anxious individuals hold inflexible negative beliefs about the self. These can be unconditional, such as “I am worthless”, and conditional, such as “If I show signs of anxiety people will think I’m weird”. Moreover, the model implicates perfectionistic standards, such as “Any sign of anxiety is a sign of weakness”. These beliefs are underlying and are activated upon entering a challenging or threatening situation.

Anticipatory processing refers to worrying prior to entering a social situation. According to this model (Clark & Wells, 1995), social phobic individuals anticipate the worst possible outcomes, predict failures, construct negative self-images, and recollect past failures. Anticipatory processing could lead to avoidance and to the use of safety behaviours (Wells, 2007). Moreover, anticipatory processing could predispose the individual to enter the situation in a self-focused state.

Self-focused attention is central in the model of Clark and Wells (1995). On entering the social situation, the individual becomes self-focused and aware of bodily sensations and of emotional symptoms of anxiety. Frequently, a self-image or impression develops while being self-focused. This image is from an observer perspective, as if it reflects what other people can see. However, this self-impression is usually biased and distorted. In effect, the image is based on misinterpretations of bodily sensations, such as interpreting normal sweat as extremely excessive.

The post-mortem involves dwelling on past social events. It is a ruminative process of analysing previous experiences in terms of perceived wrongdoings and shortcomings. This process is biased because the information processed is collected in a self-focused state. Hence, potential disconfirmatory information (e.g., positive social feedback) might not be accessible.

Finally, Clark and Wells (1995) emphasised the role of avoidance behaviours that feed back to the maintenance cycles by preventing the individual from disconfirming their anxious predictions and maladaptive beliefs.

The following sections discuss the empirical support for the model regarding the role of: a) misinterpretations of bodily sensations, b) worry and anticipatory processing, c) rumination and the post-mortem, and d) self-focused attention and the observer perspective self-image.

1.6.4.1. Empirical support for Clark and Wells' cognitive model

1.6.4.1.1. Interpretations of bodily symptoms of anxiety

A growing body of research has offered support for the notion that interpretative biases play a role in social anxiety. For example, Anderson and Hope (2009) examined 85 social phobic and 285 non-anxious adolescents (13-17 years). Participants had their blood pressure measured while taking part in a speech and in a conversation. The objective ratings of anxiety were not different between the two groups. However, the social phobic group scored higher in self-report measures of anxious arousal and anxiety sensitivity. Hence, this study indicated that social phobic adolescents overestimated their physiological responses.

Furthermore, Wells and Papageorgiou (2001b) found that when social phobic individuals were informed that their heart rate had increased during a conversation task they reported an increase in anxiety, self-focus, and level of negative beliefs. On the contrary, anxiety, self-focus, and negative beliefs decreased when participants were informed that their heart rate had decreased. The feedback was artificial and did not represent actual rate. Hence, manipulation of the interpretations of bodily symptoms could influence anxiety, belief levels, and attentional processes.

1.6.4.1.2. Worry and anticipatory processing

Clark and Wells' (1995) model asserted that worry maintained social anxiety. Worry has been defined as "a chain of thoughts and images, negatively affect-laden, and relatively uncontrollable" (Borkovec, Robinson, Pruzinsky, & DePree, 1983, p.10). It correlates with anxiety, tension, and physiological symptoms, such as upset stomach and muscle tension (Borkovec et al., 1983).

Furthermore, worry has been associated with difficulty in attentional control, public self-consciousness, and social anxiety (Pruzinsky & Borkovec, 1990). In a psychometric study that employed people with generalised anxiety, non-anxious individuals, and people with subthreshold generalised anxiety, Borkovec and Roemer (1995) explored people's beliefs about the reasons of worry. All groups reported that worry motivated them to take action, prepared them for negative outcomes, and enabled them to avoid the situation or prevent a negative outcome. In a second study, the authors (Borkovec & Roemer, 1995) found that people with generalised anxiety disorder scored higher than non-worried anxious and non-anxious individuals in a scale that attributed worry to an effort of getting distracted from more emotional issues.

The above studies offered consideration to the role of worry in emotional problems. However, Clark and Wells (1995) identified a type of worry that characterises social phobia in particular. The authors termed this anticipatory processing and the remaining section examines the evidence base for its role in social anxiety.

1.6.4.1.2.1. The nature of anticipatory processing in socially anxious individuals and its impact on state anxiety

Vassilopoulos (2004) conducted a questionnaire study and found that high socially anxious individuals engaged in anticipatory processing more than low socially anxious individuals. Moreover, individuals with high social anxiety were more likely to experience intrusive and involuntary thoughts while anticipating a social event. Participants described these thoughts as troubling and negative, and as interfering with their concentration. Additionally, high socially anxious individuals reported that these thoughts involved negative predictions and increased their negative feelings (Vassilopoulos, 2004).

Hinrichsen and Clark (2003) conducted semi-structured interviews with high and low socially anxious people and found that people with high social anxiety were more likely to perceive that anticipatory processing negatively influenced their mood and confidence. The content of anticipatory processing appeared consistent with Clark and Wells' (1995) model and included anxious predictions, negative recollections, and urges to avoid. Moreover, in a second study, Hinrichsen and Clark (2003) invited high and low socially anxious individuals to participate in a public speaking task. The authors asked participants to engage either in anticipatory processing or in a distractive non-threatening task before the speech. The results showed that compared with distraction, anticipatory processing was associated with higher levels of anxiety. Furthermore, prolonged anticipatory processing (20 minutes) was associated with an increase in anxiety levels, whereas distraction of equal duration was followed by a decrease in anxiety. These effects were observed only in the socially anxious group.

In further explorations of anticipatory processing, Vassilopoulos (2005a) conducted an experiment that employed a facilitated anticipatory processing condition and an inhibited anticipatory processing condition. He found that anxiety increased in the facilitated condition and decreased in the inhibited condition. In addition, using a paradigm with questionnaires and vignettes of social situations, Vassilopoulos (2008a) found that high socially anxious individuals were more likely to engage in maladaptive strategies while anticipating a social event.

The above studies offer support to Clark and Wells' (1995) assertion that anticipatory processing exists in social anxiety and can influence state affect.

1.6.4.1.2.2. Anticipatory processing and memory bias in social anxiety

To explore Clark and Wells' (1995) suggestion that anticipatory processing involves recollections of negative experiences, Mansell and Clark (1999) asked participants with high and low social anxiety to allocate negative and positive words in three categories: public self-referent (someone else thinks that about them), private self-referent (they think that about themselves) and other referent (it characterises someone else). Then, they told half of their sample that they would have to give a speech. The results showed that people with high social anxiety recalled fewer positive public self-referent words than people with low social anxiety. However, both groups recalled more positive than negative private self-referent words in the threat anticipation condition compared with the non-threat condition. This could have been a coping mechanism to adjust for the social threat.

In contrast to the above, Mellings and Alden (2000) did not find significant differences in recollections between high and low socially anxious individuals. These authors asked participants to take part in a social interaction. The following day they told half of their sample that they would need to participate in another social interaction and assessed retrieval of negative experiences. The findings showed that participants did not differ in their retrievals. However, high socially anxious participants reported an underestimation of performance that remained unchanged at Time 1 and Time 2. Therefore, the authors suggested that in social anxiety there could be an encoding bias (possibly reinforced by the post-mortem) rather than a retrieval bias.

Following the above, it appears that the study conducted by Mellings and Alden (2000) was more ecologically reliable. In effect, these authors created a laboratory version of a social event during which the sequence of mental events was in agreement with the cognitive model of social anxiety disorder (Clark & Wells, 1995). Therefore, the conversation was followed by a period of possible rumination and memory bias was measured by assessing retrieval of relevant experiences. On the contrary, Mansell and Clark (1999) administered a threat and measured retrieval of previously processed words. However, neither study assessed actual anticipatory processing.

In addition, Hinrichsen and Clark (2003) investigated several aspects of anticipatory processing through semi-structured interviews with high and low socially anxious participants. Contrary to Mellings and Alden (2000), Hinrichsen and Clark (2003) found that people with high social anxiety were more likely than low socially anxious people to

recollect negative past events while anticipating a social event. Nevertheless, this study was based on memories of the experience of anticipatory processing. In brief, these studies found some memory bias in social anxiety disorder; however, it remains uncertain how this bias could be associated with anticipatory processing.

In further exploration, Vassilopoulos (2005a) found that high socially anxious individuals that were inhibited from engaging in anticipating a forthcoming social event recalled more negative and fewer positive words than high socially anxious individuals that were facilitated.

In terms of this unexpected result, the author proposed that biased retrieval could be reinforced when anticipatory processing is inhibited rather than when it is prolonged and facilitated. In that case, inhibition of anticipatory processing may have operated as thought suppression therefore enhancing the possibility of negative intrusions. Moreover, the author (Vassilopoulos, 2005a) suggested that anticipatory processing may be an adaptive way of preparing for forthcoming challenging situations. However, this seems unlikely given that anticipatory processing has been linked to increased anxiety and anxious predictions (Hinrichsen & Clark, 2003; Vassilopoulos, 2004). Nonetheless, it is likely that the differences were due to methodological variations. For example, Vassilopoulos (2005a) instructed participants to predict what might go well or bad, and to try and recall past experiences. Hinrichsen and Clark (2003) provided instructions that were more consistent with the model's (Clark & Wells, 1995) notion of anticipatory processing (e.g., to think of the worst-case scenarios and of possible reactions to potential embarrassment). Therefore, it is likely that the balanced instructions allowed participants to engage in adaptive preparation techniques whereas the negative instructions led to worry.

1.6.4.1.2.3. A summary of the role of anticipatory processing in social anxiety

The above studies offer support for Clark and Wells' (1995) assertion that "social phobic people often report considerable anticipatory anxiety... As they start to think about the situation, they become anxious and their thoughts tend to be dominated by recollections of past failures, by negative images of themselves in the situation, and by predictions of poor performance and rejection" (Clark & Wells, 1995, p. 74). In previous sections (Section 1.6.3), anxious predictions and catastrophic interpretations were classified according to their content and to Beck et al.'s (1985) cognitive theory of maladaptive schemas. However, according to Clark and Wells' (1995) model, these predictions could be manifestations of worry. It could be that, like generally anxious people (Borkovec & Roemer, 1995), socially anxious individuals engage in worry to avoid more stressful topics. However, this could reflect a meta-cognitive belief (i.e., that worry could direct

attention away from distressing issues). In effect, as described later, a meta-cognitive approach, the Self-Regulatory Executive Function (S-REF) model (Wells & Matthews, 1994) offers an alternative explanation and predicts that meta-cognitive beliefs could regulate and maintain anticipatory processing in social phobia.

1.6.4.1.3. Rumination and post-mortem processing

The term rumination refers to chained thoughts about one's negative feelings and sensations, as well as to cognitions about the consequences of such feelings (Nolen-Hoeksema, 2004). This type of thinking has been linked to depressive mood, hence the term depressive rumination. Post-mortem processing (also referred to as post-event processing) is suggested to involve ruminations about the perceived reasons of certain past social behaviours (Clark & Wells, 1995). Furthermore, the post-mortem involves negatively oriented recollections of social events and thoughts about negative personal consequences. The two thinking patterns (rumination and the post-mortem) appear similar in their function though different in their content. To address this, a study in social phobic individuals assessed post-mortem processing and rumination after an initial therapeutic session (CBT) and after an idiosyncratic in-session exposure task. The results showed that in both tasks, social phobia and not rumination was an individual predictor of post-mortem processing. A correlation analysis showed that social anxiety correlated with the post-mortem, while depression correlated with rumination and the post-mortem. Post-mortem processing did not correlate with rumination (Kocovski & Rector, 2008).

Furthermore, in another study (Cody & Teachman, 2010), high and low socially anxious individuals participated in a speech and received false but standardised feedback. Then, they completed a series of measures immediately after and two days after the speech. The results showed that post-mortem processing and not general rumination correlated with memory biases regarding negative feedback items (Cody & Teachman, 2010). Therefore, the two processes appear to be distinct.

1.6.4.1.3.1. The relationship between the post-mortem and social anxiety

Consistent with Clark and Wells' (1995) model, a plethora of studies has shown that post-mortem processing contributes to social anxiety. For example, Rachman et al. (2000) assessed post-mortem processing through interviews and found that it was positively associated with social anxiety. Mellings and Alden (2000) found that post-mortem processing, assessed one day after a social interaction task, was associated with social anxiety, and Kocovski et al. (2005) found that high socially anxious individuals were more likely than low socially anxious individuals to engage in the post-mortem after a 'social

error'. Moreover, Dannahy and Stopa (2007) compared high and low socially anxious individuals in terms of their engagement in post-event processing immediately after a conversation with a confederate and one week later. They found that high socially anxious individuals engaged in more post-event processing. Furthermore, in both groups, post-mortem processing appeared to decrease over time.

Additional studies found that the post-mortem predicted social anxiety (Abbott & Rapee, 2004; Field, Psychol, & Morgan, 2004; Kocovski & Rector, 2008). Moreover, Lundh and Sperling (2002) examined diaries of stressful social events and the following post-mortem. The authors divided the data according to the nature of social events (generally stressful social events and social events that related to negative evaluation). The results showed that social anxiety was positively associated with post-mortem processing only for the situations that involved negative evaluation. Nevertheless, the post-mortem processing that took place one day after the event predicted further post-mortem processing in the following day regardless of the nature of the social situation (Lundh & Sperling, 2002).

Following the above, the post-mortem appears to be associated with social anxiety and social evaluative events. However, it has been associated with depression as well (Edwards, Rapee, & Franklin, 2003; Kashdan & Roberts, 2007). Nevertheless, one study found that participants scored higher in post-mortem processing following social situations compared with phobic situations, therefore indicating some specificity to social anxiety (Fehm, Schneider, & Hoyer, 2007).

Nevertheless, in a clinical sample, McEvoy and Kingsep (2006) administered a questionnaire of post-mortem processing along with measures of depression and anxiety and found that social anxiety measures did not correlate with the post-mortem. In particular, only anxiety and depression showed significant correlations with the post-mortem, while only state anxiety was an individual predictor and explained a significant proportion of variance in post-mortem processing. It could be that the measure used to assess post-mortem processing was not reliable in a clinical sample; however, replication is necessary.

1.6.4.1.3.2. The post-mortem, other cognitions and state anxiety

Apart from its relationship with mood and social anxiety, other studies have explored the potential link between post-mortem processing and belief systems. For example, post-mortem processing was positively associated with underestimations of performance in social situations (Abbott & Rapee, 2004) and with negative appraisals of performance over time (Dannahy & Stopa, 2007). In a study with social phobic individuals, performance

appraisals and social anxiety were individual predictors of rumination one week after a 3-minute speech. This result remained when controlling for general anxiety and depression (Abbott & Rapee, 2004).

In a psychometric study (Kocovski, Endler, Rector et al., 2005), the content of post-mortem processing was assessed following imaging of making social 'mistakes'. The authors assessed upward counterfactual thoughts that were based on an 'if only' rationale that things should have been done differently. Furthermore, they targeted downward counterfactual thoughts that were 'at least' statements about things achieved, things that could have gone worse, and the fact that a challenge was over. The findings suggested that upwards counterfactual thought characterised the post-mortem in people with social phobia.

The above findings suggest that the post-mortem is associated with underestimations of performance, as well as with "if only" counterfactual thoughts. However, the nature of these associations was not investigated. That is it remained unclear whether such appraisals and thoughts maintained the post-mortem or whether the post-mortem gave rise to such cognitions. To the authors knowledge, one study (Wong & Moulds, 2009) addressed this and found that rumination appeared to maintain unconditional beliefs in social anxiety.

In terms of affective states, Vassilopoulos (2008b) employed high and low socially anxious individuals and instructed them to engage either in an experiential focus or an analytical focus task. In particular, the experiential condition involved focusing on one's current experience whereas the analytical condition involved focusing on the perceived causes of such experience. The latter involved an element of ruminative thinking (focusing on the reasons of feelings and sensations). The author (Vassilopoulos, 2008b) found that high socially anxious participants in the analytical focus condition reported maintained levels of anxiety throughout the task whereas high socially anxious participants in the experiential condition reported decreased anxiety after the task. Furthermore, in the high social anxiety group, analytical focus was associated with less positive thinking compared with the experiential condition. Similarly, Wong and Moulds (2009) found that high and low socially anxious participants reported maintained anxiety after a rumination task, whereas the groups that participated in a distraction task reported decreased anxiety.

In review, post-mortem processing appears to be associated with poor appraisals of performance, less positive thinking, and upwards counterfactual thoughts, as well as with state anxiety in social situations. However, the context of social events could influence the relationship between post-mortem processing and affect. In particular, Kashdan and

Roberts (2007) found that following a personal disclosure condition, post-event rumination was associated with increased negative affect. However, following a superficial conversation, the reverse relationship was found.

1.6.4.1.3.3. Post-mortem processing and memory biases

Similar to findings about anticipatory processing, studies on the relationship between the post-mortem and memory have shown contradictory results. For example, one study found that post-mortem processing was associated with recollections of negative self-referent information (Mellings & Alden, 2000) one day after a social interaction task. Another study found an association between the post-mortem and recurrent, intrusive memories that were not welcome (Rachman et al., 2000). However, Edwards et al (2003) did not find a correlation between recollections of negative feedback and rumination via a free recollection task immediately after and one week after a 3-minute speech. Moreover, Field et al. (2004) found that in high socially anxious individuals, post-mortem processing was associated with more calming (though not necessarily positive) and fewer shameful memories than in low socially anxious individuals. Therefore, the authors (Field et al., 2004) suggested that social phobic individuals could be using the post-mortem to decrease distress.

More recently, Cody and Teachman (2010) asked high and low socially anxious individuals to participate in a speech and provided them with feedback about their performance and about a confederate's performance. The results showed that high socially anxious participants had more positive recollections about the confederate's feedback than about their own. Moreover, this group's recollections of positive feedback diminished over time compared with low socially anxious individuals that seemed to maintain their memories of positive feedback and to remember negative feedback as better than it was. Finally, the authors found that the post-mortem significantly positively correlated with biased recollection and recognition of negative feedback and mediated the relationship between social anxiety and recognition of negative feedback (Cody & Teachman, 2010).

1.6.4.1.3.4. A summary of the role of post-mortem processing in social anxiety

In review, the above studies found that the post-mortem predicted further post-mortem processing, and was associated with negative affect and negative appraisals about one's performance. More research is necessary to explore the relationship between the post-mortem and memory bias. However, it appears likely that post-mortem processing plays a role in the recollection of self-referent information such that it reinforces the negative and

diminishes the positive. Furthermore, it appears possible that certain calming or soothing memories are triggered during post-mortem processing in socially anxious individuals.

1.6.4.1.4. Worry versus rumination: similarities and differences

An important question concerns the extent to which anticipatory processing and the post-mortem are similar or distinguishable processes. The assumption that worry and rumination are analogous enables the examination of this broader area.

With respect to this, Watkins et al. (2005) provided participants with lists of worries and ruminations. These lists derived from broadly used questionnaires about worry and rumination. However, neutral words (e.g., thought, thinking) replaced the words “worry”, “dwelling on”, and “rumination”. Subsequently, the authors asked participants to identify one worry and one ruminative thought that preoccupied them and to rate them according to the listed intrusions and appraisals. They found that worry appeared to last longer, to be more upsetting and disturbing, and more future oriented than rumination. Rumination was perceived as more realistic and oriented towards the past compared with worry (Watkins et al., 2005). According to the authors, these results indicated that worry and rumination show more similarities than differences and that any differences were quantitative rather than qualitative (Watkins et al., 2005). Nevertheless, this study employed a measure that had not been tested for its psychometric properties.

Contrary to above, Fresco et al. (2002) examined the structure of two questionnaires of general worry and rumination. They found three main Factors: 1) engagement in worry, 2) dwelling on negative cognitions, and 3) absence of worry. Similarly, in a sample of depressed individuals, Goring and Papageorgiou (2008) found that the structure of worry and rumination involved four Factors: 1) tendency to worry, 2) tendency to analyse, 3) dwelling on negative feelings, and 4) absence of worry.

Hence, it appears that certain statements were distinguishable in terms of whether they related more to worry, rumination, or the absence of worry. Moreover, worrying and ruminative thoughts appear to differ in terms of content, time orientation, and subsequent behaviours. For example, a study by Papageorgiou and Wells (1999b) examined daily thought records in an undergraduate sample and found that worry (anxious thoughts) was more verbal than rumination (depressive thoughts). Furthermore, worry was associated with greater compulsion to act upon the thoughts and greater efforts to problem solve. Rumination was more past-oriented compared with worry (Papageorgiou & Wells, 1999b). In a brief review of the relevant literature, Papageorgiou (2006) presented the results of a similar study (Papageorgiou & Wells, 1999a) that compared worrisome thoughts of people

with panic disorder with depressive thoughts of people with major depressive disorder. The results showed that rumination was perceived to last longer, to be more uncontrollable, past-oriented, and harder to dismiss. Worrisome thoughts were associated with greater efforts to problem solve and greater confidence in problem solving.

Additionally, worry and rumination can influence affect in different ways. In effect, Muris et al. (2005) studied 73 undergraduate students to explore the correlations between personality traits, worry, rumination, anxiety, and depression. They found that worry correlated more with anxiety than with depression, whereas rumination correlated with both affects to the same extent. A mediation analysis showed that when controlling for gender, neuroticism had an impact on depression and on anxiety via rumination and worry. When controlling for neuroticism, the correlation between worry and rumination diminished. Therefore, it could be that neuroticism mediated the relationship between worry, rumination and mood, and accounted for the association between worry and rumination. This would suggest that the two processes were distinct. Moreover, a study with 337 healthy adolescents (Muris, Roelofs, Meesters, & Boomsma, 2004) found that worry predicted depression. Rumination was a predictor of depressive mood until worry was entered in the equation. Furthermore, worry was an individual predictor of anxiety, along with negative attributions. Again, rumination predicted anxiety until worry was entered in the model. Following these results, it could be that worry fully mediated the relationship between rumination and mood. On the contrary, Fresco et al. (2002) found that rumination and worry correlated with anhedonic depression and with anxiety to the same extent. However, rumination correlated with anxious arousal and with depression to a greater extent than worry.

Additionally, in a longitudinal study (Calmes & Roberts, 2007), 451 college students completed a series of self-report measures of worry, anxiety, depression, and rumination twice within six to eight weeks. The authors found that symptom-related rumination was an individual predictor of depression and anxiety. In this model, worry predicted anxiety but not depression (Calmes & Roberts, 2007). Therefore, it could be that certain elements of rumination and worry predict different emotional states.

Following the above, it appears that worry and rumination are differentiated by their content, their time orientation, their function, and their relationship to certain emotional states. Further research is necessary to explore the similarities and differences of anticipatory processing and the post-mortem in social anxiety disorder as they can be viewed as analogues of worry and rumination, respectively.

1.6.4.1.5. Self-focused attention and focusing on an inner image from an observer perspective

1.6.4.1.5.1. Self-consciousness and social anxiety

Clark and Wells' (1995) conceptualisation of social anxiety emphasised the role of self-processing. In social situations, the model highlighted a shift of attention towards the self. This approach advances on previous findings that implicate broader concepts of self-processing, such as self-consciousness, in social anxiety.

For example, Fenigstein and his colleagues (1975) developed a measure of the consistent tendency to focus attention towards the self (trait self-consciousness). Examination of the measure's structure (the Self-Consciousness Scale) indicated three main Factors: Private self-consciousness that referred to focusing on one's inner thoughts and feelings, public self-consciousness that referred to experiencing the self as a social object, and social anxiety that was considered a consequence of self-consciousness. Hope and Heimberg (1988) extended these findings by exploring self-consciousness in people with social anxiety disorder that participated in a simulated idiosyncratic social situation. The authors (Hope & Heimberg, 1988) found that public self-consciousness correlated with measures of social anxiety. Moreover, there was an association between private self-consciousness and social anxiety. However, this relationship diminished when controlling for public self-consciousness. Similarly, a cross-sectional study with undergraduate students found that public self-consciousness correlated with fear of blushing and with blushing propensity, but not with the frequency of blushing (Bögels, Alberts, & de Jong, 1996). Moreover, blushing propensity and focusing on one's anxious arousal predicted fear of blushing (Bögels et al., 1996). In contrast, a cross-sectional study with a large sample of Australian clerical workers found that both private and public self-consciousness correlated with social anxiety and with each other (Monfries & Kafer, 1993). However, this study did not conduct partial correlations to control for the relationship between the two types of self-consciousness.

Another study (Jostes, Pook, & Florin, 1999) explored self-reported self-consciousness in people with social phobia, panic disorder, obsessive compulsive disorder, and bulimia. They found that even though public and private self-consciousness were evident in other disorders, nevertheless social phobic individuals reported the highest scores on both concepts (Jostes et al., 1999).

1.6.4.1.5.2. Self-focused attention in socially anxious individuals

The above concept of self-consciousness referred to the tendency to focus on perceptions about the self's appearance, performance, and public image. However, Clark and Wells (1995) implicated the state of self-focused attention in social anxiety. This state is viewed as an information processing mechanism.

Consistently, self-focused attention and related concepts, such as public self-awareness (awareness of the self as a social object), have been associated with social anxiety, fear of blushing, and social anxiety disorder (Bögels & Lamers, 2002; Hope, Gansler, & Heimberg, 1989; Lundh & Öst, 1996; Woody, 1996).

Moreover, studies that employed the dot-probe paradigm that targets attentional bias for threatening stimuli have found increased self-focused attention in high socially anxious individuals compared with low socially anxious individuals. In particular, high socially anxious people showed increased vigilance towards internal information (a sensation on their finger) compared with external information (images of faces) in a modified dot-probe paradigm (Mansell, Clark, & Ehlers, 2003). Moreover, a similar paradigm that employed images of heart-rates and images of faces indicated attentional bias towards the heart rates that participants were led to believe were their own (Pineles & Mineka, 2005).

Additionally, self-focused attention has been associated with: 1) the elimination of the 'self-serving bias'; thus leading to increased responsibility taking for failures and decreased responsibility taking for successes (Hope, Gansler, & Heimberg, 1989), 2) an increase in negative thoughts and beliefs, especially about mistakes (Hartman, 1983; Lundh & Öst, 1996), and 3) negative interpretations about one's performance (Hartman, 1983; Woody, 1996).

However, a study that manipulated self-focused attention with the use of mirrors while performing a social task found that self-focus did not interfere with people's anxiety, self-reported blushing, and worries about performance (Bögels, Rijsemus, & De Jong, 2002). This could have been due to the presence of the mirror that enabled participants to correct their self-impressions.

In terms of self-awareness, in a cross-over design, George and Stopa (2008) found that independent of condition (mirror or camera) public self-awareness was associated with increased anxiety in a conversation task in high and low socially anxious people. However, private self-awareness decreased for the low socially anxious people and was maintained in the high social anxiety group. Hence, it could be that social situations are

associated with increased public self-awareness in high and low socially anxious people, whereas high social anxiety is associated with the maintenance of private self-awareness.

The above results indicate a role of self-consciousness and self-focused attention in social anxiety, state anxiety, and social attributions. Hence, successful treatment of social anxiety should have an impact on self-focused attention. In effect, Woody et al. (1997) found that reductions in self-focused attention after cognitive-behaviour therapy were associated with reductions in self-judgments and in anxiety during in-session behavioural tasks. Moreover, in a study that employed group exposure therapy, participants reported fewer negative self-focused thoughts after treatment compared with before (Hofmann, 2000). Thoughts were elicited via a thought-listing task.

Additionally, specific techniques that target self-focused attention should be effective in reducing anxiety and social distress. In line with this, Zou et al. (2007) found that instructions to focus on the task at hand (a conversation) rather than on the self were associated with reductions in state anxiety in people with high social anxiety. In another study, Wells and Papageorgiou (1998) found that exposure combined with instructions of being externally focused was more effective in reducing anxiety and negative beliefs compared with exposure alone.

However, these studies either instructed participants to direct their attention toward the task (Zou et al., 2007) or manipulated attentional focus during exposure (Wells & Papageorgiou, 2001b). Interventions that directly target attentional focus could show a greater effect.

In line with this, a case study (Wells, White, & Carter, 1997) showed that negative beliefs and anxious arousal decreased with attention training (Wells, 1990) and reached their initial levels with a body-focus task. Furthermore, they decreased again when attention training was re-introduced. Due to the limited sample size, further research is necessary to determine whether attention training could be beneficial in the treatment of social anxiety disorder.

1.6.4.1.5.3. The observer perspective self-image

As a manifestation of self-focused attention, Clark and Wells (1995) implicated negative self-imagery in social anxiety. In particular, the authors observed that socially anxious individuals focused on a negative self-image while in social situations. This experience involved taking other people's presumed perspective about the self. The model suggested that focusing on the observer perspective self-image could increase state anxiety and

direct attention away from external cues and potential positive feedback (Clark & Wells, 1995).

In line with this, one study examined the recollected images of social phobic patients and non-patients regarding social and non-social events. The results showed that the social phobia group reported self-images from an observer perspective in social situations and from a field perspective in non-social situations. In contrast, the non-clinical group reported a field perspective in both social and non-social situations (Wells, Clark, & Ahmad, 1998).

In an extension of this study, Wells and Papageorgiou (1999) interviewed people with social phobia, agoraphobia, and blood/injury phobia. The authors found that participants with social phobia reported significantly greater observer perspective in stressful social events compared with the other groups. However, agoraphobic individuals indicated a similar pattern, probably due to their social-evaluative concerns. Additionally, only social phobic individuals reported a shift from an observer to a field perspective in neutral situations. People with agoraphobia reported an observer perspective in both social and non-social situations.

1.6.4.1.5.3.1. The characteristics and origins of the observer perspective self-image

Hackmann et al (1998) explored the nature of self-imagery in a clinical and a non-clinical sample. Social phobic individuals reported having more, and more frequent spontaneous self-images before and while in the social situation than the control group. Furthermore, social phobic individuals' images were more likely to be visual, negative, distorted and from an observer perspective. At a subsequent study, Hackmann et al (2000) found that the self-images experienced by social phobic individuals were mostly based on visual perceptions, less frequently based on bodily sensations and sounds, and not at all on smells or tastes. An interesting finding was that 96% of the sample reported a memory that they felt was linked to their recurrent self-image, and 57% of them reported no social anxiety before that event.

The above studies offered preliminary support to the notion that social phobic individuals experience an observer perspective self-image that appears to be visual, distorted, and from an observer perspective. It is worth noting that an association between the observer perspective self-image and social anxiety has been found in an adolescent population as well (Hignett & Cartwright-Hatton, 2008).

1.6.4.1.5.3.2. The causal role of negative imagery in social anxiety

Further studies have aimed to explore causality between negative self-imagery and social anxiety. In particular, individuals with social phobia who participated in conversations whilst holding their usual, negative self-image in mind showed increased idiosyncratic symptoms and higher anxiety, and were more likely to underestimate their performance compared with socially anxious individuals who held a more positive image in mind (Hirsch, Clark, Mathews, & Williams, 2003). Furthermore, individuals with high confidence in giving speeches displayed more negative thoughts and higher levels of anxiety when primed with a negative self-image than when primed with a positive one (Hirsch, Mathews, Clark, Williams, & Morrison, 2006). Another study showed that holding a negative self-image in mind while performing a computerized task was associated with a block in non-threatening inferences (Hirsch, Mathews, Clark, Williams, & Morrison, 2003). This result suggested that focusing on a negative inner image could prevent high socially anxious people from generating positive or non-threatening inferences.

1.6.4.1.5.3.3. The effect of the observer perspective self-image on affect, attributions, performance, and memory

George and Stopa (2008) found that high socially anxious individuals that focused on their observer perspective inner image while participating in a conversation reported more anxiety than those who did not exhibit such self-focus. In low socially anxious individuals, positive attributions were associated with a decrease in anxiety and in the observer perspective inner image. Moreover, both high and low social anxiety groups showed an association between the observer perspective inner image and an underestimation of performance (George & Stopa, 2008).

Moreover, holding a negative, rather than a positive, self-image in mind was associated with more anxiety and anxious predictions, and with worse performance in a speech (Stopa & Jenkins, 2007). Furthermore, in an autobiographical memory task that followed the speech, participants that held the negative image were slower at retrieving positive memories compared with negative, whereas the participants that held the positive image were slower at retrieving negative memories compared with positive. This result remained when controlling for depression, hence indicating that negative self-imagery may play a role in catastrophic predictions and memory biases.

1.6.4.1.5.3.4. A summary of the role of the observer perspective self-image in social anxiety

The above studies investigated the presence and nature of the perspective taken by socially anxious or social phobic individuals in social situations. The results supported the assertion that experiencing self-images from an observer perspective is implicated in social anxiety (Clark & Wells, 1995). These images seem to be distorted and negative. Moreover, the images were associated with state anxiety, negative beliefs about one's performance, poor performance, and biased retrieval. Additionally, manipulation of the self-image had an effect on state anxiety in social situations, hence suggesting a causal role of negative self-imagery in social anxiety.

1.6.4.1.6. Avoidance of social situations and safety behaviours

Finally, the cognitive model (Clark & Wells, 1995) suggested that certain behaviours were involved in the maintenance of the disorder. In support of this, Wells and Papageorgiou (1998) found that exposure combined with a rationale that supported the dismissal of safety behaviours was associated with greater reductions in negative beliefs and anxiety compared with exposure alone. However, in this study participants reported the expectation that exposure without safety behaviours would be more beneficial than exposure alone. Such expectations could have influenced the outcome. Nevertheless, Kim (2005) also found that exposure was more effective when combined with a reduction in safety behaviours.

Further support for the role of safety behaviours in social phobia derived from a study that employed semi-structured interviews (McManus, Sacadura, & Clark, 2008). The authors compared 20 high socially anxious with 20 low socially anxious people in terms of their reported safety and avoidance behaviours. Both high and low socially anxious groups considered safety behaviours beneficial to the same extent. However, socially anxious people used such behaviours more.

In a second study (McManus et al., 2008), the authors explored whether exposure with and without safety behaviours would be associated with reductions in anxiety, anxious appearance, and overall performance during two 5-minute conversations. The results showed that regardless of the order of delivery and regardless of social anxiety group, participants believed that they appeared more anxious and rated their negative beliefs higher during exposure with safety behaviours compared with exposure without safety behaviours. Furthermore, they performed better in the condition that did not incorporate safety behaviours. Nevertheless, the low socially anxious group indicated better

compliance with the instruction of dropping safety behaviours compared with high socially anxious people. Furthermore, the instructions required that participants engaged in safety behaviours and in self-focused attention, hence it did not control for the relationship between these two variables. Moreover, this study instructed participants to dismiss commonly used safety behaviours and not idiosyncratic ones (McManus et al., 2008).

Taylor and Alden (2010) employed high socially anxious students that participated in 5-minute conversations while either engaging in or reducing idiosyncratic safety behaviours. The authors found that participants' self-judgements were less negative and more accurate in the exposure task without safety behaviours. There was no difference in post-task anxiety and in the observers' judgements. Taylor and Alden (2010) also examined social phobic outpatients. Results showed that both participants' and observers' judgements were less negative and more accurate in the exposure without safety behaviours condition. Furthermore, exposure without safety behaviours was associated with greater reductions in the estimated probability that a negative social event might happen. There were no differences between the two conditions in post-task anxiety.

Further studies offer additional support for the role of avoidance and safety behaviours in social anxiety. Okajima et al. (2009) conducted a cross-sectional study to explore the potential associations between social anxiety, safety behaviours, and avoidance. The authors found that in non-anxious individuals, the relationships between safety behaviours and social anxiety were weak, whereas only certain measures of social anxiety correlated with avoidance to a moderate degree. However, in the social phobic group, social anxiety correlated with safety behaviours and with avoidance to a moderate degree, with the exception of a weak relationship between fear of negative evaluation and avoidance. The differences between the two groups were significant for safety behaviours, but not for avoidance.

1.6.4.1.6.1. A summary of the role of behaviour coping strategies in social anxiety

In review, socially anxious individuals appear to employ more safety behaviours compared with non-anxious individuals. However, these behaviours are counter-productive and research suggests that exposure interventions could benefit from a rationale that reinforces the abandonment of such behaviours. Finally, avoidance and safety behaviours exhibit moderate associations with social phobia.

1.6.5. Rapee and Heimberg's (1997) cognitive model of social phobia

This model placed in its core the beliefs that other people are essentially critical and that positive evaluation by others is extremely important. According to this model, these beliefs underlie the main maintaining factors of the disorder, along with beliefs about negative consequences of social events.

On encountering a social situation, socially anxious individuals are expected to engage in maladaptive processing of self-related information. Such information can be internal and external. Hence, the authors suggested that the information processing system is "multi-tasking".

The internal information derives from a focus on the self. In particular, on entering a social situation, the individual's attention is automatically oriented towards a mental representation of the self. This representation or "social image" derives from information stored in long-term memory (e.g., photographs, social feedback). However, it is constantly updated by new information from current experiences. This new information can be based on physical symptoms as well as external cues. Hence, the social image is changeable depending on environmental influences, social experiences, and bodily sensations.

This image appears to share certain similarities with Clark and Wells' (1995) observer perspective self-image. In effect, both concepts appear to be linked to self-focused attention and to be influenced by misinterpretations of bodily sensations. However, Clark and Wells' (1995) self-image is defined mainly as an actual visual image; a caricature of the self that gets habitually and spontaneously triggered in social situations. This image was found to be negative, distorted, and from an observer perspective, as well as linked to specific memories of negative experiences (Hackmann et al., 2000; Hackmann et al., 1998; Wells et al., 1998). This seems to challenge Rapee and Heimberg's (1997) prediction that the self-image is fluid and constantly updated.

In addition to self-focused attention, Rapee and Heimberg (1997) emphasise the role of biased external attention. The model proposes that socially anxious individuals selectively attend towards negative evaluative information. Given that others are perceived as critical, the individual scans the environment for signs of negative judgment (failure to reach expectations). Hence, their attention is split in internal and external processing. These processes increase situational anxiety and avoidance behaviours that further reinforce the maintaining cycles of the disorder.

In summary, in social situations, the socially anxious individual focuses on a mental representation of the self. In parallel, the individual scans the external environment for signs of negative evaluation (negative social feedback). The presumed expectations of other people and the representation of the self influence the individual's judgments regarding the likelihood that she/he can perform in a way that could reach other people's expectations. In addition, predictions about the negative consequences of the social event are increased. Rapee and Heimberg (1997) suggested that the above factors are activated in social situations. However, the authors highlighted that the same cycles take place when anticipating a forthcoming social event and when dwelling on a past one.

1.6.5.1. Empirical support for Rapee and Heimberg's (1997) cognitive model

1.6.5.1.1. Anxious predictions about social events

This model suggests that beliefs about the consequences of social situations play a role in social anxiety. To explore this, Wilson and Rapee (2005a) conducted a cross-sectional study that assessed beliefs about the consequences of negative social events. The authors found that when controlling for depression, negative beliefs about the consequences of social events were individual predictors of social anxiety. In another study, the authors (Wilson & Rapee, 2005b) found that reductions in these beliefs were associated with reductions in self-reported social phobia after group cognitive-behaviour therapy. However, there was no association between reductions in these beliefs and the severity of symptoms rated by clinicians.

Moreover, Taylor and Wald (2003) compared groups of people with generalised social anxiety disorder, posttraumatic stress disorder, and panic disorder with agoraphobia. The authors found that compared with the other groups, social phobic people reported lower expectations for positive and higher expectations for negative social events. There was no difference between the groups in expectations for non-social events.

1.6.5.1.2. Self-attributions in social situations

Additionally, Rapee and Heimberg (1997) proposed that socially anxious individuals make negative judgments about their performance in relation to other people's expectations. However, such attributions are biased. In effect, Moscovitch et al. (2009) compared the self-attributions of 67 social phobic individuals and 60 non-anxious individuals. The authors explored the degree of certainty that the attribution was accurate and its estimated importance. The results showed that the control group reported greater certainty in and importance of positive self-views. However, the social phobic group reported neutral levels

of certainty and importance concerning both positive and negative self-views. Therefore, this study indicated that socially anxious people lacked the tendency to attribute more certainty and importance to positive self-judgements.

1.6.5.1.3. Selective attention to the negative

Furthermore, Rapee and Heimberg (1997) suggested that in addition to being self-focused, social phobic individuals selectively attend to negative external information. Therefore, they are prone to detect and identify negative social feedback or to misinterpret ambiguous interactions as negative.

Several studies have offered support to the notion that such attentional bias plays a role in social anxiety disorder. For example, computerised tasks, such as the Stroop task (Stroop, 1938) and the dot-probe paradigm (MacLeod, Mathews, & Tata, 1986) have identified such bias toward negative information. The Stroop task has been criticised in terms of its accuracy in detecting attentional bias, as opposed to interference or cognitive preoccupation. Nevertheless, several studies have found such effect in social phobia.

1.6.5.1.3.1. Data on the emotional Stroop task

In particular, Mattia et al. (1993) examined social phobic individuals and community volunteers with a modified Stroop task that incorporated social and physical threat words matched with neutral. This task presents coloured words. Participants are asked to name the colour while ignoring the word's meaning. Slower reaction times indicate greater interference. This study found that social phobic individuals responded to emotional words more slowly compared with the control group. However, the difference between the two groups was greater for the social threat words than for the physical threat words (Mattia et al., 1993). In a second study (Mattia et al., 1993), social phobic participants followed a 12 week treatment that included medication (a monoamine oxidase inhibitor), placebo tablets, or group CBT. The authors compared people's performance in the Stroop task before and after the treatment. The results showed that regardless of treatment group, reaction times to social threat words decreased with treatment.

Another study that aimed to create a self-focused condition by the use of mirrors failed to find an interaction between self-focused attention and Stroop interference with regards to physical, social, and neutral words (Lundh & Öst, 1996). Nevertheless, this study did not assess the actual influence of the mirror manipulation. Therefore, it was not clear whether participants became self-focused and to what extent. Nevertheless, in a correlation analysis, this study found that interference in the condition of social threat words

correlated with measures of perfectionism (especially with the concern over making mistakes) and with self-consciousness. Physical threat word interference also correlated with self-consciousness.

Given the high comorbidity rates of social phobia and depression, Grant and Beck (2006) explored emotional word interference (social, depressive, neutral, and positive words) in people with social anxiety, people with dysphoria, and people with both. This study found that socially anxious individuals were slower in responding to social and depressive words compared with the remaining groups.

The above studies suggested an interference bias related to social and physical threat words that could be linked to perfectionism and self-consciousness. However, such effect could be reversed in individuals with comorbid depression.

1.6.5.1.3.2. Data on the dot-probe task

The dot-probe task (MacLeod et al., 1986) enables a more accurate investigation of attentional bias. This task presents a pair of words simultaneously (e.g., a social threat word matched with a neutral) followed by a probe (e.g., a dot). Participants are asked to respond to the probe as fast as possible by pressing a button. Faster reaction times are indicative of attention toward the previously displayed word whereas slower reaction times indicate avoidance. Several studies have shown some attentional bias toward social evaluative words in social anxiety (Asmundson & Stein, 1994; Mansell, Ehlers, Clark, & Chen, 2002; Ononaiye, Turpin, & Reidy, 2007; Vassilopoulos, 2005b). However, other studies have failed to do so (Pishyar, Harris, & Menzies, 2004). The inconsistency could be attributed to methodological variations as well as to the task's low ecological validity.

Results that are more consistent derived from studies that employed faces instead of words. These studies found that social phobic individuals might be more prone to attend to angry or negative faces compared with happy or neutral ones (Mogg, Philippot, & Bradley, 2004; Pishyar et al., 2004). However, one study found that given the choice, participants might avoid faces altogether and attend towards household objects instead (Chen, Ehlers, Clark, & Mansell, 2002). Other studies have suggested that this bias could be due to a difficulty in disengaging from the threatening stimuli rather than due to vigilance (Buckner, Maner, & Schmidt, 2010; Fox, Russo, & Dutton, 2002).

In other explorations of attentional bias in social anxiety, tasks that are more sophisticated have been employed. Moriya and Tanno (2009) investigated endogenous and exogenous attention in high and low socially anxious individuals. Endogenous attention refers to the

stimuli within one's focus whereas exogenous attention refers to peripheral information. The authors expected that social phobic individuals would be sensitive to peripheral information. Such attention bias would make them prone to detect threatening stimuli and treat it as salient information. Hence, the authors explored the two competitive types of attention with non-emotional stimuli (coloured circles and letter probes). The results showed that socially anxious individuals responded more accurately when the exogenous stimuli were of high contrast compared with low contrast. No such effect was found in the low social anxiety group. These results suggested impaired exogenous attention in high socially anxious individuals.

Another study (H.-J. Lee & Telch, 2008) explored inattentional blindness in high and low socially anxious individuals. Inattentional blindness refers to the ability to ignore certain stimuli when focusing on a particular task. More specifically, Lee and Telch (2008) administered a social threat manipulation (speech) to half participants. In the first study, they asked participants to estimate the length of cross lines. During the task, a smiling or frowning sketched face, or a plain circle would appear on the screen. Then, participants were asked if they noticed anything (detection) and whether they could recognise what that was (identification). The results showed that high socially anxious individuals who anticipated giving a speech were better in identifying the unexpected frowning stimuli than the low socially anxious group that did better in identifying the smiling stimuli.

In a second study, the authors (H.-J. Lee & Telch, 2008) employed images of actual faces. The task involved squares and ovals bouncing in the screen and participants had to count the number of times that the black squares bounced off the edges. During the task, an oval image of an angry or a happy face, or a blank oval shape would pass through the screen. This study showed that in anticipation of a speech, the low socially anxious individuals performed better than the high socially anxious people in detecting and identifying the happy face. The high social anxiety group outperformed the low social anxiety group in detecting and identifying the angry face.

Hence, social anxiety could be associated with complications in the function of attention. This could predispose socially anxious individuals to attend to peripheral information, to spot threatening stimuli even when engaged in a task, to quickly attend to faces and to be slow in disengaging from negative stimuli.

Moreover, in an ecological paradigm that simulated the event of a speech in front of an audience (Perowne & Mansell, 2002), high socially anxious individuals discriminated the members of the audience that showed signs of indifference or boredom from the members that appeared interested or neutral. Low socially anxious individuals exhibited the

reversed pattern. Nevertheless, participants processed equal amounts of positive and negative signs. Furthermore, high socially anxious people reported greater self-focused attention and less other-focused attention compared with the low social anxiety group. These results remained when controlling for dysphoria. This could be indicative of the socially anxious people's tendency to detect negative social feedback and then direct their attention toward the self. Hence, self-focused and externally focused attentional bias could be implicated in social phobia in various ways.

1.6.6. A meta-cognitive perspective

Following the above, Clark and Wells' cognitive model of social phobia (1995) appears to give a detailed account of the cognitive and attentional processes implicated in social anxiety. Moreover, research has supported several hypotheses that derived from this model. Even though this model was based in part on a meta-cognitive model of emotional disorders (the S-REF; Wells and Matthews, 1994), important elements of the S-REF model were not incorporated. In particular, Wells and Matthews (1994) proposed that meta-cognition maintains maladaptive cognitive mechanisms and the respective coping strategies. This meta-cognition involves meta-cognitive knowledge that can be expressed through meta-cognitive beliefs. Such beliefs can be positive or negative and are suggested to be associated with the maintenance of cognitive and attentional processes, such as worry and threat monitoring (Wells & Matthews, 1994).

In effect, Clark and Wells (1995) focused mainly on conditional and unconditional beliefs and on cognitive mechanisms, such as worry and rumination, while largely overlooking the meta-cognitive factors that are suggested to maintain these factors. Hence, the model could benefit from a focus on self-monitoring and meta-cognition. This section discusses previous theories of meta-cognition followed by a detailed account of the advancement of the S-REF model and its implications in social phobia.

Flavell (1979) introduced a model of cognitive monitoring, according to which self-belief systems are stored in long term memory along with meta-cognitive knowledge. This meta-knowledge refers to people's understanding of themselves as cognitive beings and includes intra-individual, inter-individual, and universal beliefs about cognitive functioning. Furthermore, the model focused on meta-cognitive activity that involves meta-cognitive experiences, goals, and actions. Flavell (1979) proposed that such activity monitored cognitive progress and triggered strategies in order to improve a function and achieve a goal.

This approach suggested that meta-cognition could play an important role in people's child development and teaching. The field of education has conducted great research on the development of meta-cognitive ability in children, as well as on ways to improve it. However, Hartman (1983) suggested that meta-cognition may play a role in emotional disorders as well. In particular, the author observed that a common factor between social phobic individuals was enhanced engagement in self-centred information processing. This type of processing involved monitoring cognitive activity in social situations. Such monitoring was meta-cognitive in nature. Therefore, Hartman's (1983) suggestions that drew from the social cognitive control theory (Carver & Scheier, 1981) was that people with social phobia engaged in excessive meta-cognitive functioning by monitoring and controlling (editing) their thoughts, feelings and behaviours in social situations. Such activity could result in anxiety and impaired social performance while it disengaged people from the task at hand. Therefore, interpretation of other people's feedback could become difficult, biased and inaccurate. Hartman (1983) moved on to propose that such biased interpretations would influence self-esteem. Therefore, social anxiety comprised two main ingredients: self-focused meta-cognitive activity and low self-esteem. The author (Hartman, 1983) suggested a therapeutic approach that focused on enabling and enhancing other-focused attention. However, it failed to provide a clear distinction between meta-cognitive monitoring and self-focused attention.

This approach attempted to address the issue about whether the schemas triggered distorted cognitive functioning or if the association was the other way around. Particularly, Hartman (1983, p. 445) proposed that "socially anxious persons tend to have many self-schemata simply because they think about themselves too often". However, the model failed to show how this could be possible. In particular, this model seemed to focus on self-focused processing as a meta-cognitive activity while not clarifying how meta-cognition influenced such processing. Furthermore, the model did not address whether this meta-cognitive activity was distorted as well as excessive. For example, it could be that social phobic individuals engage in prolonged monitoring, hence directing attention to the self, and it could be that this monitoring feeds back inaccurate information about one's functioning, hence triggering further action and self-focus (monitoring).

One general model that directly addressed the relationship between meta-cognition and cognition was proposed by Nelson and Narens (1990). In an effort to conceptualise the philosophical paradox that one person could be both the observer and the observed (Nelson, 1996), the authors suggested a model consisting of an object level and a meta-level (Nelson & Narens, 1990). The meta-level involved a representation of the object level and included a meta-cognitive library of labels of emotions and strategies. The object level provided information about the current state of the self. Such information enabled the

meta-level to control current states by actions and strategies that led to the achievement of goals. The goals were the desired emotional or cognitive states. Hence, this was a dynamic model based on the constant flow of information between the two levels.

The above models implicated meta-cognitive activity in the maintenance of emotional problems, and specifically in social anxiety (Hartman, 1983), and in schizophrenia and anger (Nelson, Stuart, Howard, & Crowley, 1999). However, Hartman's (1983) model focused mainly on self-focused processing by means of self-focused attention while overlooking other important features of social phobia, such as worry and rumination. Furthermore, this approach failed to conceptualise a model that would explain how meta-cognitive activity influences self-focused attention. Nelson and Naren's (1990) model offered a model that addressed this issue by suggesting a cyclic exchange of information between an object level and a meta-level. However, this approach failed to explain how these processes were regulated. For example, it did not discuss what strategies were stored in the meta-cognitive library.

1.6.6.1. The Self-Regulatory Executive Function Model (S-REF)

The S-REF model (Wells & Matthews, 1994) took into account the extensive research on information processing to develop a generic meta-cognitive model of emotional disorders. This model addressed the issue of self-regulation by suggesting an executive that involved several cognitive mechanisms. These mechanisms form the Cognitive Attentional Syndrome (CAS) that includes worry, rumination, threat monitoring, and counter-effective behaviours (e.g., avoidance) that are considered central to psychological disorders. Most importantly, the model suggested a crucial role of meta-cognition in the maintenance of emotional disorder.

In particular, the model proposed a 3-level architecture consisting of low-level processing, controlled processing, and a storage of meta-cognitive knowledge.

Low-level automatic processing provides information about the external environment and the current state of the self. This is mainly involuntary and automatic, and it demands minimal attention. Three types of information can enter the object level: external stimuli, information about one's bodily state (e.g., heart rate), and information about one's cognitive state. This information can enter consciousness in the form of intrusions and thoughts (Wells & Matthews, 1994).

Controlled processing (or “on-line level”) is voluntary and usually, people are aware of it. It depends on attentional resources and on the self-knowledge stored in long-term memory. In particular, this type of processing involves the execution of the mechanisms required in daily life to achieve self-regulatory goals. For example, such mechanisms are information processing and coping behaviours.

The storage of meta-cognitive knowledge (or “meta-system”, Wells, 2009) includes self-knowledge that is stored in long-term memory. This self-knowledge can be procedural and declarative. Procedural knowledge includes the meta-cognitive plans that guide the execution of the styles of controlled processing. These plans involve the rules and thinking skills necessary to direct cognition towards the reduction of the discrepancy between the perceived current state and the desired state. This desired state is the goal for the execution of the selected processing style. The goals are linked to survival and the achievement of functional and adaptive states.

Declarative self-knowledge includes meta-cognitive beliefs. Meta-cognitive beliefs are beliefs about one’s own cognition. These are distinguished in two domains: positive (e.g., worry can motivate one to take action and problem solve) and negative. Negative beliefs refer to the uncontrollability of cognitive mechanisms (e.g., worry is uncontrollable) as well as to the likelihood that these mechanisms can induce harm (e.g., too much worry can weaken one’s immune system).

Moreover, the S-REF model proposes that unconditional beliefs about the self (e.g., “I am unlovable”) are possibly involved in the storage of self-knowledge. However, it is possible that these cognitions are the results or the outcome of the activation of maladaptive procedural plans that lead to prolonged worry and rumination.

In addition to the above, at any given time, various processing configurations (i.e., patterns) can be executed at the controlled processing level. In psychological disorders, the relevant configuration is termed the S-REF (Self-Regulatory Executive Function) configuration. The S-REF involves self-processing that is usually perseverative and unable to lead to the achievement of the goal. The S-REF includes the cognitive attentional syndrome that involves mechanisms such as worry, rumination, threat monitoring, avoidance, and safety behaviours. According to the model (Wells & Matthews, 1994), excessive engagement in the S-REF and in these mechanisms is suggested to maintain emotional disorders.

Finally, the S-REF model proposes two ways of experiencing thoughts: the object-mode and the meta-cognitive mode.

On the one hand, in the object mode, the governing rule is that thoughts are the reality, therefore potential threats are objective and action is necessary (Wells, 2002). This is a mental state where mental events are experienced as facts. This is useful when confronted with a threat that requires prompt action, such as flight or fight. However, in psychological disorders, this mode dominates people's experience of thinking when threat might be absent. For example, a socially anxious individual might enter the situation thinking, "everyone is staring at me; I look ridiculous". In the object mode, this thought is experienced as a fact, thereby triggering the activation of self-processing and maladaptive coping strategies, such as avoidance and escape. In this case, self-processing would prevent the individual from assessing the "danger" and the accuracy of the initial thoughts. This is because self-processing engages attentional and information processing resources that have limited capacity by nature.

On the other hand, the meta-cognitive mode refers to the experience of thoughts as mental events. That is thoughts are experienced in a detached way, merely as thoughts rather than as facts, and can therefore be evaluated. This mode enables the examination and modification of thoughts and thinking styles, and can therefore interrupt the CAS and eliminate maladaptive coping strategies.

The S-REF model suggests that people are usually flexible and shift from one mode to another. However, in psychological disorders, individuals are mostly in the object-mode. This could be because individuals lack cognitive flexibility or an adaptive meta-cognitive plan, or because their goals are maladaptive. Hence, meta-cognitive therapy, discussed in Section 1.7.6, aims to enable individuals to acquire a meta-cognitive mode that would allow them to gain a distance from distressing thoughts, to disengage from self-processing, and to develop more adaptive ways of processing that lead to helpful behaviours.

1.6.6.2. Eliciting and measuring meta-cognitive knowledge

Following the above, the S-REF model highlighted the need to explore meta-cognitive beliefs and their role in emotional problems. In order to access such beliefs, Wells and Matthews (1994) and Wells (2002) introduced 'metacognitive profiling'. This profiling involved a series of questions that elicit meta-cognitive beliefs, coping strategies, self-focused processing, memories and judgments. For example, it enquires about the advantages and disadvantages of certain strategies and about how controllable or dangerous these are perceived to be.

Moreover, the model inspired the development of self-report measures of meta-cognitive beliefs. For example, the Metacognition Questionnaire (Cartwright-Hatton et al., 2004) and its briefer form (Wells & Cartwright-Hatton, 2004) have shown good reliability and validity. These questionnaires have been adapted to assess meta-cognitive beliefs relevant to specific problems, such as post-mortem processing in social anxiety (Dannahy & Stopa, 2007), as well as to younger age groups (Bacow, Pincus, Ehrenreich, & Brody, 2009). Moreover, new meta-cognition questionnaires have been developed to assess meta-cognitive beliefs in various emotional difficulties, such as depression (Papageorgiou & Wells, 2001b) and alcohol use (Spada & Wells, 2008). These tools enabled the investigation of the role of meta-cognitive beliefs in emotional disorders, such as obsessive-compulsive disorder (Myers & Wells, 2005), psychosis (Lobban, Haddock, Kinderman, & Wells, 2002), and alcohol abuse (Spada & Wells, 2010).

1.6.6.3. Empirical evidence for the S-REF model (Wells & Matthews, 1994)

The S-REF model offered several testable hypotheses regarding the maintenance of emotional disorders. First, the model incorporated a cognitive-attentional syndrome that involves worry, rumination, threat-monitoring, and coping strategies such as avoidance behaviours. The role of these mechanisms in social anxiety has gained substantial support that has been discussed in Section 1.6.4.

Second, the model highlighted that there should be an association between meta-cognition and pathological symptoms of anxiety and depression (i.e. the cognitive attentional syndrome). In line with this, several studies have implicated meta-cognitive beliefs in psychological disorders. For example, when controlling for ordinary beliefs (perfectionism, overestimation of threat, and responsibility), meta-cognitive beliefs about rituals along with worry were predictive of obsessive-compulsive symptoms in a sample of undergraduate students (Myers, Fisher, & Wells, 2009). These results were replicated in a community control sample (Solem, Myers, Fisher, Vogel, & Wells, 2010).

Furthermore, in a sample of people with hypochondriasis and non-clinical controls, meta-cognitive beliefs about the uncontrollability and interference of illness thoughts, and cognitive self-consciousness along with illness worries were individual predictors of a measure of hypochondriasis (Bouman & Meijer, 1999).

Additionally, in a healthy sample of volunteers, positive beliefs about worry and positive beliefs about hallucinatory voices were predictive of predisposition to auditory hallucinations (Morrison, Wells, & Nothard, 2002). Consistently, in another study

(Morrison, French, & Wells, 2007), people with psychotic disorders scored higher than non-psychotic people and than people at risk of psychosis on positive beliefs about worry.

Finally, other studies have implicated meta-cognitive beliefs in anxiety disorders (Barahmand, 2009), depression (Papageorgiou & Wells, 2001a, 2001b), post-traumatic stress disorder (Roussis & Wells, 2006), alcohol use (Spada & Wells, 2008, 2010), and generalised anxiety disorder (Wells & Carter, 2001; Wells & King, 2006).

Nevertheless, the role of meta-cognitive beliefs in social anxiety remains largely unexplored. One study (Dannahy & Stopa, 2007) tested the assertion that meta-cognitive beliefs play a role in post-mortem processing in social anxiety. The authors found that high socially anxious individuals scored higher than low socially anxious individuals on cognitive self-consciousness and on beliefs about the uncontrollability of thoughts. However, the data were not normally distributed and the measure used was not tested for its psychometric properties, therefore making interpretation difficult. Another study found that group cognitive behavioural therapy had an impact on meta-cognitive beliefs and that this impact was associated with reductions in social anxiety and depression (McEvoy, Mahoney, Perini, & Kingsep, 2009).

These results suggest that meta-cognitive therapeutic techniques might be beneficial in the treatment of social anxiety disorder. In fact, a brief therapy that focused more on S-REF was found promising in the treatment of social phobia (Wells & Papageorgiou, 2001a).

Following the above, the present PhD aimed to expand our knowledge of the role of meta-cognitive beliefs in the maintenance of social phobia. A further aim was to test whether a meta-cognitive intervention could be helpful in social anxiety.

1.7. Psychological therapy in social anxiety disorder

1.7.1. Behaviourist therapeutic interventions

According to learning theory (discussed in Section 1.6.1), fear and avoidance behaviours are conditioned responses to certain stimuli. Following this approach, Wolpe (1969) developed therapeutic interventions that aimed to weaken or eliminate this learnt response. Such intervention was “systematic desensitization” that consisted of relaxation, the construction of a hierarchy, and imaginal exposure to anxiety provoking stimuli. Relaxation training was employed as a response that could contradict the learnt fear response. Hence, the person undertaking this intervention was gradually exposed to

feared stimuli while applying relaxation techniques to reduce anxiety. Eventually, the fear response was “un-learnt” and the stimuli were unable to evoke anxiety and avoidance.

Another behavioural intervention was “flooding” that required that the person is exposed to highly distressing stimuli without applying relaxation or other anxiety reducing techniques. By learning that the stimulus does not produce negative results, the fear response was expected to be disassociated from the feared stimuli, hence reducing anxiety.

Following a different approach, that of reward and punishment (operant conditioning), a therapeutic intervention was the “token economy” (Ayllon & Azrin, 1968). According to this approach, tokens were provided to reward and reinforce positive behaviours in children.

With respect to social evaluative fears, individual (Garlington & Cotler, 1968) and group (Dawley & Wenrich, 1973) systematic desensitization has been effective in reducing test anxiety. In addition, other studies found systematic desensitization more effective than a control condition, and as effective as anxiety management (Deffenbacher & Shelton, 1978) and relaxation (Snyder & Deffenbacher, 1977). Moreover, systematic desensitization has been more effective than flooding in reducing test anxiety (Horne & Matson, 1977).

Therefore, systematic desensitization has been effective in the treatment of test and speech anxiety. However, other experimenters (Kirsch & Henry, 1977) questioned the suggested functional mechanisms of this intervention. These authors found that a non-extinction control condition that employed an aversive shock after the feared stimuli was equally effective in reducing speech anxiety as a credible placebo (systematic ventilation), and systematic desensitization. According to learning theory, elimination of the fear response when the stimuli were accompanied by the aversive shock should not be possible.

Moreover, De Silva and Rachman (1981) questioned the necessity of exposure techniques in reducing fear given that fears could also be eliminated by non-exposure interventions, such as cognitive therapy, as well as spontaneously and by administration of placebo therapies. Nevertheless, several concepts of behavioural therapy (e.g., the hierarchies and habituation) have been incorporated in current CBT therapeutic protocols for social phobia (e.g., Heimberg & Becker, 2002).

1.7.2. Social skills training

Social skills training was developed within the framework of social skills deficit theory (discussed in section 1.6.2). This training involves the development and practice of social skills (e.g., appropriate eye contact) via role-plays and in real life social situations. It has been found equally effective as rational-emotive therapy in people classified as behavioural reactors, cognitive reactors, and in non-classified people (Mersch, Emmelkamp, & Lips, 1991). This could indicate that both treatments are effective regardless of the tendency of some participants to work better cognitively or behaviourally. Furthermore, cognitively based social skills training was found to reduce anxiety and negative predictions (Lucock & Salkovskis, 1988).

More sophisticated forms of social skills training that combine cognitive and behavioural techniques have also been effective in reducing social anxiety and avoidance, and in improving some elements of performance at post-treatment (Turner, Beidel, Cooley, Woody, & Messer, 1994). Moreover, such treatment has shown further improvement in anxiety at a 2-year follow-up (Turner, Beidel, & Cooley-Quille, 1995). Finally, social skills training was found to aid cognitive-behavioural group therapy (discussed below) to reduce self-reported social anxiety, even though this anxiety did not reach the levels of the control group (Herbert et al., 2005). Following the above, social skills training and cognitive-behavioural interventions might function in a complementary manner.

1.7.3. Cognitive-behavioural group therapy (CBGT) and its individual form

Cognitive-behavioural interventions have been effective as stand-alone therapies in social anxiety disorder. In line with Beck's (1976) and Beck et al.'s (1985) cognitive-behavioural approach, CBT for social phobia incorporated cognitive restructuring and exposure techniques (Heimberg, 2002; Heimberg & Becker, 2002; Heimberg, Juster, Hope, & Mattia, 1995).

In its group form, the protocol (Heimberg & Becker, 2002) suggested an initial socialisation to the cognitive model and the development of a hierarchy. This hierarchy is a list of the least to the most feared social situations. Subsequently, the model proposed in-session cognitive restructuring (e.g., with thought records) through which the goal was to identify and dispute cognitive distortions and negative automatic thoughts. This is followed by in-session exposure combined with cognitive restructuring. Finally, the protocol included homework with in-vivo exposure. Other techniques, such as video feedback, surveys, and behavioural experiments were added to this protocol in its latest form (Heimberg & Becker, 2002).

In support of this therapeutic approach, the initial protocol that included cognitive restructuring and exposure techniques (Heimberg et al., 1990) has been more effective in the treatment of social phobia (DSM-III) than educational/supportive psychotherapy. In CBGT, participants had less clinician-rated symptom severity at post-treatment and at six months follow-up compared with the control group. More specifically, 15 of the 20 participants in the CBGT group and eight of the 20 participants in the control group reported improvements after treatment. In terms of other measures of social anxiety, both interventions exhibited equivalent efficiency at post-treatment. However, the CBGT group reported greater maintenance at six months (Heimberg et al., 1990) and at five years follow-up (Heimberg, Salzman, Holt, & Blendell, 1993). Similarly, in anticipation of and during an individualised behavioural task, participants of both groups reported less anxiety. However, the reduction was greater for the CBGT group at post-treatment and at 6-months follow-up (Heimberg et al., 1990). This group difference was not sustained in five years (Heimberg et al., 1993). The control group seemed to report greater reduction in heart rate than the CBGT group at post-treatment. Also, the control group seemed to maintain greater performance gains than the CBGT group both at six months (Heimberg et al., 1990) and at five years (Heimberg et al., 1993).

Following the above, CBGT showed some superiority to a credible supportive treatment. Nevertheless, the CBGT group comprised mostly married individuals whereas the control group consisted mostly of divorced or single individuals. Even though the authors did not find differences in the marital status between people who improved and people who did not, nevertheless other variables could have influenced the results. For example, in a different sample, being married was associated with improved quality of life compared with being divorced or single (Safren, Heimberg, Brown, & Holle, 1996). Hence, quality of life may have affected the results. However Safren et al. (1996) found that CBGT improved social phobic people's perceptions about their quality of life. Even though this improvement did not reach the levels of a non-anxious comparison sample (Safren et al., 1996), it was sustained at six months (Eng, Coles, Heimberg, & Safren, 2001).

Furthermore, CBGT was found equally effective as Clonazepam, a benzodiazepine (Otto et al., 2000), and as effective as Phenelzine, a monoamine oxidase inhibitor (Heimberg et al., 1998). However, CBGT and Phenelzine were equally effective in reducing some symptoms (e.g., severity of avoidance and performance satisfaction), whereas in the majority of measures, Phenelzine was associated with greater improvements.

Finally, Hope et al. (2000; 2006b) have developed an individual form of the above protocol. This individualised CBT has been effective in reducing social anxiety, avoidance, and disability, but not quality of life (Ledley et al., 2009). This study administered 16

sessions of 1-hour duration (apart from the first exposure session that lasted 1.5 hours). Improvements were maintained at three months without any further reductions. Reductions were observed from pre to post-treatment as well as in comparison to a waiting list condition.

The above protocols are consistent with Beck's (Beck, 1976) cognitive approach and have been efficient in the treatment of social phobia. Nevertheless, in their most recent forms (Heimberg & Becker, 2002; Hope, Heimberg, & Turk, 2006a), they were based on a cognitive model of social phobia (Rapee & Heimberg, 1997) that amongst other symptoms, highlights the importance of self-focused attention and selective attention to negative external information. Even though the above treatment protocols eventually incorporated techniques that directly targeted such processing (e.g., video feedback), the above studies did not employ such techniques. Rather, they were based on traditional forms of CBT that involved cognitive restructuring and exposure techniques.

One study (Mörtberg, Karlsson, Fyring, & Sundin, 2006) compared an intensive treatment of 41 hours (in three weeks) of CBGT with a waiting list condition. Therapy was based on Heimberg and Becker's (2002) protocol. However, the authors included socialisation exercises that derived from Clark and Wells' (1995) protocol (discussed below), and relaxation techniques. The results showed improvements in self-report measures of social phobia after treatment and at 12 months. Furthermore, this treatment was superior to the waiting list. The effect sizes were small to moderate at post-treatment (ranging between .28 and .96) and at follow-up (between .14 and 1.4) with the smallest effect size corresponding to changes in depression and the largest effect sizes corresponding to changes in the impact on daily life and in social behaviours. Nevertheless, the authors did not compare this hybrid treatment with already established protocols. Such comparisons could show whether the addition of relaxation techniques and socialisation exercises added value to the CBGT protocol. As discussed below, treatment protocols that are more closely linked to the theoretical models of social phobia might improve CBT's effectiveness.

1.7.4. A therapeutic protocol based on Clark and Wells' (1995) model

Clark and Wells' (1995) model has informed therapeutic techniques (Butler & Wells, 1995; Wells, 1997; Wells & Clark, 1997) that specifically target the suggested maintenance factors. According to the manual (Wells, 1997), socialisation to the model takes place first. Experiments follow to explore the function of self-focused attention and safety-behaviours. Furthermore, video-feedback and further experiments that prompt external focus of attention aim to reduce self-focused attention and to challenge the observer perspective

self-image. Thought records and guided discovery are employed to challenge negative automatic thoughts, while anticipatory processing and the post-mortem are addressed and diminished. Further behavioural experiments target safety behaviours and avoidance. Finally, the manual proposed several techniques to challenge maladaptive beliefs and assumptions.

To evaluate this protocol, a study compared the effectiveness of this cognitive therapy (CT) versus an SSRI (Fluoxetine) combined with exposure, and a placebo pill combined with exposure (Clark et al., 2003). The results showed that all treatments were effective in reducing self-reported social anxiety and avoidance. However, CT was associated with greater reductions, whereas the Fluoxetine and placebo conditions did not differ from each other. Furthermore, all treatments appeared equally effective in reducing anxious arousal and depressive mood. In the CT group, most improvements were maintained after 3-months of infrequent booster sessions. However, in the Fluoxetine group, further improvements were observed. Moreover, therapeutic gains were maintained at 12 months follow-up in all groups; however, the CT group remained associated with greater improvements compared with the Fluoxetine group. Finally, the study found that CT produced large effect sizes that ranged from 2.14 to 2.53, whereas Fluoxetine and exposure produced smaller effect sizes that ranged between 0.92 and 1.36 (Clark et al., 2003).

In its group form, this type of cognitive therapy (hereafter referred to as group CT) was effective in treating social phobia with a recovery rate of 70% (Borge et al., 2008). Nevertheless, the relevant effect sizes ($M = 0.74$ at post-treatment and $M = 1.06$ at 1-year follow-up) were smaller than the ones in the previous study (Clark et al., 2003). This is consistent with previous results that compared group and individual cognitive therapy (Stangier, Heidenreich, Peitz, Lauterbach, & Clark, 2003). These authors found that both forms of therapy were effective. However, individual cognitive therapy was associated with greater reductions in a self-report measure of social phobia and with a larger recovery rate compared with group therapy. Nevertheless, group CT was associated with reductions in mood and general symptoms whereas individual CT was not. Both treatments showed some superiority to a waiting list condition. Individual therapy indicated further improvement at a 10-month follow-up in contrast to group CT that showed maintenance of gains. Individual CT displayed somewhat larger effect sizes (0.25-1.77 at post-treatment and 0.46-2.34 at follow-up) than group CT (Stangier et al., 2003). The effect sizes for group CT ranged between 0.37 and 0.60 at post-treatment and between 0.59 and 0.86 at follow-up.

Moreover, Borge et al. (2008) reported that group CT and group interpersonal therapy were equally efficient in the treatment of social anxiety disorder in people who had received previous treatment unsuccessfully. Furthermore, group CT was found to be effective in “real-world” settings; that is in a community mental health clinic that treated all ages and included all comorbidities (McEvoy, 2007). In addition, this protocol in its individual and its group form was effective in improving self-directedness in people with social anxiety disorder between baseline and 1-year follow-up (Mörtberg, Bejerot, & W.A., 2007). Nevertheless, self-directedness reached the levels of the control group only in the responders to the treatment. Novelty seeking increased to the level of the control group. There were no improvements in the remaining temperamental factors that were measured.

Finally, in a case series of six social phobic individuals that undertook brief cognitive therapy, the results were promising (Wells & Papageorgiou, 2001a). The treatment was shortened on the basis of the meta-cognitive model described earlier (Wells & Matthews, 1994). In particular, the treatment did not include thought records and reduced the time spent on verbal reattribution. There was less challenging of safety behaviours and more emphasis on self-focused attention. Consistent with the original protocol, this therapy included video-feedback. Furthermore, it dealt with worry and rumination, and included behavioural experiments that challenged beliefs and negative predictions. Treatment was concluded when a certain change in participants’ self-focused attention was achieved. Participants had six months of weekly 60-minute individual sessions. The results indicated that this type of treatment was effective in reducing self-report measures of social anxiety, belief levels, self-consciousness, and depression. Nevertheless, given the limited sample size and the lack of a control group, this study should be interpreted with caution.

In further exploration of the notion that sophisticated protocols might be more effective in the treatment of social phobia, Rapee et al. (2009) compared standard cognitive behavioural therapy (cognitive restructuring and exposure), stress management without exposure, and enhanced cognitive behavioural therapy. The latter incorporated techniques specific to the cognitive model, such as video feedback and attention retraining. The results showed that more participants were free of the diagnosis of social phobia after standard and enhanced CBT at post-treatment compared with stress management. However, all techniques were equally effective in reducing safety behaviours and core beliefs (Rapee et al., 2009), while standard CBT was superior to stress management in some measures. This study did not employ a follow-up assessment so it remains unclear whether the gains were maintained in the long-term or if there had been further improvements.

Overall, therapeutic protocols that are specific to the main cognitive mechanisms in social phobia appear promising. Nonetheless, more research needs to identify the interventions that are most helpful and cost-effective.

1.7.5. A comparison between the treatments

In recent years, meta-analytic methodologies have been developed to examine how meaningful the results of treatment outcome studies are. Such meta-analyses compute the effect sizes of the treatments applied. The employment of a control group (e.g., placebo or waiting list), the outcome measures (e.g., self-report or physiological), and the inclusion and exclusion criteria are only some of the factors that could influence each trial's effect size. Given that trials with negative results might not be easily published, it is necessary to control for potential publication bias. Therefore, the following studies should be interpreted by taking into account their methodological differences and the criteria by which the authors included studies and examined their findings. All but one study (Feske & Chambless, 1995) controlled for publication bias, and all considered trials that employed people with a diagnosis of social phobia.

Feske and Chambless (1995) conducted a meta-analysis of studies on rational-emotive therapy, self-instructional training, cognitive-behavioural group therapy with and without exposure, and exposure alone. Some trials had placebo conditions (even though this was not an inclusion criterion for the meta-analysis). The various treatment conditions showed similar drop-out rates (on average 12% for cognitive-behavioural interventions and 10% for exposure alone). With respect to the uncontrolled studies, the authors found that cognitive-behavioural and exposure interventions were equally effective in reducing symptoms of depression, anxiety, and social phobia (self-report measures and thought listing) at post-treatment and at follow-up. Effect sizes ranged between 0.56 to 1.04 at post-treatment and between 0.69 and 1.10 at follow-up. In controlled studies, exposure techniques displayed larger effect sizes ($M = 1.12$) compared with CBT ($M = 0.38$) in measures of social anxiety but similar to CBT in measures of mood and cognitive symptoms (exposure; $M = 0.49-0.51$, CBT; $M = 0.51-0.55$).

However, in this analysis, two cognitive-behavioural studies had employed more appropriate control groups than waiting lists, thus decreasing their effect size. Hence, it would be safer to conclude that cognitive-behavioural and exposure techniques were broadly similar in their effectiveness in reducing social anxiety, mood, and cognitive symptoms.

Taylor (1996) examined trials that employed cognitive therapy, exposure, social skills training, cognitive therapy with exposure, placebo, and waiting list conditions. The author computed effect sizes in relation to self-report measures of social anxiety. Furthermore, the author combined group and individual forms of therapy. The results indicated that at post-treatment, the waiting list condition produced the smallest effect sizes ($M = 0.13$) compared with other therapies (mean effect sizes ranged between 0.48 for the placebo condition and 1.06 for combined cognitive therapy and exposure). Only combined cognitive therapy and exposure produced larger effect sizes than placebo. This study showed that all conditions, except the waiting list, had considerable drop-out rates ranging from 12.2% to 18%. At follow-up, effect sizes ranged between 0.93 and 1.08.

Another study (Gould, Buckminster, Pollack, Otto, & Massachusetts, 1997) included trials that employed cognitive-behavioural interventions and medication treatments compared with control groups. Cognitive-behavioural interventions included cognitive restructuring, social skills training, anxiety management, systematic desensitisation, and exposure. The authors found that cognitive-behavioural interventions and medications were equally effective in reducing self-reported social anxiety. The greatest effect sizes were associated with exposure ($M = 0.89$), exposure with cognitive restructuring ($M = 0.80$), and SSRI medications (Fluvoxamine and Settraline; $M = 1.89$). There were no differences between group and individual forms of therapy. Drop-out rates were similar across treatments types (on average, 10% for cognitive-behavioural and 13.7% for medication treatments). All studies indicated additional improvements at 3-months follow-up. However, most studies indicated no further gains over that period. Finally, this study found that cognitive behavioural group therapy was the most cost-effective treatment.

An extensive meta-analysis that included publications in English and in Spanish (Gil, Carrillo, & Meca, 2001) investigated a broader range of outcome measures, including interviews and self-report questionnaires. This study considered trials with exposure, cognitive-restructuring, social skills training, and any combination of the above. The results showed that all interventions were effective at post-treatment (with mean effect sizes ranging between 0.56 and 0.83) and at 3-months follow-up (with mean effect sizes ranging between 0.75 and 1.10). Consistent with previous results, there were no differences between the different types of treatment.

Finally, another study examined effect sizes in self-report outcome measures and observer ratings (Fedoroff & Taylor, 2001). The authors included studies of cognitive-restructuring with or without exposure, social skills training, applied relaxation, and pharmacotherapy, in group and individual forms, with or without placebo and waiting list conditions. With respect to the self-reported measures of social anxiety, the largest effect

sizes were displayed in studies with benzodiazepines (Mean effect size = 2.09) and SSRI medication (Mean effect size = 1.70) with no statistical difference between the two. Both medication treatments were superior to waiting list (Mean effect size = 0.03), pill placebo (Mean effect size = 0.65), attention placebo (Mean effect size = 0.44), and relaxation (Mean effect size = 0.51). Benzodiazepines were more effective than MAO inhibitors (Mean effect size = 1.08), cognitive restructuring (Mean effect size = 0.72), cognitive restructuring combined with exposure (Mean effect size = 0.84), and social skills training (Mean effect size = 0.64). In relation to the observer ratings, the largest effect sizes were exhibited by exposure (Mean effect size = 3.47) but there was no significant difference from other treatments (with effect sizes ranging between 0.81 and 3.15). Benzodiazepines (Mean effect size = 3.15) were more effective than waiting list (Mean effect size = 0.81), while exposure plus cognitive restructuring (Mean effect size = 1.80), SSRI (Mean effect size = 1.54) and MAO inhibitors (Mean effect size = 1.23) were more effective than the placebo condition. At follow-up, all psychological treatments were equally effective (with effect sizes ranging from 0.86 for social skills training to 1.31 for exposure) but no different than the placebo conditions that indicated mean effect size equal to 0.42 (Fedoroff & Taylor, 2001). However, for this analysis, only one placebo trial was included. This might have influenced the comparison between this single trial and the remaining 26 trials of psychological treatments. Moreover, this meta-analysis did not include therapeutic interventions based on Clark and Wells' (1995) model. Such interventions could have provided effect sizes greater than those of the attention placebo condition.

Following the above, it appears that the various modes of cognitive-behavioural therapies are effective in the treatment of social phobia to a similar extent. Some medication treatments appear to be superior at post-treatment; however, cognitive-behavioural group therapy might be the most cost-effective treatment. Drop-out rates appear similar across the studies. Group and individual forms did not differ in their effectiveness.

The majority of these meta-analyses included trials with controlled criteria, such as restricted or no comorbidity, specialised therapists, specific recruitment methods, and manualised therapeutic protocols. Such factors could influence the trials' effect sizes and could reduce the studies' ecological validity compared with the reality of clinical practice. In line with this, one meta-analysis (Lincoln & Rief, 2004) found that laboratory characteristics showed a correlation with the relevant effect sizes. Therefore, factors such as recruitment via advertisements, employment of specialised therapists, and the application of manualised treatments were associated with larger effect sizes. However, sample restrictions (e.g., limited comorbidity) did not influence the predictive value of the therapeutic impact. Even though the application of sophisticated manuals might influence the trial's effect size, the use of manuals can increase the likelihood that therapy is

implemented properly. Hence, such research could highlight the components of successful therapy and the areas that need improvement.

Finally, the majority of the studies investigated in the above meta-analyses had employed CBGT rather than Clark and Wells' (1995) cognitive therapy. Hence, more studies that examine specialised protocols are necessary.

1.7.6. Meta-cognitive therapy

Following the above, cognitive restructuring techniques combined with exposure appear to be effective. However, this treatment had considerable drop-out rates of approximately 10% or more. Moreover, a number of participants showed no improvement (e.g., five out of 20 in Heimberg et al., 1990) or improvements did not reach the levels of community samples (e.g., in quality of life; Eng et al., 2001).

Other therapeutic protocols, such as Clark and Wells' (1995) cognitive therapy, have shown larger effect sizes and recovery rates (Borge et al., 2008). However, even though Clark and Wells' (1995) treatment draws on the meta-cognitive model (Wells and Matthews, 1994), it largely overlooks meta-cognition. It has been argued by Wells (2002) that refining the treatment by taking a more direct meta-cognitive focus is a way forward. Such focus could deal more with cognitive processes rather than cognitive content. In effect, as discussed earlier, Wells and Papageorgiou (2001a) piloted such a treatment with promising results.

Based on the S-REF model (Wells & Matthews, 1994), meta-cognitive therapy (Wells, 2002; Wells, 2009) incorporates a focus on meta-cognitive beliefs about the cognitive mechanisms that are central in emotional disorders. In social phobia, these mechanisms are anticipatory processing, self-focused attention, the observer perspective self-image, and post-mortem processing. Meta-cognitive techniques could target these strategies in order to replace them with more adaptive mechanisms that enable goal achievement and discrepancy reduction. Such techniques are attention training (Wells, 1990, 2002) that aims to increase the flexibility of attention, hence releasing attentional fixation to the self. Other techniques involve challenging meta-cognitive beliefs and using allocated "worry time" to control worry and rumination, as in generalised anxiety disorder (Wells, 1997). Furthermore, detached mindfulness (Wells, 2005) could be applied to develop an alternative relationship with thoughts other than engaging in repetitive thinking patterns. Such meta-cognitive interventions might directly target the processes that maintain social anxiety.

In line with this hypothesis, one study (McEvoy et al., 2009) found that group CT was associated with reductions in post-mortem processing and that these reductions correlated with decreased meta-cognitive beliefs. Furthermore, reductions in some self-report measures of social anxiety (Social Interaction Anxiety Scale; Mattick and Clarke 1998) were associated with uncontrollability beliefs measured with the MCQ-30 (Wells & Cartwright-Hatton, 2004). This study showed that group CT produced reductions in meta-cognition and that these reductions were associated with improved treatment outcomes.

Nevertheless, one study did not support the meta-cognitive hypothesis. McEvoy and Perini (2008) compared group CT with relaxation and group CT with attention training. The results showed that incorporation of attention training was not associated with greater improvements than incorporation of relaxation. Nevertheless, this study employed a protocol of CBT that already utilised exposure and behavioural experiments to challenge self-focused attention. Therefore, it could be that the addition of attention training did not produce enough supplementary improvement to result in statistically significant results.

1.8. Aims and objectives of the current PhD

The present PhD considered that social phobia exists on a continuum with social anxiety. This rationale is consistent with research in a Brazilian sample that found that individuals with sub-threshold social anxiety disorder showed higher comorbidity, anxiety, and psychosocial impairment compared with a non-anxious control group, but lower compared with a social phobia group (Filho et al., 2010). Moreover, an epidemiological study in the Netherlands (Acarturk et al., 2008) found that as the number of social fears increased so did the severity of social anxiety disorder (e.g., comorbidity), while quality of life decreased. In further support of this rationale, a study based on the National Comorbidity Service in the USA found that mild levels of anxiety and mood disorders were predictive of hospitalisation and severe mental illness ten years after the initial interview (Kessler et al., 2003). Therefore, sub-clinical social anxiety could make a valid analogue in the research of social phobia.

Following the above, the present thesis reports a series of studies that examined the potential contribution of meta-cognitive beliefs to social anxiety.

In particular, in Study 1, a cross-sectional design employed questionnaires that measured cognitive mechanisms (anticipatory processing, the observer perspective self-image, and the post-mortem), fear of negative evaluation (social anxiety), and meta-cognitive beliefs about worry. The main objective was to identify whether meta-cognitive beliefs contributed

to social anxiety and its maintenance by testing for positive relationships between these variables.

Study 2 explored whether high and low socially anxious people had meta-cognitive beliefs that themed around the cognitive mechanisms implicated in social phobia. People with high and low fear of negative evaluation participated in semi-structured interviews. Meta-cognitive profiling (Wells, 2002) informed a series of questions to elicit possible meta-cognitive beliefs about anticipatory processing, focusing on the observer perspective self-image, and the post-mortem. Furthermore, the interviews assessed strategies for controlling these processes and stop signals. A further aim was to compare high and low social anxiety groups in terms of the elicited meta-cognitive beliefs.

Subsequently, it was decided to explore the contribution of these new meta-cognitive beliefs in social anxiety. The above interviews informed two new questionnaires that assessed meta-cognitive beliefs about anticipatory processing and about focusing on the observer perspective self-image. Study 3 investigated the psychometric properties of these instruments. A second objective was to explore the potential relationships between these beliefs and social anxiety. Finally, a further aim was to capture relationships other than the ones displayed by already established measures of meta-cognitive beliefs about general worry (MCQ-30).

A cognitive model of social phobia (Rapee & Heimberg, 1997) suggested that selective attention to negative external information plays a role in social anxiety. According to the S-REF model (Wells & Matthews, 1994), such attentional bias could be a manifestation of threat monitoring which is regulated by meta-cognition. Therefore, meta-cognitive beliefs could play a role in attentional bias in social anxiety. To explore this hypothesis, high and low socially anxious individuals participated in a dot probe task that utilised emotional social and physical words (Study 4). The task followed the administration of a social threat (interaction with a stranger). Self-report questionnaires measured meta-cognitive beliefs, social cognitions, and social anxiety.

Additionally, previous findings have shown that socially anxious individuals engage in anticipatory processing. This processing has been associated with increased state anxiety. However, according to the S-REF model, meta-cognitive beliefs should play a role in the maintenance of worry. Study 5 aimed to investigate whether meta-cognitive beliefs interact with anticipatory processing and/or distraction to influence state anxiety before and after a speech. Eight high socially anxious individuals completed a battery of questionnaires followed by a threat induction (recorder speech). Then, half participants engaged in a 10-minute anticipatory processing period and half completed a distraction

task. Subsequently, participants engaged in a 3-minuted speech followed by assessment of state anxiety and the observer perspective self-image.

Finally, in study 6, an intervention that targets meta-cognitive activity was explored. In particular, this study compared detached mindfulness against thought challenging with Socratic questioning in twelve high socially anxious participants. A cross-over design was adopted while controlling for order of delivery of the techniques.

1.9. Participant numbers and Ethics

Overall, 686 participants were recruited from a larger pool of individuals ($N = 1160$) that completed screening questionnaires. Approval for each study was obtained by the University of Manchester's School of Psychological Sciences Research Ethics Committee (Appendix 1.1).

CHAPTER 2

Do meta-cognitions contribute to social anxiety? A preliminary study

2.1. Introduction

A generic meta-cognitive model of emotional disorders (Wells & Matthews, 1994), the Self-Regulatory Executive Function (S-REF) model, suggests that meta-cognition regulates and maintains a cognitive attentional syndrome (CAS). This syndrome is apparent in all disorders but its manifestations vary in quantity and content. The CAS involves worry, rumination, threat monitoring, and maladaptive coping strategies, such as avoidance. The model proposes that meta-cognition regulates the CAS, and that prolonged engagement in the CAS can keep the individual trapped in maladaptive self-regulatory executive functioning, therefore maintaining negative mood and cognitions. Individual differences in meta-cognitive knowledge can be explored by eliciting the relevant meta-cognitive beliefs. These can be positive and negative beliefs about cognitive mechanisms, such as worry. For example, a positive belief is “worry helps me cope” and a negative belief is “worry is uncontrollable”.

Consistent with the S-REF model, positive and negative meta-cognitive beliefs have been associated with worry (Cartwright-Hatton & Wells, 1997; de Jong-Meyer, Beck, & Riede, 2009) and with symptoms of obsessive-compulsive disorder (Myers & Wells, 2005), posttraumatic stress disorder (Roussis & Wells, 2006), alcohol abuse (Spada & Wells, 2010), hypochondriasis (Theo & Karin, 1999), and depression (Papageorgiou & Wells, 2001a).

Nevertheless, the role of meta-cognitive beliefs in social anxiety remains largely unexplored. Dannahy and Stopa (2007) investigated differences in meta-cognitive beliefs between high and low socially anxious individuals after threat induction (a conversation with a confederate). In particular, participants took part in an initial conversation one week earlier and expected that they would have another conversation at the time they completed the measure of meta-cognitive beliefs. The results showed that high socially anxious individuals scored higher than low socially anxious individuals on cognitive self-consciousness and on uncontrollability beliefs about post-event rumination. These preliminary results support the idea that meta-cognitive beliefs may be associated with social anxiety. However, the measure of meta-cognition used was constructed for the study and it has unknown psychometric properties.

Additionally, McEvoy and colleagues (2009) found that, after group cognitive-behavioural therapy, several meta-cognitive beliefs (MCQ-30 subscales; Wells & Cartwright-Hatton, 2004) decreased significantly. Reductions in uncontrollability beliefs about worry were associated with reductions in social interaction anxiety. Moreover, the findings showed that a decrease in these beliefs and in beliefs about the need to control thoughts was associated with a decrease in post-mortem processing. Finally, they found that reductions in several meta-cognitive beliefs were associated with improvements in depression (McEvoy et al., 2009).

The above studies offer preliminary support for the notion that meta-cognitive beliefs might play a role in social anxiety. Compared with low socially anxious people, high socially anxious individuals appeared more likely to be cognitively self-conscious and to have uncontrollability beliefs about the post-mortem. Moreover, reductions in meta-cognitive beliefs were associated with positive treatment outcomes in social anxiety, post-mortem processing, and depression.

However, more research is necessary to investigate the assertion that meta-cognitive beliefs play a role in social anxiety (Wells & Matthews, 1994). In particular, the S-REF model proposed that positive and negative beliefs about the mechanisms of the CAS should influence emotional disorders by maintaining these mechanisms. Additionally, negative beliefs about these mechanisms should have a mediator and/or a moderator effect; that is these beliefs should amplify the effect of the CAS on the disorder. Following the above, the present study aimed to examine the potential contribution of meta-cognitive beliefs to social anxiety and its maintenance. The hypotheses were the following:

- i) Positive and negative meta-cognitive beliefs will positively correlate with social anxiety
- ii) Positive and negative meta-cognitive beliefs will positively correlate with one or more of the cognitive mechanisms implicated in social phobia. These are anticipatory processing, the observer perspective self-image, and the post-mortem.

Additionally, the following research questions were generated:

- a) Do meta-cognitive beliefs contribute to social anxiety independently of the maintenance processes: anticipatory processing, the observer perspective, and the post-mortem?
- b) What is the optimal set of unique predictors of social anxiety from the cognitive and meta-cognitive variables?
- c) Do positive and negative meta-cognitive beliefs have an indirect effect on social anxiety via anticipatory processing and the post-mortem? Moreover, do negative meta-cognitive beliefs have a moderating effect as well?

2.2. Method

2.2.1. Participants

An a priori power analysis (Erdfelder, Faul, & Buchner, 1996) with set probability for error $\alpha = .05$, an expected medium effect size of .15, and five predictors indicated that a sample of 108 participants would suffice for $1-\beta = .90$. Overall, 163 University students and staff were recruited via the University of Manchester's online advertising service. All participants were offered the chance to enter into a prize draw as compensation for their participation. Participants' ages ranged from 18 to 57 years ($M = 23$, $SD = 6.8$). Forty-nine (30%) were male and 114 (70%) female.

2.2.2. Measures

Participants were invited to complete the following questionnaires:

The Fear of Negative Evaluation scale (FNE; Watson & Friend, 1969): A 30-item measure of distress over negative evaluation from others. The FNE has been found efficient for identifying analogue populations for studies in social phobia (Stopa & Clark, 2001). It has shown acceptable to good test-retest reliability over a 1-month period (.78), and good discriminant validity from the Crowne-Marlowe Social Desirability Scale (Crowne & Marlowe, 1964).

The short Metacognitions Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004): A 30-item measure of meta-cognitive beliefs. These beliefs form five subscales: cognitive self-consciousness, cognitive confidence, positive beliefs about worry, negative beliefs about the uncontrollability and dangerousness of thoughts, and beliefs about the need to control thoughts. The scale's internal consistency was found to be excellent (Cronbach's $\alpha = .93$) for the whole scale, and ranged from .72 to .93 for the subscales. Test-retest reliability over a period of 22 to 118 days was acceptable to good with correlations of .75 for the whole scale, and ranging from .59 to .87 for the subscales (Wells & Cartwright-Hatton, 2004).

The Anticipatory Social Behaviours Questionnaire (ASBQ; Hinrichsen & Clark, 2003): A 12-item questionnaire that measures anticipatory processing. The scale has shown good internal consistency ($\alpha = .88$). In the current sample, alpha was .83.

The Self-Image Perspective Scale (SIPS): A 3-item scale that was developed for the purposes of this study (Appendix 2.1) in order to measure the perspective taken in social situations as follows:

- Item 1 targeted the extent to which a self-impression occurred in social situations on a Likert scale ranging from 1 (never) to 5 (always),
- Item 2 incorporated Wells et al.'s (1998) scale of the perspective taken in social situations on a scale ranging from -3 (entirely looking out at the situation) to +3 (entirely observing myself), and
- Item 3 measured the extent to which the self-impression was visual on a 4-point Likert scale (not at all - very much so).

The Post-Event Processing Questionnaire (PEPQ; Rachman et al., 2000): A 13-item measure of the level of engagement in post-mortem processing. The scale has shown good internal consistency ($\alpha = .85$) and one Factor with three items failing to load on it. For the purpose of the present study the original visual analogue scale (ranging from 0 to 100) was replaced with a 4-point Likert scale (Not at all, Somewhat, Moderately so, Very much so). The response scale for the first item of the measure was also modified to “No anxiety, Mild anxiety, Moderate anxiety, and Severe anxiety”. In the current sample, alpha was .82.

2.2.3. Procedure

Online advertisements were posted at the University of Manchester's online research volunteering service. In addition, posters were placed at the Psychology department's common room. Participants were provided with information about the study, contact details, and a link to the participant information sheet, consent form, and questionnaires. Hard copies were also available at the common room.

2.2.4. Overview of analysis

SPSS version 15.0 was used for the analyses. Principal component analyses and reliability tests examined the psychometric properties of the ASBQ and PEPQ. Pearson correlation analyses investigated the first and second hypotheses. To explore the first research question, social anxiety (FNE) was regressed on meta-cognitive beliefs at Step 1 and on the cognitive variables (anticipatory processing, observer perspective, and the post-mortem) at Step 2. Meta-cognitions were entered at step 1 because in the S-REF model they are considered causal antecedents of anticipatory processing and the post-mortem. In subsequent analysis, the above steps were reversed to explore if meta-cognitive beliefs explained additional variance beyond the cognitive variables. Furthermore, to investigate the second research question, an exploratory stepwise regression analysis was conducted with the FNE as the dependent variable.

Finally, mediation and moderation analyses (Baron & Kenny, 1986) explored the third research question. To explore mediation, three regressions were needed. First, the mediator was regressed on the independent variable. Second, the dependent variable was regressed on the independent variable. Third, the dependent variable was regressed on the independent variable and the mediator. To confirm the mediation hypothesis, the first analysis should show an effect of the independent variable on the mediator. The second analysis should indicate an effect of the independent variable on the dependent variable. Finally, in the third analysis, the effect of the independent variable on the dependent variable should be reduced (compared with the second analysis) or diminished when controlling for the mediator. Additionally, the mediator should have a significant effect on the dependent variable when controlling for the independent variable.

The moderation analysis assumed that the effect of the independent variable on the dependent variable varied linearly with respect to the moderator. Hence, to explore moderation, an interaction variable was created (independent X moderator). Then, a hierarchical regression was conducted with the independent variable and the moderator at Step 1, and the interaction variable at Step 2 (forced entry). Moderation is confirmed if the interaction variable has a significant effect when controlling for the remaining two variables. However, as reported in the Results section, the interaction variable indicated high correlations with the remaining predictor variables, thus creating multicollinearity. This was resolved by transforming the raw data to z values and entering these in the regression analyses (Friedrich, 1982; Tabachnick & Fidell, 2007).

It should be noted that the measure of meta-cognitive beliefs (MCQ-30; Wells & Cartwright-Hatton, 2004) targeted beliefs about worry and thoughts. These were not expected to influence the observer perspective. Hence, the observer perspective variable was omitted from the mediation and moderation analyses. Moreover, gender ($r = -.02$) and age ($r = -.11$) did not significantly correlate with social anxiety and were omitted from all analyses.

Finally, in addition to the R^2 coefficient, Cohen's f^2 statistic (Cohen, 1992) estimated the effect size attributable to the addition of a block of variables in hierarchical regressions:

$$f^2 = \frac{R_{AB}^2 - R_A^2}{1 - R_{AB}^2}$$

2.3. Results

2.3.1. An examination of the psychometric properties of PEPQ

The PEPQ Items (Rachman et al., 2000) were subjected to principal components factor analysis. Item 1 was excluded from the analysis due to the use of a different scale compared with the one used for the remaining Items. The Items appeared appropriate for factoring. In effect, the skewness of the Items ranged from .02 to 1.06. The KMO value was .87, $p < .005$, and Barlett's test of sphericity was significant ($\chi^2 = 739.39$, $p < .0005$).

The scree-plot and the component matrix indicated three Factors with eigenvalues above 1. All Items loaded on one Factor apart from Item 4 (Were the thoughts/memories ever welcome for you?), Item 8 (If you did think about the event over and over again, did your feelings about the event get better and better?), and Item 9 (If you thought about the event, did you see it from your point of view, as opposed to how other people would view it?). These Items loaded on a second Factor, and item 13 (As a result of the event, do you now avoid similar events; did this event reinforce your decision to avoid similar situations?) loaded highly on the first and on a third Factor. The first Factor explained 41.2% of the variance, the second Factor explained 11.76%, and the third Factor explained 8.55%.

Therefore, only three Items loaded on the second Factor, while no Item loaded exclusively on the third Factor. Hence, a second principal component analysis was conducted and a 2-Factor solution was specified. Oblique (direct oblimin) rotation was employed. The structure matrix showed that nine Items loaded on Factor 1 (Items 1, 2, 3, 5, 6, 7, 10, 11, and 12). Three Items loaded on the second Factor (Items 4, 8, and 9). The first Factor explained 41.02%, and the second Factor explained 11.76% of the variance. The first Factor was interpreted to involve negative and uncontrollable ruminative thoughts and had good reliability ($\alpha = .89$). The second Factor targeted positive ruminative thoughts and perspective taking, and had low reliability ($\alpha = .34$).

Overall reliability was good ($\alpha = .81$) and deletion of the second Factor's Items did not indicate significant improvements. Hence, it was decided to retain the scale intact and to include the overall scores in further analyses. This would facilitate comparisons with previous studies that had employed the same measure.

2.3.2. An examination of the psychometric properties of ASBQ

The ASBQ (Hinrichsen & Clark, 2003) was also analysed with principal components analysis. The data appeared appropriate for factoring. In effect, the skewness of the items ranged from .10 to .82. The KMO value was .82, $p < .005$ and Barlett's sphericity test was significant ($\chi^2 = 682.73$, $p < .0005$). The scree-plot and component matrix indicated a 3-Factor solution with eigenvalues above 1. All items loaded highly on one Factor, except item 12 (I make a conscious effort not to think about the situation) that loaded on a second Factor. Furthermore, Items 10 (I think about ways in which I could avoid having to face the situation) and 11 (I think about ways in which I could escape from the situation if it gets too embarrassing) loaded highly on the first and second Factors. The first Factor explained 36.84% of the variance, the second Factor explained 14.29%, and the third Factor explained 9.24%.

Given that no Item loaded on Factor 3, a second analysis was conducted that specified a 2-Factor solution. Oblique (direct oblimin) rotation was employed. The pattern matrix indicated that eight Items loaded on Factor 1 (Items 1-8) and four Items loaded on Factor 2 (Items 9-12). The first Factor targeted anticipatory and preparation-related thoughts and showed good reliability ($\alpha = .82$). The second Factor targeted avoidance and safety-seeking thoughts and had acceptable reliability ($\alpha = .72$). The first Factor explained 36.8% of the variance, and the second an additional 14.29%.

Overall reliability was good ($\alpha = .83$). Given that according to Clark and Wells' (1995) model, anticipatory processing involves anxious predictions and thoughts about avoidance, it was considered meaningful to use the overall scores in future analyses.

These results suggested that the present study was comparable to previous ones that have used the same measures.

2.3.3. Correlations between meta-cognitive beliefs, social anxiety, and the maintenance processes

Table 2.1 displays the results of the bivariate correlations between the variables. In line with the first hypothesis, social anxiety positively and significantly correlated with negative beliefs. However, the positive correlation between social anxiety and positive beliefs was not significant. In line with the second hypothesis, positive and negative meta-cognitive beliefs significantly positively correlated with anticipatory processing, the observer perspective self-image, and the post-mortem.

Table 2.1: Inter-correlations between social anxiety, positive and negative meta-cognitive beliefs, anticipatory processing, focusing on the inner image, and the post-mortem, * $p < .05$, ** $p < .01$, $N=159$

| Scales | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|-----|-------|-------|------|-------|-------|-------|
| 1. Fear of negative Evaluation $\bar{x} = 14.79, SD = 7.37$ | .13 | .46** | .64** | .03 | .25** | -.08 | .46** |
| 2. MCQ positive beliefs $\bar{x} = 11.52, SD = 4.12$ | — | .39** | .37** | .02 | .20* | .15 | .28** |
| 3. MCQ negative beliefs $\bar{x} = 11.06, SD = 4.75$ | | — | .56** | .02 | .25** | .11 | .61** |
| 4. Anticipatory processing (ASBQ) $\bar{x} = 26.83, SD = 6.26$ | | | — | .18* | .23** | .13 | .64** |
| 5. The extent to which a self-impression is experienced (SIPS-1) $\bar{x} = 3.61, SD = 0.78$ | | | | — | .24** | .34** | .20* |
| 6. The observer perspective (SIPS-2) $\bar{x} = -0.11, SD = 1.43$ | | | | | — | .16* | .30** |
| 7. The extent to which the self-image is a visual image (SIPS-3) $\bar{x} = 2.55, SD = 0.83$ | | | | | | — | .22** |
| 8. Post-mortem processing (PEPQ) $\bar{x} = 28.28, SD = 7.59$ | | | | | | | — |

2.3.4. Predictors of social anxiety

In order to explore the theoretically driven hypothesis that positive and negative meta-cognitive beliefs contribute to social anxiety, a hierarchical regression was conducted as follows: FNE was treated as the dependent variable, while MCQ positive and negative subscales were entered at Step 1. The ASBQ, the observer perspective (SIPS-2), and PEPQ were entered at Step 2. According to the Kolmogorov-Smirnov D statistic, the FNE scores were normally distributed, $D(159) = .07$, $p = .06$. Exploration of the residuals did not yield concerns for univariate outliers (all within the ± 2.6 boundaries). According to Allison (1999), tolerance values below .40 (with a VIF value of 2.50) should raise concern for multicollinearity. However, according to Stevens (2002), a VIF value of 10 (with tolerance equal to .1) is problematic. In the current analysis, tolerance values ranged between .48 and .89, and VIF values ranged between 1.12 and 2.07. Hence, it appeared that there was no multicollinearity.

Meta-cognitive beliefs explained a significant proportion of the variance in social anxiety, 21%, $p < .005$, while the cognitive variables exclusively explained 25% of the variance in social anxiety, $p < .005$, $f^2 = 0.43$. According to the regression coefficients (Table 2.2), positive meta-cognitive beliefs, $\beta = -.18$, $p = .008$, negative meta-cognitive beliefs, $\beta = .17$, $p = .033$, and anticipatory processing, $\beta = .59$, $p = .000$, were individual predictors of social anxiety.

Table 2.2: Hierarchical regression coefficients with FNE as the dependent variable, positive and negative meta-cognitive beliefs at Step 1, and cognitive variables at Step 2

| Variable | Adj.R ² | ΔR^2 | p | B | $SE B$ | β | t | P |
|--|--------------------|--------------|--------|-------|--------|---------|-------|--------|
| Model 1 | .20 | .21 | <.0005 | | | | | |
| MCQ positive | | | | -.11 | .14 | -.06 | -0.79 | .43 |
| MCQ negative | | | | .74 | .12 | .48 | 6.21 | <.0005 |
| Model 2 | .44 | .25 | <.0005 | | | | | |
| MCQ positive | | | | -.32 | .12 | -.18 | -2.7 | .008 |
| MCQ negative | | | | .27 | .12 | .17 | 2.15 | .03 |
| Anticipatory Processing | | | | .69 | .09 | .59 | 7.22 | <.0005 |
| Focusing on an observer perspective self - image | | | | .53 | .32 | .10 | 1.65 | .10 |
| Post-mortem processing | | | | -.004 | .08 | -.004 | -.04 | .96 |

The above steps were reversed to examine the proportion of variance that meta-cognitive beliefs exclusively explained. Results showed that 42% of the variance in social anxiety was explained by the three cognitive variables, $\text{Adj.R}^2 = .42$, $\Delta R^2 = .43$, $p < .0005$, while an additional 3%, $p = .009$, was explained by meta-cognitive beliefs, $\text{Adj.R}^2 = .44$, $\Delta R^2 = .03$, $p = .009$, $f^2 = .48$.

2.3.4.1. Optimal number of predictors of social anxiety

An exploratory analysis was conducted to construct an optimal model of predictors for social anxiety. Stepwise elimination was employed with the FNE scale as the dependent variable and the MCQ subscales, anticipatory processing, the post-mortem, and the observer perspective as independent variables. This method was preferred to forward or backward selection because it can target effects when controlling for other variables and select predictors at any stage of the elimination process. Thus, there is less likelihood for Type II error (Tabachnick & Fidell, 2007).

The final regression indicated three significant predictors (Table 2.3): positive meta-cognitive beliefs, negative meta-cognitive beliefs, and anticipatory processing.

Table 2.3: Stepwise regression analysis: Predictors of social anxiety (FNE) at the final step

| Variable | <i>B</i> | <i>SE B</i> | β | <i>P</i> |
|-------------------------|----------|-------------|---------|----------|
| MCQ positive | -.26 | .11 | -.15 | .03 |
| MCQ negative | .31 | .11 | .20 | .01 |
| Anticipatory Processing | .69 | .08 | .58 | <.0005 |

2.3.5. Indirect effects of meta-cognitive beliefs on social anxiety

Baron and Kenny's (Baron & Kenny, 1986) causal step mediation and moderation analyses were employed as described in Section 2.2.4. The results are presented below.

2.3.5.1. Investigation of the indirect effect of positive meta-cognitive beliefs on social anxiety via anticipatory processing

In line with the mediation hypothesis, in the first regression, positive meta-cognitive beliefs predicted anticipatory processing, $\beta = .36$, $p < .0005$. However, in the second regression, the effect of these beliefs on the dependent variable (FNE) was marginal, $\beta = .14$, $p = .06$. The lack of a significant effect could be attributed to the suspected suppressor effect of negative beliefs and/or anticipatory processing on positive beliefs. According to Tabachnick and Fidell (2007), a suppressor effect is present when the correlation between an independent variable and a dependent variable is smaller than the respective standardised regression coefficient or when the correlation and the regression coefficients have opposite signs. Accordingly, Section 2.3.3 and 2.3.4 showed a non-significant positive correlation between positive beliefs and social anxiety and a significant negative regression coefficient when controlling for anticipatory processing and negative beliefs. In such circumstances, MacKinnon et al. (2000) suggest that mediation analysis should take place even if the second step indicates a non-significant effect of the independent variable on the dependent variable (as indicated here). Thus, the current mediation analysis was carried through.

In line with the mediation hypothesis, in the third regression, the effect of positive beliefs on social anxiety was diminished when controlling for anticipatory processing, $\beta = -.10$, $p = .12$, while anticipatory processing predicted social anxiety when controlling for positive beliefs, $\beta = .68$, $p < .0005$. Therefore, positive meta-cognitive beliefs had a marginal indirect effect on social anxiety via anticipatory processing (Figure 2.1). Sobel's (1982) test indicated that this effect was significant, $z = 4.45$, $p < .0005$.

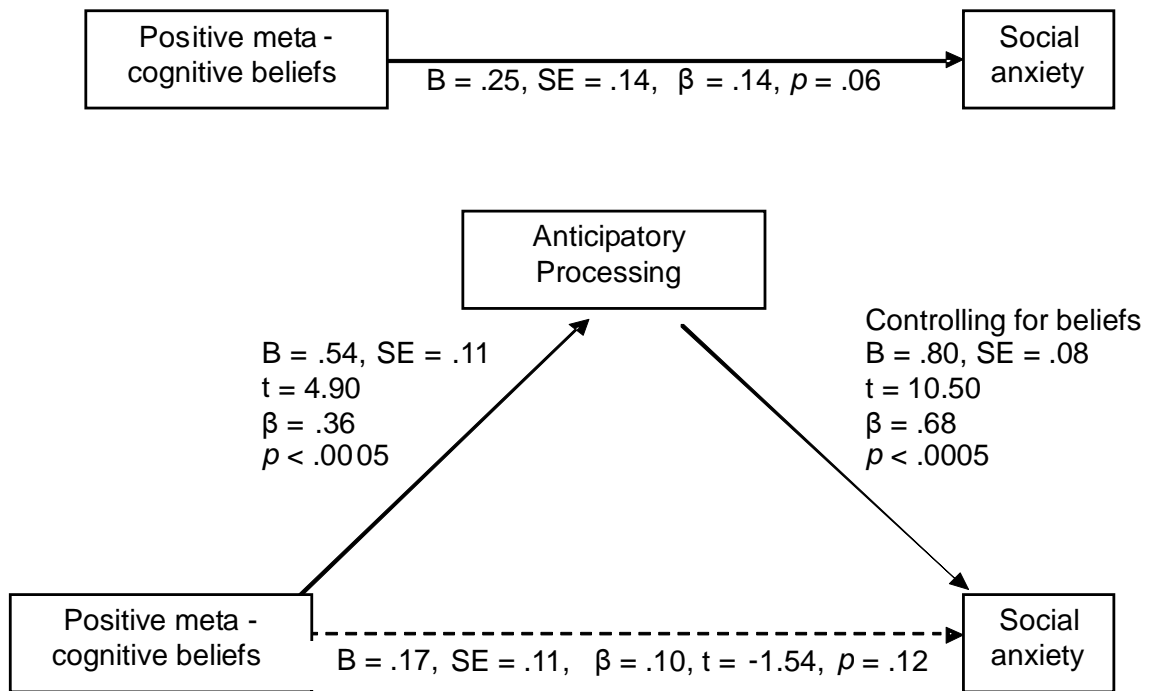


Figure 2.1: Mediation analysis that shows the indirect effect of positive meta-cognitive beliefs on social anxiety via anticipatory processing

2.3.5.2. Investigation of the indirect effect of negative meta-cognitive beliefs on social anxiety via anticipatory processing

As Figure 2.2 illustrates, the mediation hypothesis was confirmed. In the first analysis, negative meta-cognitive beliefs (independent variable) predicted anticipatory processing (the mediator), $\beta = .55, p < .0005$. In the second analysis, negative beliefs predicted the dependent variable (FNE), $\beta = .46, p < .0005$. Finally, in the third analysis, the predictive value of negative meta-cognitive beliefs on social anxiety decreased when controlling for anticipatory processing, $\beta = .16, p = .03$, and anticipatory processing predicted social anxiety when controlling for negative beliefs, $\beta = .67, p < .0005$. Sobel's (1982) test indicated that this indirect effect was significant, $z = 5.71, p < .0005$. Hence, negative meta-cognitive beliefs had both an indirect effect on social anxiety via anticipatory processing, as well as a direct effect when controlling for the mediator.

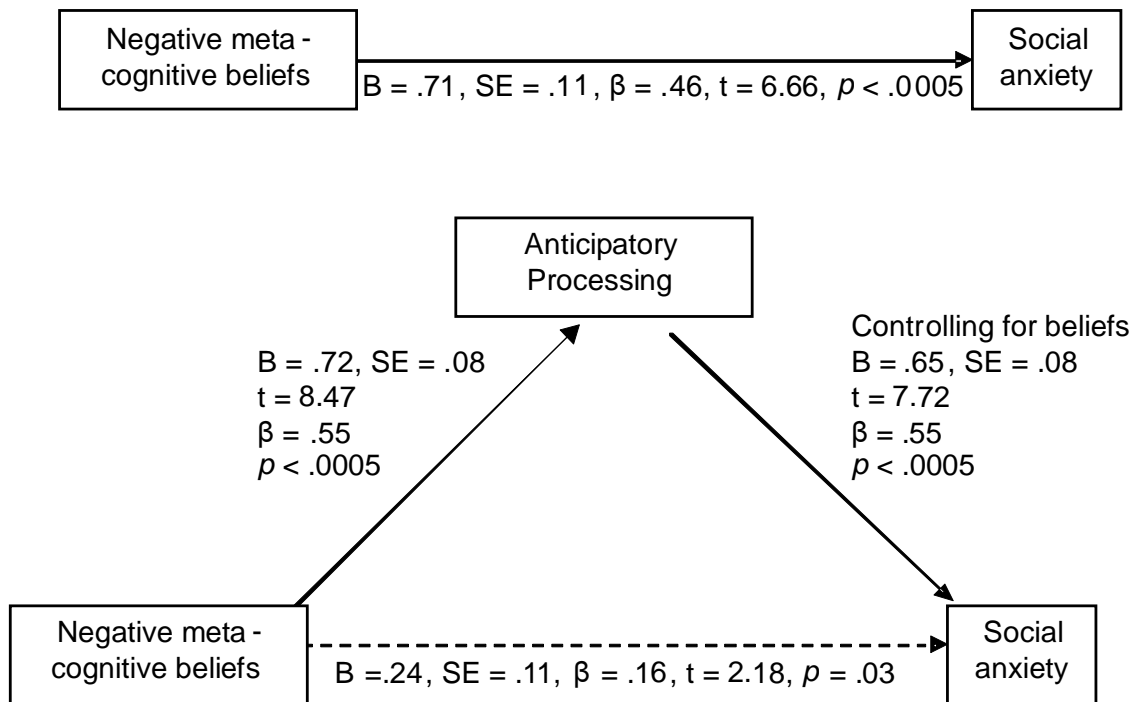


Figure 2.2: Mediation analysis that shows the indirect effect of negative meta-cognitive beliefs on social anxiety via anticipatory processing

2.3.5.3. Investigation of the indirect effect of positive meta-cognitive beliefs on social anxiety via post-mortem processing

In the first regression, positive meta-cognitive beliefs had an effect on the post-mortem, $\beta = .28, p < .0005$. However, as shown previously, in the second regression, these beliefs had a marginal effect on social anxiety, $\beta = .14, p = .06$. In the third regression, the contribution of positive beliefs on social anxiety diminished, $\beta = .02, p = .81$, while the post mortem predicted social anxiety while controlling for positive beliefs, $\beta = .46, p < .0005$. This indirect effect was significant (Sobel's $z = 3.18, p < .005$). Therefore, the results showed a marginal indirect effect of positive meta-cognitive beliefs on social anxiety via the post-mortem (Figure 2.3).

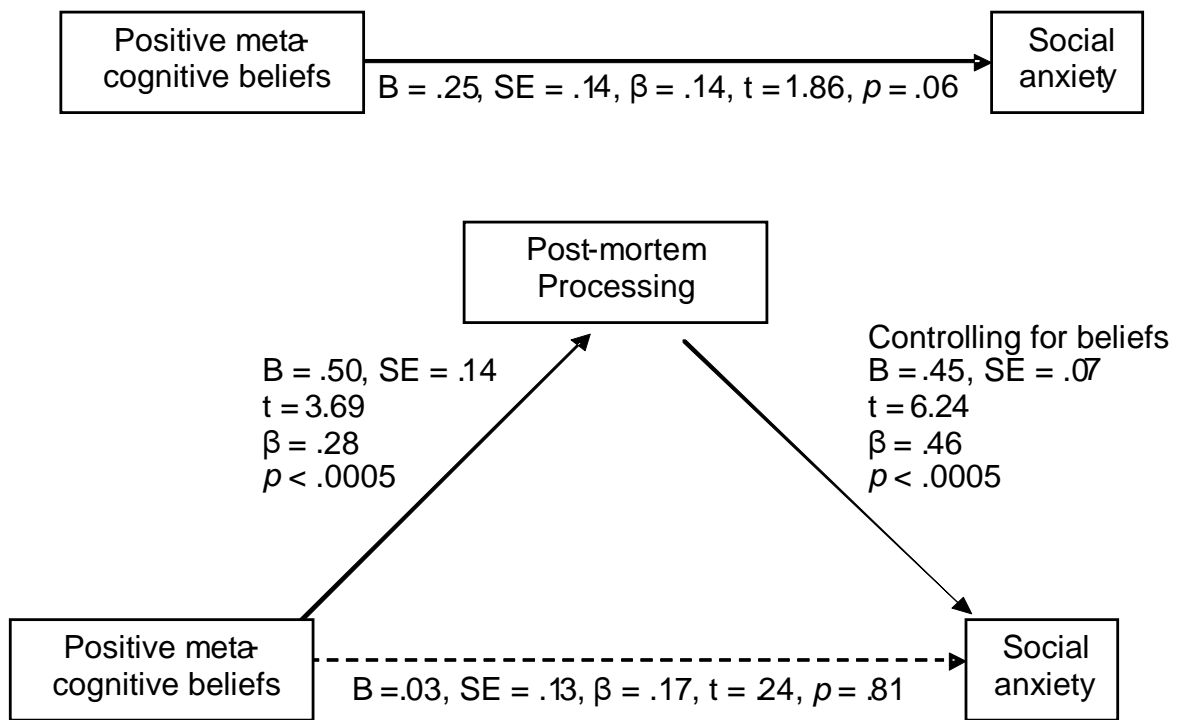


Figure 2.3: Mediation analysis that shows the indirect effect of positive meta-cognitive beliefs on social anxiety via the post-mortem

2.3.5.4. Investigation of the indirect effect of negative meta-cognitive beliefs on social anxiety via post-mortem processing

As Figure 2.4 illustrates, in the first regression, negative meta-cognitive beliefs predicted the post-mortem, $\beta = .60$, $p < .0005$. In the second regression, these beliefs predicted social anxiety, $\beta = .46$, $p < .0005$. Finally, in the third regression, negative meta-cognitive beliefs predicted social anxiety when controlling for the post-mortem, $\beta = .27$, $p < .0005$, and the post-mortem predicted social anxiety when controlling for negative beliefs, $\beta = .48$, $p < .0005$. Even though apparently small, this reduction in the effect of negative meta-cognitive beliefs on social anxiety between the second and third regressions was enough to indicate mediation. In effect, Sobel's (1982) test showed a significant indirect effect, $z = 5.36$, $p < .0005$. Hence, the mediation hypothesis was supported.

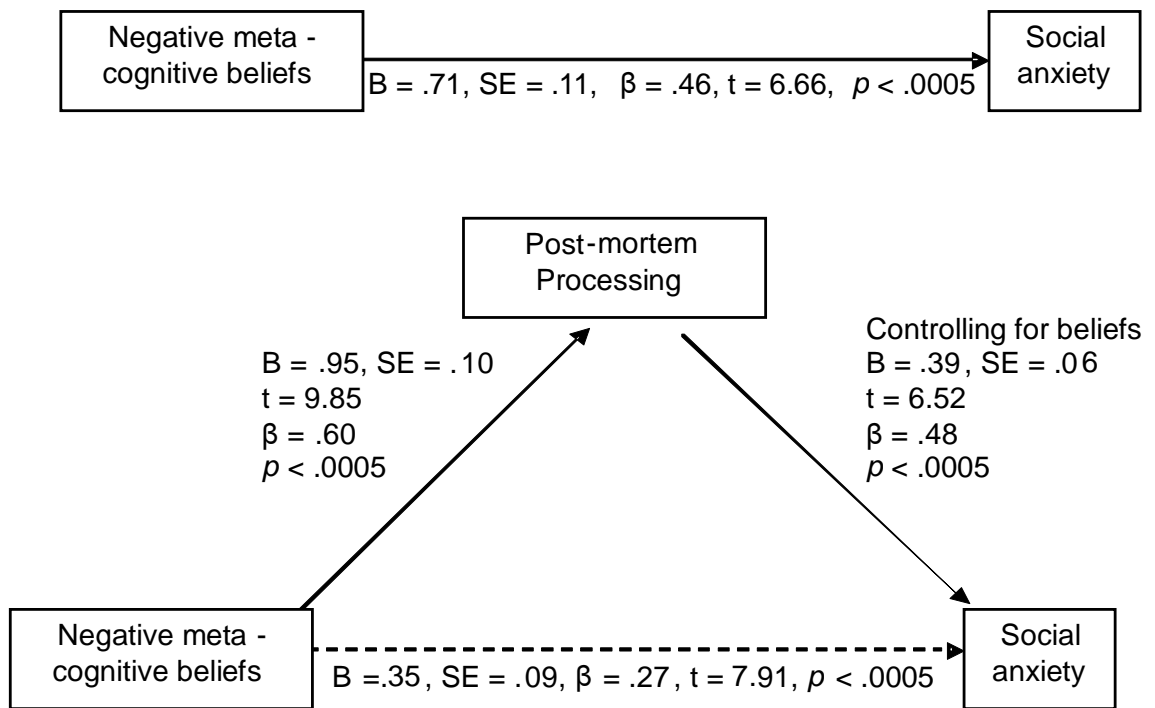


Figure 2.4: Mediation analysis that shows the indirect effect of negative meta-cognitive beliefs on social anxiety via the post-mortem

2.3.5.5. Investigation of the potential moderator effects of negative meta-cognitive beliefs on the relationship between anticipatory processing and the post-mortem, and social anxiety

Two hierarchical regressions were conducted to investigate potential moderator effects. However, the meta-cognitive variable and the cognitive variables correlated highly with the interaction variable (.71 to .93). This led to problematic tolerance (.3 to .1) and VIF values (between 10 and 33). Therefore, as discussed in Section 2.2.4, the data were transformed into z values (Friedrich, 1982; Tabachnick & Fidell, 2007). Following this, the correlations ranged between .46 and .64 (tolerance (.61 to .97) and VIF (1.48 to 1.63)). These values indicated that there was no multicollinearity.

The moderator (negative meta-cognitive beliefs) and the independent variable (anticipatory processing or the post-mortem) were entered in the first step of the analyses. In step 2, the interaction variable (moderator X independent variable) was entered. The moderation hypothesis was not supported (Figure 2.5). The effect of the interaction variables on social anxiety when controlling for the individual contribution of negative beliefs and the respective cognitive mechanisms was not significant ($\beta = -.003, p = .96$ when employing anticipatory processing, and $\beta = -.08, p .23$ when employing the post-mortem).

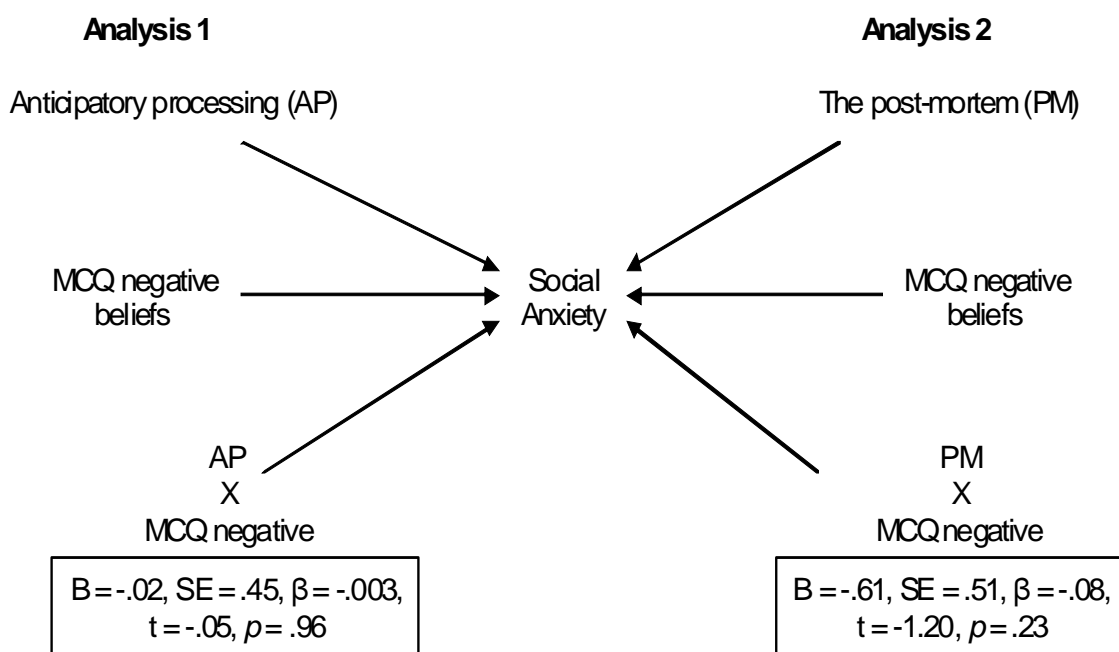


Figure 2.5: Moderation analyses to test the hypothesis that negative meta-cognitive beliefs moderated the relationship between anticipatory processing and social anxiety, and between the post-mortem and social anxiety

2.4. Discussion

In terms of the first hypothesis, negative meta-cognitive beliefs significantly and positively correlated with social anxiety. These beliefs concerned the uncontrollability and dangerousness of worry and thoughts. This result is in agreement with the S-REF model (Wells & Matthews, 1994) that implicates meta-cognitive beliefs in emotional disorders. Moreover, this finding adds to previous indications that high socially anxious people have strong uncontrollability beliefs about rumination (Dannahy & Stopa, 2007). However, contrary to the first hypothesis, positive beliefs did not correlate with social anxiety to a statistically significant level. This may be because different types of meta-cognitive beliefs relate to different emotional problems. For example, Myers and Wells (2005) found that thought fusion beliefs and beliefs about the need to control thoughts were individual predictors of obsessive-compulsive symptoms. Furthermore, Roussis and Wells (2006) found that positive beliefs about worry had an indirect effect on posttraumatic stress symptoms via worry, whereas uncontrollability beliefs were direct individual predictors of stress symptoms related to PTSD. Another likely explanation is that the MCQ-30, used to measure positive beliefs about worry, may not be specific enough to capture the positive meta-cognitive beliefs in social anxiety. Finally, as discussed below, this result could be

attributed to a suppressor effect of negative beliefs and/or anticipatory processing on positive beliefs.

In terms of the second hypothesis, positive and negative meta-cognitive beliefs significantly and positively correlated with anticipatory processing, the observer perspective self-image, and the post-mortem. This is in line with the assertion that meta-cognitive beliefs regulate the cognitive attentional syndrome. For example, according to the S-REF model, positive and negative beliefs about worry (e.g., “worry helps me cope”, and “worry is uncontrollable”) should be associated with increased worry. Consistently, this study found that positive and negative beliefs about worry and thoughts were positively associated with worry about social situations, dwelling on past social experiences, and focusing on an observer perspective self-image when in social situations.

In addition to the above hypotheses, the present study generated three research questions. The first enquired whether meta-cognitive beliefs predict social anxiety independently of the cognitive maintenance processes. The results showed that positive and negative meta-cognitive beliefs were individual predictors of social anxiety. Moreover, these beliefs accounted for a significant proportion of variance in social anxiety and explained a significant amount of that variance over and above the cognitive variables.

However, positive meta-cognitive beliefs predicted social anxiety when controlling for other variables and this relationship was negative. Dannahy and Stopa (2007) found that high and low socially anxious individuals did not differ in their scores on positive meta-cognitive beliefs. Their results were in line with the present study that found a non-significant positive correlation between positive meta-cognitive beliefs and social anxiety. However, this relationship became significant and negative when controlling for uncontrollability beliefs. This finding requires further investigation as it may be the result of a suppressor effect of negative beliefs and anticipatory processing. Therefore, it could be that positive beliefs normalise worry, thereby decreasing anxiety. However, when negative beliefs and/or anticipatory processing are present, positive beliefs become strong predictors of social anxiety. This could be due to the mediating effect of anticipatory processing discussed below.

These results offer further support for the S-REF model (Wells & Matthews, 1994) and the notion that meta-cognitive beliefs could be implicated in social anxiety and social phobia. In effect, the second research question led to an exploratory analysis that indicated an optimal set of cognitive and meta-cognitive predictors of social anxiety. These were positive and negative meta-cognitive beliefs, and anticipatory processing.

Finally, the S-REF model proposes that positive and negative meta-cognitive beliefs should have an impact on emotional disorders via regulating the CAS. Additionally, negative meta-cognitive beliefs may moderate the negative effect of the cognitive mechanisms on emotional disorders. In line with this, the third research question enquired whether positive and negative beliefs had an indirect effect on social anxiety via anticipatory processing and the post-mortem. A further aim was to explore whether negative beliefs have a moderating effect on the relationship between anticipatory and post-mortem processing, and social anxiety.

Consistent with the S-REF model, the results showed that negative meta-cognitive beliefs had an effect on social anxiety that was partially mediated by anticipatory processing and the post-mortem. Positive meta-cognitive beliefs had a marginal effect on social anxiety that was fully mediated by anticipatory processing and the post-mortem. However, negative beliefs did not show a moderating effect on the relationship between the cognitive mechanisms and social anxiety. It could be that a clinical sample of social phobic individuals is necessary to identify such an effect.

A limitation of the current study was that the scale that was used to measure the post-mortem (PEPQ) did not correlate with social phobia in a clinical sample (McEvoy & Kingsep, 2006). Nevertheless, the authors did not explore potential associations between the PEPQ and the FNE scale that was used in the present study. Finally, the MCQ-30 (Wells & Cartwright-Hatton, 2004) measures meta-cognitive beliefs about worry and thoughts. A measure of meta-cognitive beliefs specific to cognitive processes in social anxiety could be more sensitive to the associations between meta-cognitive beliefs and the CAS in social anxiety.

In summary, negative meta-cognitive beliefs positively correlated with social anxiety. Moreover, positive and negative meta-cognitive beliefs positively correlated with the cognitive mechanisms implicated in social phobia. Additionally, these beliefs made individual contributions to social anxiety, along with anticipatory processing. Finally, these beliefs had indirect effects on social anxiety through the cognitive mechanisms. These results are consistent with the call to move conceptualisation of social anxiety closer to the meta-cognitive model (Wells, 2002).

CHAPTER 3

Investigation of the nature of meta-cognitive beliefs in social anxiety and the construction of two new questionnaires

3.1. Introduction

According to the S-REF model (Wells & Matthews, 1994), meta-cognitive beliefs are involved in the maintenance of emotional disorders. The previous study (Study 1) found that this might apply in social anxiety. More specifically, the results showed that positive beliefs had an inverse predictive value in social anxiety when controlling for negative beliefs and cognitive mechanisms. Negative beliefs were positive individual predictors of social anxiety. Moreover, positive and negative beliefs had indirect effects on social anxiety via two maintenance processes in social phobia. These were anticipatory processing and the post-mortem. However, Study 1 assessed meta-cognitive beliefs about general worry and thoughts as opposed to beliefs about these maintenance processes that are more specific to social anxiety.

In one study, McEvoy et al. (2009) found that reductions in meta-cognitive beliefs were associated with reductions in social anxiety, depression, and post-mortem processing after group cognitive therapy. However, similar to the first study of the current PhD, this study employed the short version of the Metacognitions Questionnaire (Wells & Cartwright-Hatton, 2004) to target beliefs about general worry.

These findings expand on previous results that high socially anxious individuals scored higher than low socially anxious individuals on cognitive self-consciousness and on the uncontrollability of ruminative thoughts (Dannahy & Stopa, 2007). In this study, Dannahy and Stopa (2007) used a modified version of the Metacognitions Questionnaire (Cartwright-Hatton & Wells, 1997) to target beliefs about cognitions that occur during the post-mortem. This measure was designed to assess three types of meta-cognitive beliefs: positive beliefs that the post-mortem helps in problem solving, uncontrollability beliefs, and cognitive self-consciousness. However, the authors did not investigate the psychometric properties of their modified questionnaire.

In summary, there is preliminary evidence for the S-REF model based suggestion that meta-cognitive beliefs play a role in social anxiety. However, this evidence derived from measures of beliefs about general worry and thoughts and from a modified measure with unknown psychometric properties. Hence, research could benefit from reliable assessment tools that target meta-cognitive beliefs about the more specific cognitive mechanisms implicated in social phobia.

Following the above, the current study aimed to investigate the presence and content of meta-cognitive beliefs about three cognitive mechanisms implicated in social anxiety. As described by Clark and Wells (1995), these mechanisms are anticipatory processing, the observer perspective self-image, and post-mortem processing. In particular, the first objective was to explore the nature of these processes and to elicit positive and negative meta-cognitive beliefs about them. A further aim was to explore potential differences in these beliefs and processes between high and low social anxiety groups.

The final objective was to use the content elicited to inform the development of two new measures that would target meta-cognitive beliefs about anticipatory processing and about focusing on an observer perspective self-image. For the purposes of the present PhD, these measures would facilitate further research on the role of meta-cognitive beliefs in social anxiety.

3.2. Method

3.2.1. Participants

As reported in the previous study, 163 participants were screened using the Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969). Cut-off points (Stopa & Clark, 2001) were used on the measure to select a low social anxiety (Low-FNE) and a high social anxiety (High-FNE) group corresponding to a “non-clinical” and a “clinical” population. Sixteen low-FNE participants and twelve High-FNE participants either refused to participate or had not provided valid contact details and could not be reached. Ultimately, the low social anxiety group included 22 participants that scored eight or below on the FNE scale. The high social anxiety group included 20 participants whose total score was 22 or above.

Table 3.1 shows the mean age of participants in each group and the percentages of males and females. The difference in gender between the two groups was not significant, $\chi^2(1, N = 40) = 1.66$, Exact $p = .27$ (however, two cells (50%) had fewer than five expected frequencies). The low-FNE group were older ($M = 26.20$) than the high-FNE group ($M = 21.95$), $t = -2.39$, $SE = 1.79$, $p = .02$ (equal variances not assumed, $F = 6.35$, $p = .02$)).

Table 3.1: Means and standards deviations for Age, and Gender distribution

| | High FNE (N=22) | Low FNE (N=20) |
|--------------------------|-----------------|----------------|
| Mean (age) | 21.95 | 26.20 |
| Standard Deviation (age) | 3.41 | 7.25 |
| Gender (Female) | 19 (86.4%) | 14 (70%) |
| Gender (Male) | 3 (13.6%) | 6 (30%) |

3.2.2. Semi-structured interview

The interview questions were based on meta-cognitive profiling (Wells, 2002; Wells & Matthews, 1994). This type of questioning targets meta-cognitive beliefs about cognitive processes. For example, meta-cognitive profiling includes questions about the advantages and disadvantages of worrying (e.g., “Do you think there are any advantages to worrying”?, “Can worry be harmful in any way”?).

For the purposes of the present study, the interview questions referred to anticipatory processing, focusing on a self-image from an observer perspective, and post-mortem processing. Initially, the experimenter explained these concepts and provided examples. Then, a series of questions elicited a) positive and negative beliefs about these processes, b) ways of controlling them, and c) stop signals. Moreover, the experimenter enquired about the frequency of occurrence of the cognitive mechanisms, their duration, and the average time spent to control them. The interview questions are presented in Appendix 3.1.

3.2.3. Coding

The data were analysed and coded into categories of meta-cognitive beliefs as follows: First, recurrent themes were identified and noted. For example, beliefs, such as “It makes me feel anxious”, “It makes me feel sad”, and “It makes me upset”, were categorised under the theme “feelings”. Second, the themes were reformulated into categories based on the theoretical background (e.g., the heading “feelings” was changed to “negative meta-cognitive beliefs about feelings related to anticipatory processing”). Third, the final categories were checked for coherence and consistency with the initial themes. For example in relation to post-mortem processing, two separate categories were formed to include beliefs about positive and negative feelings respectively. These categories were “positive post-mortem”, and “negative beliefs about the emotions related to post-mortem processing”.

Each participant was allocated a score of either 0 (absence: a belief was not expressed) or 1 (presence: a belief was expressed) on each category of beliefs. Continuous data formed separate categories (e.g., “controllability” and “time spent trying to control the cognitive mechanism”). The categories are presented in Appendix 3.2 (rating sheet).

3.2.4. Procedure

High and low socially anxious individuals took part in semi-structured telephone interviews. Each Interview lasted approximately 30-45 minutes. The experimenter contacted participants by email or phone and asked them to participate in the phone interview that was described in the participant information sheet. Second year psychology students were offered course credits and everybody was given the opportunity to enter a prize draw for £50.

The experimenter conducted the interviews, audio-recorded them, and kept written notes. Written and oral consent was obtained from participants before the interview. All participants were reminded that they did not have to divulge any personal information if they did not wish to do so and that they had the right to withdraw from the study at any time without having to give an explanation.

3.2.5. Overview of Analysis

An independent rater was employed in order to test inter-rater reliability, as follows: Lists of beliefs were created for each participant. Each list included the statements mentioned by each participant regarding anticipatory processing, focusing on an observer perspective self-image, and post-mortem processing. All statements were listed verbatim. Moreover, a ‘rating sheet’ was created that included all categories of beliefs. The rater rated each participant’s responses by assigning each of the listed beliefs into the given categories and then rating each category with 1 if a relevant belief was mentioned and with 0 if it was not. Therefore, each participant’s responses were rated in the same way that the experimenter had rated them. The experimenter offered training and written instructions. The ‘rating sheet’ and the instructions are presented in Appendices 3.2 and 3.3, respectively. The rater was paid £50 for her assistance.

Cohen’s kappa statistics (Cohen, 1960) were employed to check the agreement between the experimenter and the rater. Results were interpreted following Landis and Koch’s (1977) suggestions, as follows: reliability coefficients greater than .80 and lower than .20 represented an almost perfect agreement and a slight agreement, respectively.

Intermediate coefficients were considered fair (.20-.40), moderate (.40-.60), and substantial (.60-.80), accordingly.

To explore potential differences between the high and low social anxiety groups, t-tests and chi-square tests were conducted. The following section reports significant differences and trends.

Correlation coefficients and eta-squared statistics (η^2) were used as effect sizes, while the phi (ϕ) statistic was employed to estimate the χ^2 effect size.

3.3. Results

3.3.1. Inter-rater reliability

Inter-rater agreement ranged between moderate to perfect for almost all categories (Appendix 3.4). The exceptions were the following:

- Negative beliefs that anticipatory processing had a negative impact on performance: Slight agreement, Cohen's kappa = 0.19,
- Beliefs that being practical and solution-focused could control anticipatory processing: Slight agreement, Cohen's kappa = 0.11,
- Beliefs that rationalisation could control the observer perspective self-image: Slight agreement, Cohen's kappa = 0.21,
- Beliefs that the observer perspective self-image could be controlled by acknowledging it: Slight agreement, Cohen's kappa = 0.11,
- Beliefs that a stop signal for the observer perspective self image was when it was rationalised: Fair agreement, Cohen's kappa = 0.29,
- Beliefs that a stop signal for the observer perspective self image was preoccupation with it: Fair agreement, Cohen's kappa = 0.38, and
- Beliefs that post-mortem processing could be controlled by avoiding social situations: Slight/no agreement, Cohen's kappa = 0.05.

These categories were omitted from the analyses and from the development of the new questionnaires.

The 54 categories that were retained and examples of beliefs are presented in Appendix 3.5.

3.3.2. Comparisons between the high and low social anxiety groups

The following sections report the results of comparisons between the social anxiety groups regarding meta-cognitive beliefs (χ^2 tests) and the level of engagement in the cognitive processes (t-tests).

Normality was tested with the Kolmogorov-Smirnov (K-S) test. The following continuous variables were not normally distributed and logarithm transformation succeeded in normalising them: duration of anticipatory processing, frequency of focusing on a self-image, duration of focusing on the self-image, duration of post-mortem processing, and time spent trying to control the post-mortem. Ratings of the uncontrollability of the post-mortem failed to normalise with any of the transformations applied (logarithm, square root, and reciprocal), hence a non-parametric test was employed.

3.3.2.1. Frequency of cognitive processes

In terms of anticipatory processing, low socially anxious individuals reported that they engaged in this process in approximately one social situation out of 10 ($SD = .88$), while the high social anxiety group reported on average 3.4 social situations out of 10 ($SD = 1.87$). This difference was significant, $t(24) = -4.41$, $p < .0005$, without assuming equal variances, $\eta^2 = -.58$, $r = .76$.

Additionally, the high-FNE group reported experiencing an observer perspective self-image in more social situations ($M = 6$ out of 10, $SD = 1.99$) than the low-FNE group ($M = 3.5$ out of 10, $SD = 3.53$), $t(28) = -2.45$, $p = .01$ (equal variances not assumed), $\eta^2 = -.21$, $r = .45$.

However, in terms of the post-mortem, the high social anxiety group reported engaging in the post-mortem in 4 situations out of 10 ($SD = 2.45$), whereas the low social anxiety group reported engaging in the post-mortem in 3.7 social situations out of 10 ($SD = 2.94$). This difference was not significant, $t(27) = -.417$, $p = .68$, $\eta^2 = .01$, $r = .08$.

These results are presented in Figure 3.1.

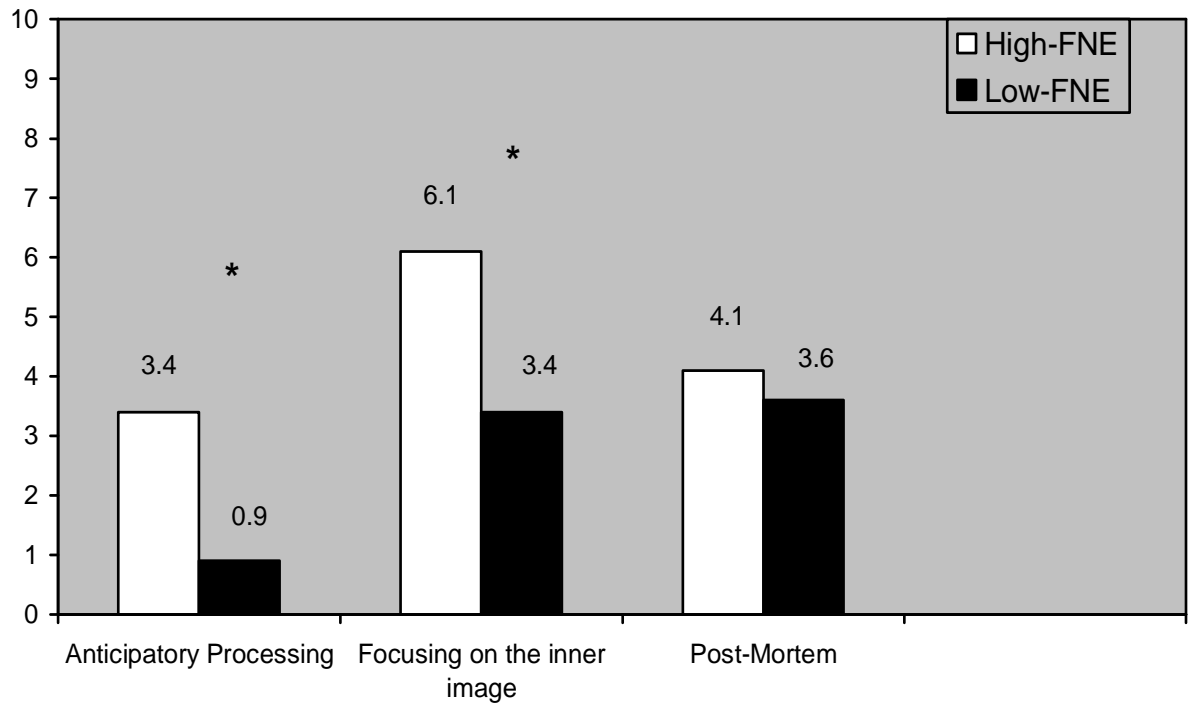


Figure 3.1: Differences between high and low social anxiety groups in the frequency (out of ten social situations) of anticipatory processing, focusing on the inner image, and the post-mortem, * $p < .02$

3.3.2.2. Duration of cognitive processes

The high social anxiety group reported that on average, their anticipatory worry lasted 515 minutes ($SD = 723.75$) while the low social anxiety group reported that it lasted 103.5 minutes ($SD = 335.41$). This difference was significant, $t(38) = -2.22$, $p = .024$ (equal variances not assumed), $\eta^2 = -.13$, $r = .36$.

Furthermore, the high socially anxious group reported focusing on the observer perspective self-image for approximately 336 seconds ($SD = 325.52$), while the low socially anxious group reported 78 seconds ($SD = 214.04$), $t(-2.84)$, $p = .01$, $\eta^2 = -.19$, $r = .43$.

Finally, the high social anxiety group reported engaging in the post-mortem for an average of 1,105 minutes ($SD = 2349.96$), whereas the low social anxiety group reported engaging in the post-mortem for an average of 533 minutes ($SD = 1466.82$). This difference was not significant, $t(37) = -.91$, $p = .37$, $\eta^2 = -.05$, $r = .22$.

These results are presented in Figure 3.2.

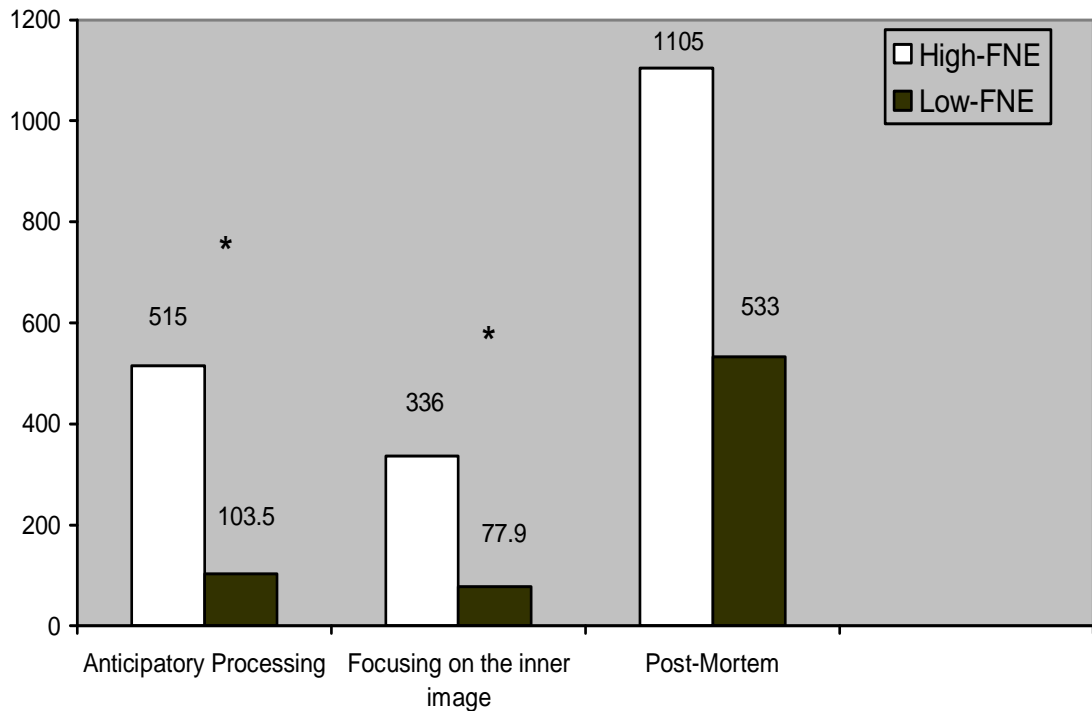


Figure 3.2: Differences between high and low social anxiety groups in the duration (in minutes) of anticipatory processing, focusing on the inner image, and the post-mortem, * $p < .05$

3.3.2.3. Meta-cognitive beliefs about the cognitive processes

Additionally, the high and low social anxiety groups differed on various meta-cognitive beliefs about anticipatory processing and the post-mortem. However, sample sizes were small, hence making interpretation difficult.

3.3.2.3.1. Positive meta-cognitive beliefs

In particular, nine High-FNE individuals (40.9%) and two low socially anxious individuals (10%) reported that anticipatory processing helped them become self-aware in social situations. This difference was significant, $\chi^2 (1, N = 11) = 5.18$, Exact $p = .03$, $\phi = .68$.

3.3.2.3.2. Negative meta-cognitive beliefs

Seven high-FNE individuals (31.8%) and one low-FNE individual (5%) reported having the negative meta-cognitive belief that the post-mortem made them want to avoid future situations. This difference was significant, $\chi^2 (1, N = 8) = 4.89$, $p = .05$ (two cells had expected count fewer than 5), $\phi = .78$.

Finally, eight high-FNE individuals (36.4%) and one low-FNE individual (5%) reported having the negative meta-cognitive belief that post-mortem processing distracted them from other things that they should be doing or thinking. This difference was significant, $\chi^2(1, N = 9) = 6.12, p = .02, \phi = .82$, but two cells had expected count fewer than 5.

3.3.2.3.3. Uncontrollability of cognitive processes

On a scale of zero to ten (0= completely uncontrollable, 10=completely controllable), the high social anxiety group reported that anticipatory processing was 5.7 controllable (SD = 1.61), while the low social anxiety group rated its controllability as 8.4 (SD = 1.22). This difference was significant, $t(31) = 5.52, p < .0005, \eta^2 = .49, r = .70$.

Moreover, the two groups differed in terms of the perceived uncontrollability of the self-image. The high social anxiety group reported greater uncontrollability ($M = 4.93/10$, $SD = 2.61$) than the low social anxiety group ($M = 7.5/10$, $SD = 2.55$), $t(31) = -2.82, p = .008, \eta^2 .20, r = .45$.

Finally, the high socially anxious group rated post-mortem processing as 5.2/10 controllable (SD = 2.48) while the low socially anxious group rated it as 8/10 controllable (SD = 1.88). These data failed to normalise and a t-test was not possible. However, a Mann-Whitney test showed that low-FNE individuals perceived post-mortem processing as more controllable (Mdn = 8) than did high-FNE individuals (Mdn = 6), $Z = -3.02, U = 48, p = .002, r = -0.53$.

These results are presented in Figure 3.3.

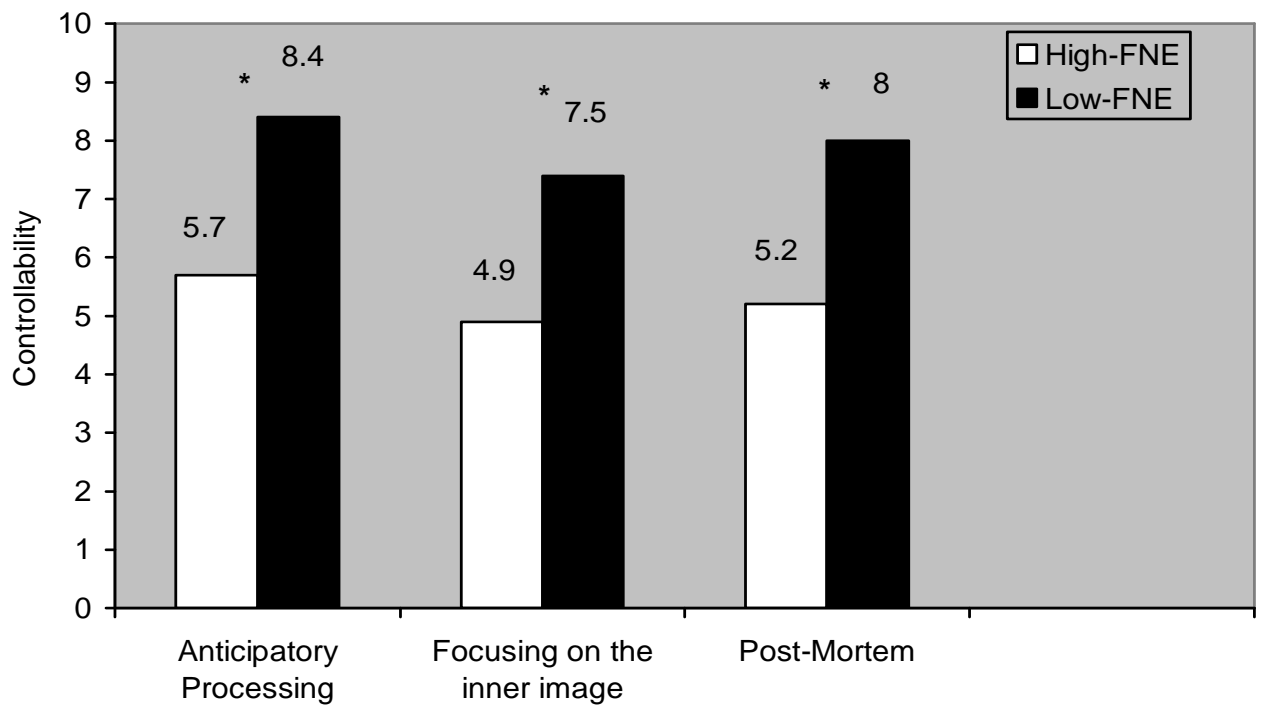


Figure 3.3: Significant differences between high and low FNE groups in perceived controllability of the cognitive mechanisms, $*p < .01$

3.3.2.4. Thought control strategies

Additionally, the interview elicited beliefs about the ways of controlling the cognitive mechanisms. Compared with high-FNE individuals (59.1%), low-FNE individuals (85%) were marginally more likely to report that anticipatory processing could be controlled by rationalisation, $\chi^2(1, N = 30) = 3.45, p = .09, \phi = .33$.

In addition, thirteen high-FNE individuals (59.1%) and four low-FNE individuals (20%) reported that anticipatory processing could be controlled by distraction; that is by thinking of something else. This difference was significant, $\chi^2(1, N = 17) = 6.64, p = .01, \phi = .62$.

Finally, 10 high-FNE individuals (45.5%) and three low-FNE individuals (15%) reported having the belief that the post-mortem could be controlled by speaking to somebody (e.g., parents, friends, and a counsellor). This difference was significant, $\chi^2(1, N = 13) = 4.55, p = .05, \phi = .59$.

3.3.2.5. Time spent trying to control cognitive processes

In terms of the time spent trying to control the cognitive processes, high socially anxious individuals reported that they spend more time trying to control anticipatory processing (42% of their worry time, $SD = 27.32$) compared with the low socially anxious group (16.6% of their worry time, $SD = 25.15$). This difference was significant, $t(27) = -2.6$, $p = .01$, $\eta^2 = .23$, $r = .48$.

Moreover, high socially anxious individuals seemed to spend on average 34% ($SD = 21.31$) of the socialising time trying to control their image while low socially anxious individuals reported spending 12% ($SD = 19.45$) of that time for the same purpose, $t(28) = -3.04$, $p < .01$, $\eta^2 = .27$, $r = .53$.

Finally, the high-FNE group reported spending 36% ($SD = 27.62$) of the time they engaged in the post-mortem trying to control it, whereas the low-FNE group reported spending on average 13% ($SD = 19.97$) of that time trying to control post-mortem processing. This difference was significant, $t(26) = -2.50$, $p = .02$, $\eta^2 = .23$, $r = .48$.

These results are presented in Figure 3.4.

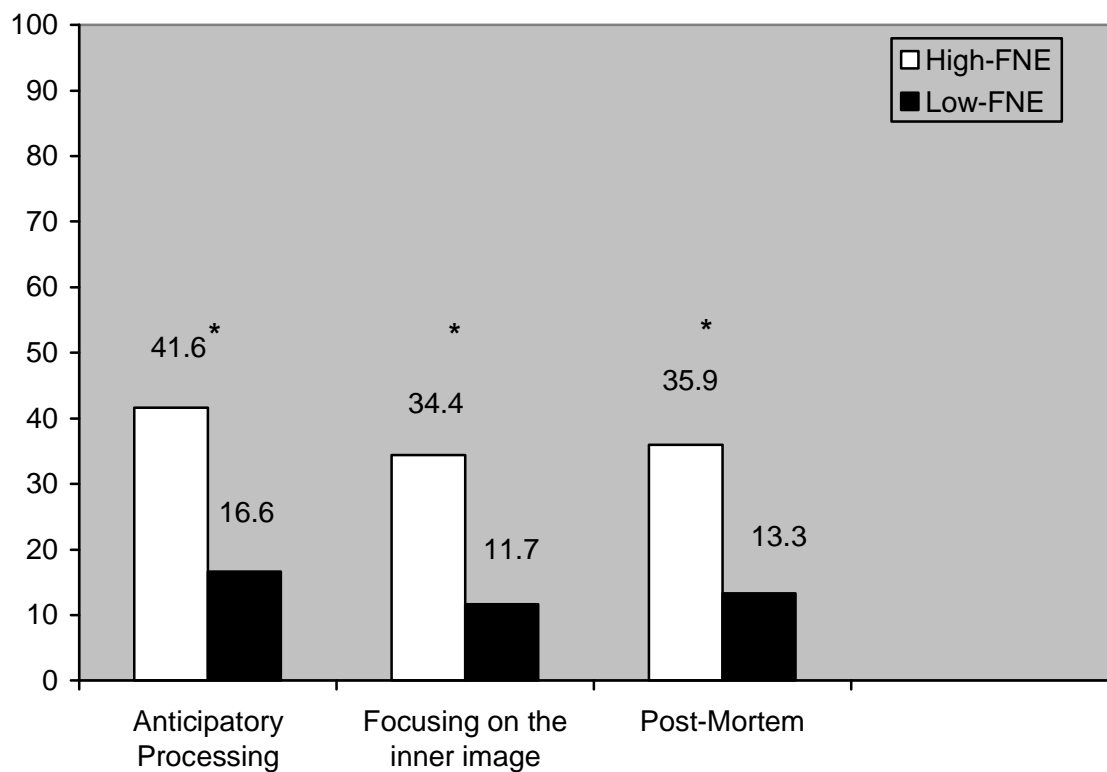


Figure 3.4: Significant differences in the percentage of time spent trying to control anticipatory processing, focusing on the inner image, and the post-mortem between high and low social anxiety groups, * $p < .02$

3.3.2.6. Stop signals

Finally, six high-FNE individuals (27.3%) and one low-FNE individual (5%) reported that a signal for stopping anticipatory processing was the disconfirmation of worries. This difference was significant, $\chi^2(1, N = 7) = 6.36, p = .02$, but two cells had fewer than five expected frequencies, $\phi = .36$.

Similarly, eleven high-FNE individuals (50%) and one low-FNE individual (5%) reported that a stop signal for focusing on their self-image was the disconfirmation of the image. This difference was significant, $\chi^2(1, N = 12) = 4.02, p < .01, \phi = .58$.

3.3.3. Construction of new measures

The descriptive data obtained in the interview study was used as a basis for generating items for two specific measures of meta-cognitive beliefs in social anxiety, as follows:

- The Metacognitions about Anticipatory Processing scale consisted of 31 randomly ordered items representative of all of the reliable categories of meta-cognitive beliefs. These were grouped in the following subscales (Appendix 3.6):
 - task-focused beliefs (e.g., “Anticipatory processing helps me plan what I can talk about”),
 - other-focused beliefs (e.g., “Makes me sensitive to other people’s needs”),
 - self-focused beliefs (e.g., “Helps me visualise how to present myself”),
 - avoidance beliefs (e.g., “Allows me to avoid situations I find difficult”), and
 - uncontrollability beliefs (e.g., “Is something I have no control over”).
- Similarly, the Metacognitions about Focusing on an Image of the Self scale consisted of 26 randomly ordered Items that formed three subscales (Appendix 3.7). These were positive beliefs (e.g., “Focusing on my self-image helps me present the person I want to be”), negative beliefs (e.g., “Stops me from being myself”), and uncontrollability beliefs (e.g., “Just happens spontaneously”).

Subsequent studies reported in the next chapter investigated the psychometric properties of these measures. The final versions of the questionnaires are discussed in Study 3.

3.4. Discussion

This study explored the nature of anticipatory processing, focusing on an inner image from an observer perspective, and post-mortem processing, and the presence and nature of meta-cognitive beliefs about these processes. Moreover, it explored relevant differences between high and low socially anxious individuals.

In terms of the cognitive processes, high socially anxious individuals seemed to engage in anticipatory processing and in focusing on the observer perspective image more frequently and for a greater period compared with low socially anxious individuals. As proposed by Wells and Matthews (1994), this could be indicative of prolonged engagement in the CAS (Wells & Matthews, 1994). In further support of this argument, high socially anxious individuals reported spending more time trying to control anticipatory processing, the observer perspective self-image, and post-mortem processing. However, even though the high social anxiety group reported engaging in the post-mortem twice as much as the low social anxiety group, this difference was not significant. This could be due to the low effect size and large standard deviations in the context of a small sample.

In terms of meta-cognitive beliefs, the high social anxiety group was more likely than the low social anxiety group to report that anticipatory processing helped them become self-aware in social situations. This belief implied that self-awareness was an advantage. Nevertheless, self-focused attention has been described as one of the maintenance mechanisms of social phobia (Clark & Wells, 1995; Hartman, 1983; Ingram, 1990) and current research has supported this assertion (Hirsch, Clark et al., 2003; Mansell et al., 2003; Mellings & Alden, 2000; Woody, 1996). According to the S-REF model (Wells & Matthews, 1994), self-focused attention might limit cognitive capacity, exaggerate physical symptoms, and prevent people from attending to disconfirmatory information. The above results indicated that there could be positive meta-cognitive beliefs linked to self-focused attention in social anxiety.

Furthermore, high socially anxious individuals reported that thought distraction could control anticipatory worry, whereas low socially anxious individuals seemed to rely more on rationalisation. In effect, studies have shown that distraction was associated with reduced state anxiety, whereas anticipatory processing with increased state anxiety (Hinrichsen & Clark, 2003; Vassilopoulos, 2005a). Nevertheless, the present study did not test whether these strategies were actually activated during anticipatory worry periods. Further research is required to examine whether the relationship between meta-cognitive beliefs and worry could be moderated by strategies, such as distraction and rationalisation.

Moreover, half of the high socially anxious group reported that disconfirmation signalled that they should stop focusing on their observer perspective self-image. However, the S-REF model (Wells & Matthews, 1994) suggests that individuals' preoccupation with self-processing might inhibit the processing of disconfirmatory information. Hence, the individual might fail to perceive the stop signal, thus staying focused on the self-image. Exposure with an emphasis on external focus of attention might reverse this effect. In line with this, Wells and Papageorgiou (1998) found that in social phobia, exposure combined with external focus of attention was more efficient than exposure alone in reducing anxiety and negative beliefs in social phobic individuals participating in a behavioural task.

In terms of the uncontrollability of the cognitive processes, high socially anxious individuals reported greater uncontrollability of the cognitive processes compared with low socially anxious individuals. This was consistent with the notion that uncontrollability beliefs about thoughts are implicated in emotional disorders (Wells & Matthews, 1994). Moreover, this result expands on previous findings that high socially anxious people scored higher on uncontrollability beliefs about the post-mortem compared with a low social anxiety group (Dannahy & Stopa, 2007), and that uncontrollability beliefs about general worry were individual positive predictors of social evaluative anxiety (Study 1).

Moreover, it is worth noting that both groups reported positive, negative, and uncontrollability meta-cognitive beliefs about the cognitive processes. Therefore, it could be that the above results reflect individual differences in the strength of meta-cognitive beliefs rather than in the content. To explore this, two new questionnaires were developed to assess beliefs about anticipatory processing and about focusing on the observer perspective self-image (see Chapter 4; Study 3).

The current study had the following limitations: The age difference between the two groups was significant. Hence, it could be that age had an effect on the results. However, this difference could be representative of the general population. In particular, a study on the prevalence of social anxiety found that social phobia was largely associated with ages below 25 compared with above (Ohayon & Schatzberg, 2010). Consistent with this, the current sample indicated a mean age of 22 years for the high social anxiety group and a mean age of 26 years for the low social anxiety group.

Another limitation was the use of an analogue population. Thus, results cannot be generalised to clinical populations. Moreover, several of the analyses indicated low effect sizes, hence suggesting a likelihood of Type II error. A larger sample size and more structured interviews could have improved the study's statistical power.

Of greatest significance, the interview method is limited because individuals may lack accurate insight into their cognitive processes and meta-cognition. Meta-cognitive statements about cognitive processes may not reflect stable underlying beliefs but only post-hoc explanations for mental phenomena.

In brief, the present study conducted a preliminary examination of the presence and nature of meta-cognitive beliefs in social anxiety. In effect, high and low socially anxious participants expressed positive and negative meta-cognitive beliefs about three cognitive mechanisms implicated in social phobia. These beliefs will be used to develop two new measures on meta-cognition in social anxiety. The next chapter presents the results of the investigation of these measures in an analogue population.

CHAPTER 4

Development of measures of meta-cognitive beliefs in social anxiety: psychometric properties, and relationships with cognitive mechanisms and social anxiety

4.1. Introduction

According to the Self-Regulatory Executive Function (S-REF) model (Wells & Matthews, 1994), emotional disorders are maintained by a Cognitive Attentional Syndrome (CAS). This syndrome involves worry, rumination, threat monitoring, avoidance, self-focus and unhelpful coping behaviours. Contemporary cognitive-behavioural models of social phobia (Clark & Wells, 1995; Rapee & Heimberg, 1997) implicate several of these mechanisms in social anxiety. The present study focused on two: anticipatory processing and focusing on the observer perspective self-image.

Anticipatory processing is a worry-like thinking process that involves repetitive, negative, and intrusive predictions. Furthermore, anticipatory processing involves memories of past failures, thoughts about avoidance and escape, and a self-focused processing state (Clark & Wells, 1995). Current research has shown that anticipatory processing is associated with high social anxiety, and that distraction that interrupts anticipatory processing is associated with decreased state anxiety in high socially anxious individuals (Hinrichsen & Clark, 2003; Vassilopoulos, 2005a, 2008a).

Another cognitive component in the Clark and Wells (1995) model is the observer perspective self-image. This involves taking the presumed perspective of others about the self. For example, in a crowded and noisy place people tend to speak loudly. If the sounds suddenly stopped and a person continued speaking with the same volume, then this person would be likely to become aware of the sound of his/her voice as presumably heard by others. Similarly, in stressful social situations, people with social phobia are thought to experience self-images as if viewed from other people's eyes (Clark & Wells, 1995). These images are based on physical sensations and biased predictions; hence, they might not be accurate representations of what other people can see. Current research has offered support to the notion that negative self-imagery plays a causal role in social anxiety (Hirsch, Clark et al. 2003; Hirsch, Mathews et al. 2003; Hirsch, Mathews et al. 2006). Furthermore, studies (Hackmann et al., 2000; Hackmann et al., 1998; Wells et al., 1998) have shown that high socially anxious individuals are more likely than low socially anxious individuals to experience self-images that are negative, distorted, and from an observer perspective.

Even though anticipatory processing and the observer perspective self-image have been linked to elevated anxiety and social discomfort, it remains unclear how these processes are maintained. The S-REF model (Wells & Matthews, 1994) suggests that meta-cognitive knowledge is involved in the maintenance of the maladaptive cognitive mechanisms implicated in emotional disorders. In line with this, the first study of the present PhD (Gkika & Wells, 2009a) found that meta-cognitive beliefs about the uncontrollability and harmfulness of thoughts as well as positive meta-cognitive beliefs were associated with anticipatory processing. Furthermore, positive and uncontrollability beliefs were individual predictors of social anxiety, while anticipatory processing mediated the relationships between uncontrollability and positive beliefs, and social anxiety.

The above results may have been influenced by the measure that was used. Study 1 utilised the Metacognitions Questionnaire (Wells & Cartwright-Hatton, 2004) that assesses beliefs about general worry and thoughts. However, a subsequent study (Chapter 2) indicated that there are meta-cognitive beliefs that are specific to social anxiety by means of targeting anticipatory processing and the observer perspective self-image. To the author's knowledge, there are no measures that assess these beliefs. Such measures could enable further research on the role of meta-cognitive beliefs in social anxiety.

Following the above, two questionnaires were developed: The Metacognitions about Anticipatory Processing Scale (MAPS) and the Metacognitions about Focusing on an Image of the Self (MFIS) scale. The purpose of the present study was to investigate the psychometric properties of these measures in a convenience sample (first set of analyses), and to explore the role of beliefs in social anxiety (second set of analyses).

The following hypotheses were generated:

- 1) The new meta-cognitive belief measures would correlate positively with the Fear of Negative Evaluation (FNE) Scale (Watson & Friend, 1969) and the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998).
- 2) Meta-cognitive beliefs would be individual predictors of social anxiety beyond anticipatory processing and the observer perspective self-image, and depression. Following the findings in Study 1, positive beliefs were expected to show an inverse association with FNE when controlling for negative beliefs and anticipatory processing, and negative beliefs were expected to have a positive relationship with the FNE scale.
- 3) Anticipatory processing, public self-consciousness, and the observer perspective self-image were considered elements of the CAS. Hence, based on the S-REF model (Wells & Matthews, 1994), it was expected that these mechanisms would mediate the relationship between meta-cognitive beliefs and social anxiety.

4.2. Method

4.2.1. Items

As reported in the previous chapter, 22 high socially anxious individuals and 20 low socially anxious individuals participated in semi-structured interviews. The interviews served to elicit meta-cognitive beliefs about anticipatory processing, post-mortem processing, and the observer perspective self-image. The questions were based on meta-cognitive profiling (Wells, 2002). The two groups were based on the cut-off points suggested for British populations (Stopa & Clark, 2001). Participants' answers as well as the theoretical background (S-REF model; Wells & Matthews, 1994) informed the items of the new questionnaires.

4.2.2. Participants

Participants in this study were 313 individuals that had not taken part in the interviews. They were recruited at convenience and were compensated with a prize draw opportunity and course credits. Following the departmental regulations, the credits were only offered to 2nd year psychology students. For the analysis of the MFIS scale, the sample consisted of 269 participants. Mean age was 22.69, SD = 6.19. Seventy-nine of the participants were male (29.4%) and 188 (69.5%) were female. For the analysis of the MAPS scale, the sample consisted of 313 individuals. Eighty-nine (28.6%) of them were male and 222 (70.9%) were female. Mean age was 22.76 (SD = 6.05). The number of recruited participants ensured that the ratio of cases to items was at least 10:1.

The MAPS and MFIS were re-administered to 64 individuals that responded within the time limit (3-4 weeks after the first administration). The mean days that elapsed between the test and retest conditions was 21.58, SD = 2.71. Mean age was 21.95, SD = 7.19. Fifty-four individuals were female (84.4%) and 10 were male (15.6%).

Finally, a power analysis using the G*Power software (Erdfeider et al., 1996) indicated that a sample of 146 individuals would suffice for a power of .95 when entering seven predictors in a hierarchical linear regression and assuming a medium effect size of .15. In line with this, 176 individuals completed all the administered questionnaires.

4.2.3. Measures

The following self-report measures were administered:

The short Metacognitions Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004): A 30-item measure of individual differences in meta-cognitive beliefs. This measure was described in the previous Chapter (Section 2.1.2.2.)

The Social Interaction Anxiety Scale (Mattick & Clarke, 1998): A 20-item scale that assesses fear of and responses to social interactions. It has shown high internal consistency (Cronbach's alpha .93) and test-retest reliability (.92), and high correlation with the FNE (.66, $p < .001$).

The Depression Anxiety Stress Scale (S. H. Lovibond & P. F. Lovibond, 1995): A 42-item questionnaire that targets depression, anxiety, and stress. It has shown (P. F. Lovibond & S. H. Lovibond, 1995) good convergent validity with the BDI and BAI. Its internal consistency was high for all subscales (Antony, Bieling, Cox, Enns, & Swinson, 1998): depression (.97), anxiety (.92), and stress (.95).

The Metacognitions about Anticipatory Processing Scale (MAPS): A 31-item measure of meta-cognitive beliefs about anticipatory processing. This measure used a 4-point Likert scale (Do not agree, Agree slightly, Agree moderately, and Agree very much). As described in Chapter 3 (Study 2), semi-structured interviews elicited meta-cognitive beliefs about anticipatory processing. Overall, 40 beliefs were elicited and categorised in the following subscales: task-focused (e.g., "Keeps me more alert and focused on the tasks I need to do"), other-focused (e.g., "Helps me ensure I do not upset other people"), self-focused (e.g., "Helps me be more aware of myself"), avoidance (e.g., "Allows me to avoid situations I find difficult"), and negative beliefs (e.g., "Could be harmful for my wellbeing", "Is something I have no control over"). Nine beliefs were omitted because they were very similar to other beliefs that were retained. Finally, each category included six beliefs apart from the negative belief subscale that included seven beliefs.

The Metacognitions about Focusing on the Self-Image Scale (MFIS): A 26-item measure of meta-cognitive beliefs about focusing on an observer perspective self-image while in social situations. A 4-point Likert scale was used as described above (Do not agree – Agree very much). The Items derived from the semi-structured interviews conducted in Study 2. Overall, 28 beliefs about the observer perspective were elicited and categorised in positive (e.g., "Helps me present the person I want to be"), negative (e.g., "Can cause me to lose track of the conversation"), and uncontrollability beliefs (e.g., "Enters my mind

against my will"). One belief was omitted because it was very similar to another belief that was retained. Ultimately, the subscales included 13, eight, and six items, respectively.

It is worth noting that the selection of the above categories was based on the S-REF model (Wells & Matthews, 1994). According to this model, positive and negative meta-cognitive beliefs play an important role in the maintenance of emotional disorders. Negative beliefs involve beliefs about the harmfulness and uncontrollability of cognitive mechanisms. Therefore, the present study selected items that expressed positive and negative meta-cognitive beliefs, and omitted items from other categories, such as stop signals and thought control strategies (reported in Study 2). Moreover, the retained beliefs were assigned into positive and negative categories by two raters with good inter-rater reliability (Study 2).

The Anticipatory Social Behaviours Questionnaire (ASBQ; Hinrichsen & Clark, 2003): A 12-item measure of anticipatory processing with good internal consistency (Cronbach's $\alpha = .88$). In this study, alpha was .89.

The Self-Consciousness Scale (Fenigstein et al., 1975): A 23-item measure of private self-consciousness, public self-consciousness, and social anxiety. The three subscales have shown good test-retest reliability: public self-consciousness, $r = .84$, private self-consciousness, $r = .76$, and social anxiety, $r = .73$ (Fenigstein et al., 1975).

The Self-Image Perspective Scale (SIPS): A measure of the frequency of focusing on a self-impression in social situations and of the nature of this impression. This measure was described in previous chapters (Chapter 2, Section 2.1.2.2.).

4.2.4. Procedure

In a cross-sectional design, participants were recruited via the online volunteering service at the University of Manchester and with posters placed in the common rooms. Further online advertisements were posted at the University of Brighton. The posters and online advertisements provided a link to a webpage where participants could complete the first part of the survey online. This part involved completion of the questionnaires described above. Three weeks after the completion of the first part, the experimenter contacted the participants and provided a link to the second part of the study. This involved the re-administration of the MAPS and MFIS scales. Recruitment was scheduled to continue until at least 60 individuals completed both questionnaires within three to four weeks of their initial participation.

4.2.5 Overview of analysis

Principal component factor analyses were conducted to explore the structure of the new scales. Cronbach's alpha reliability analyses examined the scales' internal consistency. Spearman correlations were used to test whether age was associated with the scales and subscales. Mann-Whitney U-tests were employed to test whether gender had an effect on the scales and subscales. Stability was investigated with Spearman correlations between the test and respective retest scores on the scales and subscales. Subsequent tests of stability included paired t-tests for the normally distributed data and Wilcoxon t-tests for the non-parametric data. Finally, Spearman correlations were employed to explore convergent validity. The MCQ-30 subscales were used to test convergent validity with meta-cognitive beliefs. Moreover, the MFIS scale was entered in an analysis along with the SIPS and SCS subscales to test its correlation with the observer perspective and with self-consciousness, respectively. The MAPS was entered in a correlation analysis along with the ASBQ to test convergent validity with anticipatory processing.

Exploration of the data indicated that none of the variables was normally distributed. Therefore, to investigate the inter-correlations predicted in the first hypothesis, Spearman correlation analysis was conducted. To explore the second hypothesis, linear regression analyses were designed. However, transformations of the dependent variable failed. Therefore, it was decided to divide the sample into high and low social anxiety (FNE) groups. The high FNE group was represented by 1 and included participants who had scored equal to or above the median ($Mdn = 15$). The low FNE group was represented by 0 and included participants who had scored below the median.

Following the above, three logistic regressions were conducted as follows: The new variable ("FNE coded") was the dependent variable. Depression (DASS-Depression subscale) was entered at Block 1 and was followed by the cognitive variables at Block 2. These were either public self-consciousness and the observer perspective self-image or anticipatory processing. Then, the MFIS or MAPS subscales were entered at Block 3, respectively.

The third logistic regression analysis was conducted with depression at Step 1, the observer perspective, public self-consciousness, and anticipatory processing at Step 2, and three MCQ-30 subscales at Block 3. The choice of MCQ subscales was based on their correlations with the FNE scale.

As a confirmatory method, multiple linear regressions were also conducted with the initial FNE variable as the dependent variable. The variables entered in each Step followed the pattern of the logistic regressions described above. This hierarchy explored potential unique contributions of meta-cognitive beliefs to social anxiety beyond depression and the purported cognitive mechanisms.

To explore whether the meta-cognitive variables would also predict social anxiety measured with SIAS, the SIAS variable had to be transformed. The square root transformation was successful and the new "SIASsqrt" variable was entered in linear multiple regression analyses as the dependent variable. The hierarchical steps followed the patterns described above.

Finally, to explore the third hypothesis, mediation analyses explored the potential mediating effects of the cognitive variables on the relationships between meta-cognition and social anxiety. As described in the Results, these analyses followed Baron and Kenny's (1986) causal step method when there was one mediator and Preacher and Hayes' (2008) multiple mediator analysis when there were more than one mediators.

4.3. Results

4.3.1. The Metacognitions about Focusing on an Image of the Self scale (MFIS)

4.3.1.1. Factor analysis

The 26 items of the original MFIS scale were analysed using principal components factor analysis. The Kaiser–Meyer–Olkin (KMO) test was used to assess potential homogeneity of variables. Results showed that the data were suitable for this analysis (KMO = .90, Barlett's test (325) = 3313, $p < .0005$). Direct oblimin rotation was employed to allow for items to be inter-correlated. The analysis returned a 4-Factor solution with eigenvalues greater than one. It appeared that Factor 1 reflected positive beliefs about preparing for social situations. Factor 2 themed around beliefs about contaminating the situation, and Factor 3 around uncontrollability beliefs. Factor 4 seemed to refer to positive beliefs about controlling others' impressions in social situations, but included only two items.

However, Item 2 ("focusing on the observer perspective self-image can lead people to think I am acting strangely") and Item 5 ("Makes me want to leave the situation") loaded on both Factors 2 and 3. Therefore, Item 2 was removed. Item 5 was retained because according to Clark and Wells' (1995) model, focusing on an observer perspective inner-image is likely to increase escape seeking.

Following the removal of Item 2 and given that Factor 4 was similar in meaning with Factor 1 and comprised only two Items, the principal components analysis was repeated by specifying a 3-factor solution on the remaining 25 Items. The scree-plot (Figure 4.1) and the examination of the structure matrix (Appendix 4.1) indicated that the 3-item solution was the only one that fitted the data well. The scree plot was interpreted using Tabachnick and Fidell's (2007) guidelines that suggest finding the point where a line drawn through the points changes slope. It was considered that a straight line could fit eigenvalues 1, 2, and 3 and another straight line with a different slope could fit comfortably the remaining eigenvalues.

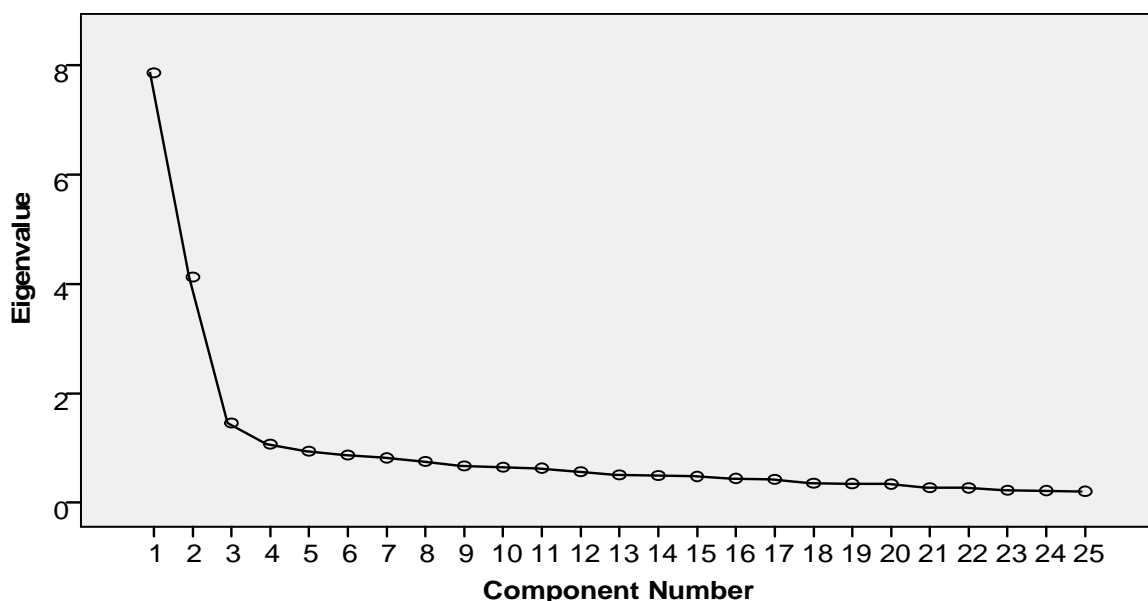


Figure 4.1: MFIS principal components Factor analysis with a 3-Factor solution: scree-plot

The three Factors explained 53.76% of the variance (Factor 1: 31.45%, Factor 2: 16.49%, and Factor 3: 5.82%), and the respective eigenvalues were above one (Factor 1 = 7.86, Factor 2 = 4.12, and Factor 3 = 1.45).

Factor 1 (MFIS-positive) appeared to express positive meta-cognitive beliefs that focusing on an observer perspective inner image could improve impression management and self-presentation. Examples were: "Focusing on the observer perspective self-image is a way of ensuring that people have a certain impression of me" and "Helps me present the person I want to be".

Factor 2 (MFIS-contamination) involved Items that expressed negative beliefs that focusing on an observer perspective image could contaminate social situations (e.g., by triggering maladaptive behaviours). For example, "Can make me give an impression of being unfriendly" and "Stops me from acting naturally".

Factor 3 (MFIS-uncontrollability/self-bias) included negative meta-cognitive beliefs that focusing on an observer perspective self-image was uncontrollable and could reinforce a negative self-bias. Examples were “Makes me see myself in a bad way” and “Cannot be controlled”.

4.3.1.2. Item inter-correlations

Inter-item correlations examined whether items of the same subscale correlated with each other. With respect to the MFIS-positive subscale, correlations ranged between .18 and .72. Only Item 13 indicated a correlation below .20 with Item 12, $r = .18$, $p = .15$. The MFIS-contamination subscale showed correlations that ranged between .38 and .69. The MFIS-uncontrollability/self-bias showed correlations that ranged between .30 and .75.

4.3.1.3. Internal consistency

The full scale and the subscale internal consistencies were good to excellent. In particular, the scale alpha was .90, MFIS-positive alpha was .91, MFIS-contamination alpha was .84, and MFIS-uncontrollability/self-bias alpha was .81.

4.3.1.4. Normality tests

According to the Kolmogorov-Smirnov (K-S) test (D statistic) and examination of the histograms, neither the full scale nor the subscales were normally distributed: MFIS-positive $D(255) = .06$, $p = .013$, MFIS-contamination $D(255) = .14$, $p < .0005$, and MFIS-uncontrollability/self-bias $D(255) = .12$, $p < .0005$. Hence, non-parametric tests were employed.

4.4.1.5. Subscale inter-correlations

Spearman correlations indicated that the subscales significantly positively correlated with each other (Table 4.1).

Table 4.1: Inter-correlations between the MFIS subscales

| | MFIS-uncontrollability/self-bias | MFIS-contamination |
|--------------------|----------------------------------|--------------------|
| MFIS-contamination | .54, $p < .0005$ | |
| MFIS-positive | .38, $p < .0005$ | .18, $p = .003$ |

4.3.1.6. Gender and Age

Spearman correlations were conducted to explore potential correlations between the three subscales and age. There was a significant inverse correlation between MFIS-positive and age, $r = -.12$, $p = .05$.

Mann-Whitney U-tests were conducted to explore potential effects of gender on the subscales. Gender appeared to have an effect on the MFIS-positive subscale, $U = 5589.50$, $z = -2.34$, $p = .02$ ($M = 28.73$, $SD = 7.87$, for males and $M = 26.5$, $SD = 7.76$, for females). Furthermore, gender showed a significant effect on the whole scale, $U = 5289$, $z = -2.39$, $p = .02$, with male participants scoring higher ($M = 50.08$, $SD = 11.35$,) than female participants ($M = 46.81$, $SD = 12.30$,).

4.3.1.7. Stability

The test and retest data ($N = 64$) were examined for normality. The full scale and MFIS-positive subscale were normally distributed. The other two subscales were not. Spearman correlations between the test and retest scores revealed good test-retest reliability:

- Total scale: $.68$, $p < .0005$
- MFIS positive: $.64$, $p < .0005$
- MFIS contamination: $.78$, $p < .0005$
- MFIS uncontrollability/self-bias: $.71$, $p < .0005$

Paired Wilcoxon tests revealed no significant differences between the test and retest data of two subscales: MFIS-contamination ($M = 10.93$, $Md = 7$, $N = 64$ at the test condition and $M = 10.72$, $Md = 10$ at the retest condition, $N = 62$), $z = -.81$, $p = .31$, and MFIS-uncontrollability/self-bias, ($M = 8.87$, $Md = 8$, $N = 64$ at the test condition and $M = 8.92$, $Md = 8$, $N = 64$ at the retest condition), $z = -.42$, $p = .76$ (Table 4.2).

However, with the normally distributed data, paired t-tests indicated significant differences with slightly increased scores in positive beliefs, $t(61) = 3.33$, $p = .001$, and the full scale, $t(59) = 2.27$, $p = .03$, at the retest condition (Table 4.2).

Table 4.2: Means and standard deviations of test and retest scores on the MFIS scale and subscales

| | Mean | SD |
|-------------------------------|-------|-------|
| Full scale | 49.63 | 10.23 |
| Full scale retest | 47.05 | 11.72 |
| MFIS positive | 29.79 | 7.18 |
| MFIS positive retest | 26.98 | 7.59 |
| MFIS negative | 10.94 | 4.15 |
| MFIS negative retest | 10.72 | 3.91 |
| MFIS uncontrollability | 8.87 | 3.62 |
| MFIS uncontrollability retest | 8.92 | 3.91 |

4.3.1.8. Convergent validity

The MFIS subscales showed acceptable to good convergent validity with the MCQ subscales. Correlations ranged between .15, $p < .05$, and .51, $p < .01$. Furthermore, MFIS subscales significantly and positively correlated with the observer perspective, with correlations ranging between .28 and .45, $p < .01$. Finally, the MFIS subscales significantly and positively correlated with both private and public self-consciousness. Correlations were .31 and .46, respectively, $p < .05$. The only non-significant correlations were between the MFIS-positive subscale and the extent to which the observer perspective self-image was visual (.07, non-sig), and between the MFIS-contamination subscale and the extent to which a self-impression was experienced in social situations (.12, non-sig). All relevant correlations are presented in Table 4.3.

Appendix 4.2 presents the final version of the MFIS scale.

Table 4.3: Spearman correlations between the MFIS subscales and scales selected to test convergent validity

1 = MFIS positive beliefs,

2 = MFIS beliefs that focusing on the observer-perspective self-image could contaminate social situations,

3 = MFIS beliefs that focusing on the self-image was uncontrollable and maintained a negative self-bias

| | MCQ positive | MCQ uncontrollability and danger | MCQ cognitive confidence | MCQ cognitive self- confidence | MCQ Need for control | SIPS 1: The extent to which a self- impression is experienced in social situation | SIPS 2: The observer perspective | SIPS 3: The extent to which the self-image is a visual image | SCS Private self- conscious ness | SCS Public self- conscious ness |
|---|-----------------|--|--------------------------------|---|-------------------------------|---|---|---|--|---|
| 1 | .42** | .32** | .25** | .29** | .39** | .23** | .33** | .07 | .37** | .41** |
| 2 | .19** | .40** | .30** | .15* | .25** | .12 | .28** | .15* | .31** | .40** |
| 3 | .30** | .51** | .41** | .30** | .44** | .30* | .45** | .27** | .39** | .46** |

** $p < 0.01$, * $p < 0.05$

4.3.2. The Metacognitions about Anticipatory Processing Scale (MAPS)

4.3.2.1. Factor analysis

The 31 items that formed the MAPS scale were analysed using principal components analysis. The data proved fit for this analysis ($KMO = .91$) and Barlett's test of sphericity was significant ($\chi^2(300) = 3522.76, p < .0005$). Direct oblimin rotation was employed to allow the Items to correlate with each other. Rotation failed to converge in 25 iterations and therefore 50 iterations were allowed. Only two Items loaded on Factor 5 that seemed similar in meaning with Factor 2 (negative beliefs). Furthermore, several Items that indicated positive beliefs loaded on three Factors (1, 3, and 4). The scree plot suggested that a three Factor solution would be appropriate. Following the above, a second principal components analysis was conducted and a 3-factor solution was specified.

Examination of the structure matrix indicated eight Items that loaded on both Factors 1 and 3. These were:

- Item 4: Stops me from saying or doing something stupid
- Item 5: Is useful in working out how other people see me
- Item 8: Helps me be more aware of myself
- Item 11: Makes sure that I can behave appropriately
- Item 21: Sharpens my mind so that I can perform better
- Item 24: Enables me to know what other people want of me
- Item 25: Helps me avoid making mistakes
- Item 31: Helps me understand what is expected of me

These Items were removed except Items 24 and 31 because their removal resulted in loss of the third Factor.

The new 25-item scale was further analysed with principal components analysis. The scree plot suggested that the 3-Factors solution was appropriate (Figure 4.2), with eigenvalues above one (Factor 1 = 8.45, Factor 2 = 2.96, and Factor 3 = 1.38). Similar to the analysis of the MFIS questionnaire (Section 4.3.1.1), in the current analysis, the point of change of the slope was identified at eigenvalue 3, fitting eigenvalues 1, 2, and 3 in one straight line and the remaining eigenvalue in another straight line with a different slope (Tabachnick & Fidell, 2007).

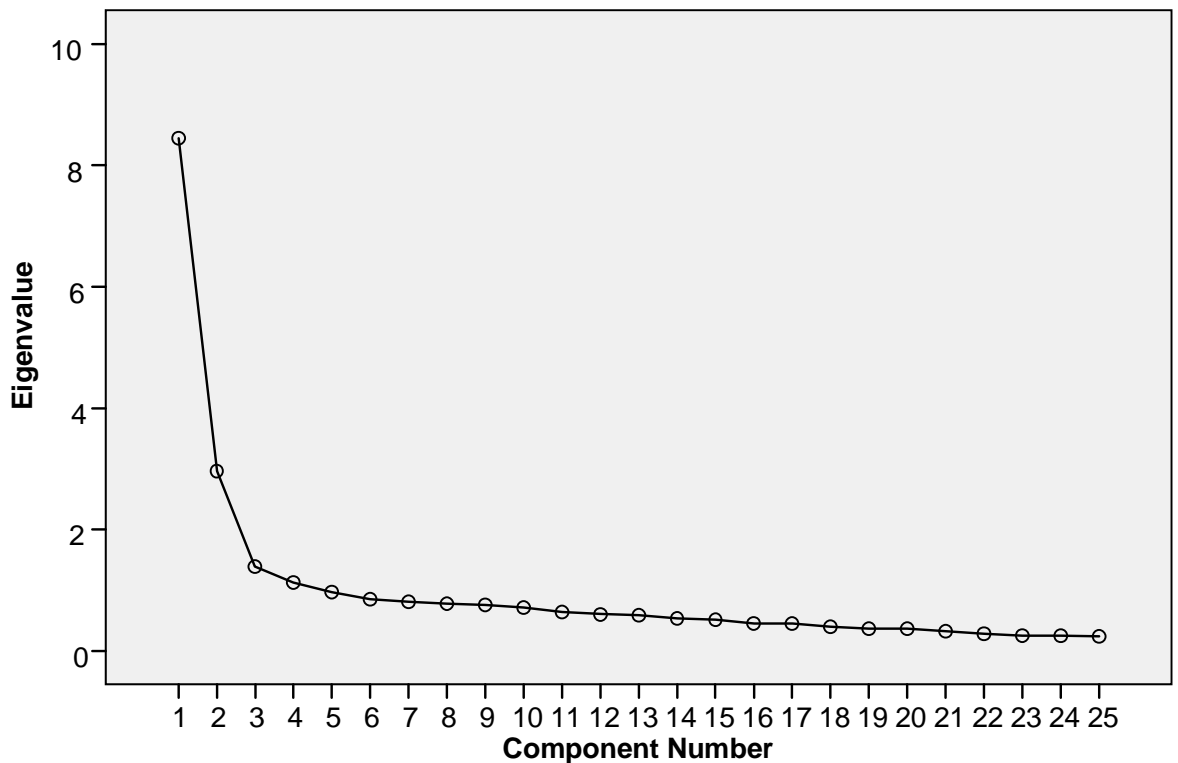


Figure 4.2: MAPS principal components factor analysis scree plot

The three Factors explained 51.19% of the variance (Factor 1: 33.8%, Factor2: 11.85, Factor 3: 5.53%). Item loadings are presented in Appendix 4.3.

Factor 1 (MAPS-positive) included positive meta-cognitive beliefs that anticipatory processing could improve preparation for and self-presentation in social situations. Examples were “Helps me visualise how to present myself” and “Helps me plan what I can talk about”.

Factor 2 (MAPS-uncontrollability/harm) involved negative meta-cognitive beliefs about the uncontrollability and harmfulness of anticipatory processing. For example, “Could be harmful for my wellbeing” and “Is something I have no control over”.

Factor 3 (MAPS-sociability) included positive beliefs that anticipatory processing could help one anticipate other people’s expectations and needs. Examples were “Makes me sensitive to other people’s needs” and “Enables me to know what other people want of me”.

The complete scale is presented in Appendix 4.4

4.3.2.2. Item inter-correlations

Item 6 of the MAPS-positive subscale showed a significant correlation with Item 15, ($r = .20$), $p < .0005$. This subscale's inter-correlations ranged between .20 and .64. In relation to MAPS-uncontrollability/harm, inter-correlations ranged between .22 and .59. The MAPS-sociability subscale displayed inter-correlations that ranged between .37 and .64.

4.3.2.3. Internal consistency

The scale and the three subscales showed good internal consistency. In particular, the full scale alpha was .91, while MAPS-positive $\alpha = .88$, MAPS-uncontrollability/harm $\alpha = .82$, and MAPS-sociability $\alpha = .87$.

4.3.2.4. Normality tests

According to the Kolmogorov-Smirnov test (D statistic) and examination of the histograms, the scale and subscales were not normally distributed, MAPS-positive, $D(283) = .07$, $p = .001$, MAPS-uncontrollability/harm, $D(283) = .15$, $p < .0005$, MAPS-sociability, $D(283) = .07$, $p = .002$, and full scale, $D(283) = .06$, $p = .009$.

4.3.2.5. Subscale inter-correlations

Spearman correlations were conducted to explore whether the subscales inter-correlated. The results showed significant and positive correlations between the subscales (Table 4.4):

Table 4.4: Correlations between the MAPS subscales

| | MAPS-sociability | MAPS-uncontrollability |
|------------------------|--------------------|------------------------|
| MAPS-uncontrollability | .25, $p < .0005$ | |
| MAPS-positive | .73, $p < .0005$. | .31, $p < .0005$, |

4.3.2.6. Gender and Age

Spearman correlations were conducted to explore potential associations between the three subscales, the full scale, and age. Age did not correlate significantly with the subscales ($r = -.02$ for MAPS-positive, $r = -.11$ for MAPS uncontrollability/harm, and $r = .01$ for MAPS sociability) and the full scale ($r = -.02$), $p > .05$.

Mann-Whitney U-tests showed that gender did not have a significant effect on any of the subscales but it appeared to have an effect on the full scale, $U = 6711$, $z = -2.16$, $p = .03$, indicating higher scores in male ($M = 53.19$, $SD = 11.62$) than in female ($M = 50$, $SD = 12.95$) participants.

4.3.2.7. Stability

The K-S test (D statistic) indicated that the test and retest data of the scale ($D(59) = .09$, $p = .20$ and $D(59) = .08$, $p = .20$, respectively) and of the MAPS-positive subscale ($D(59) = .09$, $p = .20$ and $D(59) = .07$, $p = .20$, respectively) were normally distributed. The remaining data were not. MAPS-uncontrollability/harm, $D(59) = .18$, $p < .0005$ (test), $D(59) = .21$, $p < .0005$ (retest), MAPS sociability, $D(59) = .13$, $p = .01$ (test), $D(59) = .084$, $p = .20$ (retest).

Therefore, Pearson correlations were conducted to examine test-retest reliability of the normally distributed subscales. The results indicated good stability for the full scale, $.67$, $p < .0005$, and the MAPS-positive subscale, $.70$, $p < .0005$.

Spearman correlations were conducted for the non-parametric data. The subscales showed good stability, MAPS-uncontrollability/harm, $.76$, $p < .0005$, and MAPS-sociability, $.64$, $p < .0005$.

Moreover, paired Wilcoxon t-tests revealed no significant differences between the test and retest data, MAPS-uncontrollability/harm, $z = -.23$, $p = .82$ (test condition, $M = 11.12$, $Md = 10$, $N = 64$, and retest condition, $M = 11.31$, $Md = 10$, $N = 64$), MAPS-sociability, $z = -.56$, $p = .57$ (test condition. $M = 12.93$, $Md = 13$, $N = 63$, and retest condition, $M = 13$, $Md = 12.50$, $N = 62$).

However, for the normally distributed data, the differences were significant for the full scale, $t(58) = 2.16$, $p = .03$, and MAPS-positive, $t(61) = 3.43$, $p = .001$. In both scales the means had increased at the retest condition ($M = 48.58$ and $M = 24.45$, respectfully) compared with the initial administration ($M = 45.93$ and $M = 22.40$, respectfully).

4.3.2.8. Convergent validity

Spearman correlations investigated the relationships between the MAPS and MCQ subscales. The MAPS-positive subscale indicated the highest correlations with MCQ uncontrollability, $.39$, $p < .01$, and with MCQ need for control, $.39$, $p < .01$. The MAPS-uncontrollability/harm subscale correlated highly with the uncontrollability MCQ subscale, $.56$, $p < .01$. The MAPS-sociability subscale correlated most highly with the MCQ need for

control subscale, .43, $p < .01$. All MAPS subscales significantly positively correlated with anticipatory processing. Correlations ranged between .52, $p < .01$, and .69, $p < .01$. All relevant correlations are presented at Table 4.5.

Table 4.5: Spearman correlations between the MAPS subscales, MCQ-30, and anticipatory processing, ** $p < 0.01$,

MAPS= Meta-cognitions about Anticipatory Processing Scale

MCQ-30= 30-Item Metacognitions Questionnaire

| | MCQ Positive beliefs | MCQ Un/ability - harm | MCQ Cognitive confidence | MCQ Cognitive self- consciousness | MCQ Need for control | Anticipatory processing |
|-----------------------------|----------------------------|-----------------------------|--------------------------------|---|----------------------------|----------------------------|
| MAPS positive | .29** | .39** | .24** | .30** | .39** | .69** |
| MAPS un/ability- harm | .24** | .56** | .30** | .30** | .42** | .52** |
| MAPS sociability | .27** | .31** | .34** | .35** | .43** | .53** |

4.3.3. Relationships between meta-cognitive beliefs, cognitive mechanisms, and social anxiety

4.3.3.1. Correlations

According to the K-S test (D statistic) and the examination of the histograms, only two variables were normally distributed. These were public self-consciousness, $D(135) = .06$, $p = .20$, and the MFIS-positive subscale, $D(135) = .07$, $p = .08$. For the remaining variables, the K-S values ranged between .08 and .18, and were significant. Therefore, Spearman correlation analysis was employed.

Consistent with the first hypothesis, several meta-cognitive beliefs significantly positively correlated with social anxiety (FNE). These were the MFIS-positive, .16, $p = .034$, MFIS-contamination, .35, $p < .0005$, MFIS-uncontrollability, .45, $p < .0005$, MAPS-positive, .26, $p = .001$, and MAPS-uncontrollability/harm, .39, $p < .0005$. The only subscale that did not show a significant correlation with the FNE scale was the MAPS-sociability subscale, .07, $p = .34$.

The MCQ-30 subscales correlated significantly and positively with the SIAS, apart from MCQ cognitive self-consciousness, $.07, p = .40$. All meta-cognitive beliefs significantly and positively correlated with anticipatory processing and with private self-consciousness. Finally, the MCQ positive subscale, $.14, p = .06$, MCQ cognitive confidence, $.11, p = .17$, and MCQ cognitive self-consciousness, $.12, p = .12$ did not significantly correlate with the observer perspective self-image, and MCQ cognitive confidence did not significantly correlate with public self-consciousness, $.13, p = .08$. These correlations are presented in Appendix 4.5.

4.3.3.2. Descriptive statistics of the high and low social anxiety groups

As reported in section 4.2.5, the dependent variable (FNE) was not normally distributed and transformations failed to normalise the data. Therefore, a binary variable was created to use in logistic regressions. In particular, high and low social anxiety groups were formed based on a median split ($Mdn = 15$). The mean age of the Low-FNE group was 24.51 ($SD = 8.71$). This group included 91 individuals, 73 female and 19 male. The high-FNE group included 84 individuals, 68 of which were female and 16 male. This group's mean age was 21.4 ($SD = 4.55$). There was no significant difference between the two groups in gender, $\chi^2(1) = .42, p = .52$. However, previous studies indicated gender differences based on the FNE scale and the brief-FNE (Carleton, Collimore, & Asmundson, 2007; Stopa & Clark, 2001), and other studies failed to control for gender due to sample limitations (Dannahy & Stopa, 2007; George & Stopa, 2008). Therefore, initially, the current study controlled for gender. Gender did not indicate a significant contribution in any of the analyses. Therefore, gender is omitted in the results reported below.

Mean scores on the social anxiety and depression scales are presented in Table 4.6. The differences between the groups were significant for FNE, $U = .00, z = 11.45, p < .0005$, SIAS, $U = 1049.50, z = .7.8, p < .0005$, Depression, $U = 2411, z = .3.23, p = .001$, and age, $U = 3128, Z = .2.24, p = .025$.

Table 4.6: High and low socially anxious individuals' mean scores and standard deviations on social anxiety (FNE and SIAS) and depression measures

| | FNE | SIAS | Depression |
|----------|-----------------------|----------------------|---------------------|
| High-FNE | M = 22.94 (SD = 4.72) | M = 31.3 (SD = 2.65) | M = 7.4 (SD = 8.29) |
| Low-FNE | M = 8.65 (SD = 3.92) | M = 15.65 (SD = 9) | M = 3.9 (SD = 5.06) |

4.3.3.3. Predictors of social anxiety (FNE)

To explore the second hypothesis, three logistic regressions were conducted with each analysis including the MAPS, the MFIS, or the MCQ-30 subscales as independent variables. The MCQ-30, MAPS, and MFIS subscales were not entered in the same analysis due to the high likelihood for multicollinearity. In fact, the correlations between the MAPS and the MFIS subscales were significant ($p < .01$) and ranged between .21 and .70. Moreover, the sample size would not allow for the inclusion of more than seven predictors while ensuring a ratio of 20 participants to each predictor. Finally, according to the S-REF model, meta-cognitive beliefs are verbal expressions of one's knowledge regarding one's own cognitive mechanisms. Hence, the content of these beliefs is specific to the relevant mechanisms. Therefore, it was not considered meaningful to include beliefs about different mechanisms in the same regression analysis.

Following the above, the first analysis employed the MFIS subscales as independent variables. Investigation for outliers indicated that case 53 was a multivariate outlier with Cook's distance equal to .57. However, this was viewed as a normal deviation and it was decided to retain the case. The second analysis that employed the MAPS did not yield any univariate or multivariate outliers according to Cook's distance values (all below 1) and the standardised residuals (all within the ± 2.6 range).

The analysis that employed the MFIS subscales included depression at Block 1, public self-consciousness and the observer perspective at Block 2, and the MFIS subscales at Block 3. All Hosmer and Lemeshow tests were not significant. These tests evaluate the goodness-of-fit of the model. A non-significant result indicates a good model (Tabachnick & Fidell, 2007).

The results (Table 4.7) highlighted public self-consciousness, Wald(1) = 14.38, $p < .0005$, and MFIS-uncontrollability/harm, Wald(1) = 6.92, $p = .009$, as individual positive predictors of social anxiety. MFIS-positive yielded a significant inverse relationship, Wald(1) = 5.13, $p = .023$. Depression had a significant effect at Step 1, Wald = 11.25, $p = .005$. However, this became marginal, Wald(1) = 3.67, $p = .055$, when the cognitive variables were entered in the equation at Step 2, and non-significant when the meta-cognitive variables were accounted for at Step 3, Wald(1) = .61, $p = .434$.

Table 4.7: Logistic regression with social anxiety groups (FNE) as the dependent variable, depression at Block 1, public self-consciousness and the observer perspective at Block 2, and the meta-cognitive beliefs about focusing on the self-image at Block 3

| 95% CI for exp <i>b</i> | | | | | | |
|---|-------------|-------|-------|--------------|-------|----------|
| | B (SE) | Lower | Upper | Exp <i>b</i> | Wald | <i>p</i> |
| Block 1 Constant <i>-2 Log likelihood = 199.21</i> <i>Cox & Snell R² = .09</i> <i>Nagelkerke R² = .13</i> | -.63 (.22) | | | .53 | 7.76 | .005 |
| Depression | .11 (.03) | 1.05 | 1.20 | 1.12 | 11.25 | .001 |
| Block 2 Constant <i>-2 Log likelihood = 164.22</i> <i>Cox & Snell R² = .28</i> <i>Nagelkerke R² = .37</i> | -3.25 (.66) | | | .04 | 23.9 | <.0005 |
| Depression | .06 (.03) | 1.00 | 1.14 | 1.06 | 3.67 | .05 |
| Public self-consciousness | .18 (.04) | 1.10 | 1.3 | 1.2 | 18.79 | <.0005 |
| Observer perspective | .25 (.16) | .94 | 1.74 | 1.29 | 2.47 | .12 |
| Block 3 Constant <i>-2 Log likelihood = 146.22</i> <i>Cox & Snell R² = .36</i> <i>Nagelkerke R² = .48</i> | -4.4 (1.04) | | | .01 | 17.7 | <.0005 |
| Depression | .03 (.04) | .95 | 1.11 | 1.03 | .61 | .43 |
| Public self-consciousness | .18 (.05) | 1.10 | 1.31 | 1.2 | 14.38 | <.0005 |
| Observer perspective | .16 (.18) | .82 | 1.68 | 1.18 | .81 | .37 |
| MFIS positive | -.07 (.03) | .87 | .99 | .93 | 5.13 | .023 |
| MFIS contamination | .07 (.07) | .94 | 1.23 | 1.08 | 1.22 | .27 |
| MFIS uncontrollability/ self-harm | .27 (.10) | 1.07 | 1.61 | 1.31 | 6.92 | .01 |

The second analysis (Table 4.8) included depression at Block 1, anticipatory processing at Block 2 and the MAPS-subscales at Block 3. Hosmer and Lemeshow tests were not significant.

The results indicated that anticipatory processing, Wald(1) = 15.26, $p < .0005$ was a positive predictor of high social anxiety, and that MAPS-sociability was associated with low social anxiety, Wald(1) = 5.3, $p = .021$.

Table 4.8: Logistic regression with social anxiety groups (FNE) as the dependent variable, depression at block 1, anticipatory processing at Block 2, and meta-cognitive beliefs about anticipatory processing at Block 3

| 95% CI for exp <i>b</i> | | | | | | |
|---|-------------|-------|-------|--------------|-------|----------|
| | B (SE) | Lower | Upper | Exp <i>b</i> | Wald | <i>p</i> |
| Block 1 Constant <i>-2 Log likelihood = 200.3</i> <i>Cox & Snell R² = .07</i> <i>Nagelkerke R² = .09</i> | -.48 (.22) | | | .62 | 4.70 | .03 |
| Depression | .08 (.03) | 1.03 | 1.15 | 1.09 | 8.29 | .004 |
| Block 2 Constant <i>-2 Log likelihood = 172.82</i> <i>Cox & Snell R² = .22</i> <i>Nagelkerke R² = .29</i> | -4.06 (.82) | | | .02 | 24.22 | <.0005 |
| Depression | .002 (.03) | .94 | 1.07 | 1.00 | .003 | .95 |
| Anticipatory processing | .16 (.03) | 1.10 | 1.26 | 1.17 | 21.16 | <.0005 |
| Block 3 Constant <i>-2 Log likelihood = 163.04</i> <i>Cox & Snell R² = .27</i> <i>Nagelkerke R² = .36</i> | -3.76 (.94) | | | .02 | 16.07 | <.0005 |
| Depression | .002 (.03) | .94 | 1.07 | 1.00 | .003 | .95 |
| Anticipatory processing | .20 (.05) | 1.10 | 1.35 | 1.22 | 15.26 | <.0005 |
| MAPS positive | .03 (.06) | .91 | 1.16 | 1.03 | .19 | .66 |
| MAPS uncontrollability/ harm | .05 (.06) | .93 | 1.19 | 1.05 | .59 | .44 |
| MAPS sociability | -.17 (.07) | .73 | .97 | .84 | 5.3 | .02 |

Finally, the third analysis entered depression at Block 1, anticipatory processing, public self-consciousness, and the observer perspective at Block 2, and the MCQ-30 subscales that correlated significantly with FNE at Block 3. These were the MCQ-positive, MCQ-uncontrollability, and MCQ-need for control subscales. Hosmer and Lemeshow tests were not significant.

The results (Table 4.9) showed that these meta-cognitive variables were not significant predictors of social anxiety. Anticipatory processing, $B(SE) = .12 (.04)$, $Wald(1) = 7.02$, $p = .008$, public self-consciousness, $B(SE) = .1 (.05)$, $Wald(1) = 4.86$, $p = .03$, and the observer perspective, $B(SE) = .44 (.17)$, $Wald(1) = 6.61$, $p = .01$ were individual predictors of social anxiety. The significant contribution of depression at Step 1, $B(SE) = .09 (.03)$, $Wald(1) = 8.6$, $p = .003$, became non-significant when the cognitive variables were entered in the equation at Step 2, $B(SE) = .01 (.03)$, $Wald(1) = .18$, $p = .67$.

Table 4.9: Logistic regression with FNE as the dependent variable, depression at Block 1, anticipatory processing, the observer perspective, and public self-consciousness at Block 2, and three MCQ-30 subscales at Block 3

| 95% CI for exp <i>b</i> | | | | | | |
|---|----------------|-------|-------|--------------|-------|----------|
| | B (SE) | Lower | Upper | Exp <i>b</i> | Wald | <i>p</i> |
| Block 1 Constant <i>-2 Log likelihood = 200.69</i> <i>Cox & Snell R² = .07</i> <i>Nagelkerke R² = .09</i> | -.58 (.22) | | | .56 | 6.87 | .009 |
| Depression | .09 (.03) | 1.03 | 1.15 | 1.09 | 8.6 | .003 |
| Block 2 Constant <i>-2 Log likelihood = 157.1</i> <i>Cox & Snell R² = .3</i> <i>Nagelkerke R² = .4</i> | -4.32 (.9) | | | .01 | 22.8 | <.0005 |
| Depression | .01 (.03) | .95 | 1.08 | 1.01 | .18 | .668 |
| Anticipatory processing | .09 (.04) | 1.02 | 1.19 | 1.10 | 6.15 | .013 |
| Public self-consciousness | .10 (.04) | 1.01 | 1.21 | 1.11 | 5.24 | .022 |
| Observer perspective | .42 (.17) | 1.09 | 2.12 | 1.52 | 6.08 | .014 |
| Block 3 Constant <i>-2 Log likelihood = 150.26</i> <i>Cox & Snell R² = .33</i> <i>Nagelkerke R² = .44</i> | -4.03 (.98) | | | .02 | 16.89 | <.0005 |
| Depression | .01 (.04) | .93 | 1.09 | 1.01 | .07 | .797 |
| Anticipatory processing | .12 (.04) | 1.03 | 1.23 | 1.13 | 7.02 | .008 |
| Public self-consciousness | .10 (.05) | 1.01 | 1.22 | 1.11 | 4.86 | .027 |
| Observer perspective | .44 (.17) | 1.11 | 2.16 | 1.55 | 6.61 | .010 |
| MCQ-30 positive | -.08 (.05) | .83 | 1.02 | .92 | 2.66 | .103 |
| MCQ-30 uncontrollability/ danger | .08 (.05) | .97 | 1.12 | 1.08 | 2.07 | .150 |
| MCQ-30 need for control | -.09 (.08) | .79 | 1.06 | .92 | 1.29 | .257 |

4.3.3.4. Confirmatory linear regressions

The above results were confirmed by hierarchical linear regression analyses. The exact same Steps were applied in two separate analyses with the MFIS and the MAPS subscales as independent variables, respectively.

The first analysis (Table 4.10) included depression at Step 1, public self-consciousness and the observer perspective self-image at Step 2, and the MFIS subscales at Step 3. The results yielded three predictors of social anxiety (FNE). These were public self-consciousness, $\beta = .41$, $t = 5.51$, $p < .0005$, MFIS-positive, $\beta = -.19$, $t = -2.75$, $p = .007$, and MFIS-uncontrollability/self-bias, $\beta = .22$, $t = 2.53$, $p = .012$. All three models explained additional variance in social anxiety: Depression, $\text{Adj.R}^2 = .10$, $\Delta R^2 = .11$, $p < .0005$, cognitive variables: $\text{Adj.R}^2 = .32$, $\Delta R^2 = .23$, $p < .0005$, and meta-cognitive variables, $\text{Adj.R}^2 = .38$, $\Delta R^2 = .06$, $p = .001$.

Table 4.10: The final step of the hierarchical linear regression analysis with FNE as the dependent variable, depression at Step 1, the observer perspective and public self-consciousness at Step 2, and MFIS subscales at Step 3

| Variable | Adj.R ² | ΔR^2 | p | B | SEB | β | t | p |
|----------------------------------|--------------------|--------------|------|------|-----|---------|-------|--------|
| Final step | .38 | .06 | .001 | | | | | |
| Depression | | | | .16 | .08 | .13 | 1.90 | .06 |
| Observer perspective self-image | | | | .60 | .42 | .10 | 1.41 | .16 |
| Public self-consciousness | | | | .58 | .11 | .41 | 5.51 | <.0005 |
| MFIS positive | | | | -.21 | .08 | -.19 | -2.75 | .007 |
| MFIS contamination | | | | .19 | .16 | .09 | 1.14 | .26 |
| MFIS uncontrollability/self-bias | | | | .52 | .20 | .22 | 2.53 | .01 |

Similarly, the second analysis included depression at Step 1, anticipatory processing at Step 2, and the MAPS subscales at Step 3. The results indicated two significant predictors (Table 4.11). These were anticipatory processing, $\beta = .61$, $t = 6.39$, $p < .0005$, and MAPS-sociability, $\beta = -.26$, $t = -2.85$, $p = .005$. Again, all three models explained additional variance in social anxiety: Depression, $\text{Adj.R}^2 = .1$, $\Delta R^2 = .11$, $p < .0005$, cognitive variables: $\text{Adj.R}^2 = .31$, $\Delta R^2 = .21$, $p < .0005$, and meta-cognitive variables, $\text{Adj.R}^2 = .36$, $\Delta R^2 = .06$, $p = .001$.

Table 4.11: The final step of the hierarchical linear regression analysis with FNE as the dependent variable, depression at Step 1, anticipatory processing at Step 2, and MAPS subscales at Step 3

| Variable | Adj.R ² | ΔR ² | p | B | SE B | β | t | p |
|-----------------------------|--------------------|-----------------|------|------|------|------|-------|--------|
| Final step | .36 | .06 | .001 | | | | | |
| Depression | | | | .06 | .09 | .05 | .65 | .52 |
| Anticipatory processing | | | | .71 | .11 | .61 | 6.39 | <.0005 |
| MAPS positive | | | | -.03 | .13 | -.02 | -.19 | .85 |
| MAPS uncontrollability/harm | | | | .21 | .17 | .10 | 1.25 | .21 |
| MAPS sociability | | | | -.47 | .17 | -.26 | -2.85 | .005 |

4.3.3.5. Predictors of social anxiety (SIAS)

Finally, to explore whether the MCQ-30, MAPS and MFIS subscales predicted social anxiety measured with SIAS, three linear multiple regression analyses were conducted with SIAS as the dependent variable. According to the significant Kolmogorov-Smirnov test ($D(167) = .12, p < .0005$) and the histogram, this variable was not normally distributed. However, square root transformation was successful, $D(167) = .06, p = .2$. Tolerance and VIF values were also explored indicating no concern for multicollinearity.

As discussed earlier, it was not considered meaningful to include beliefs about different cognitive mechanisms in the same analysis. Therefore, the hierarchical linear regression analyses followed the same pattern of the analyses above. Therefore, depression was entered at Step 1, public self-consciousness and the observer perspective self-image or anticipatory processing were entered at Step 2, and the MFIS or MAPS subscales were entered at Step 3, respectively.

The first analysis utilised SIAS as the dependent variable, and depression as a predictor at Step 1. Public self-consciousness and the observer perspective were entered at Step 2 and the MFIS subscales at Step 3.

The results are presented in table 4.12. This time, depression remained a significant predictor when the cognitive and meta-cognitive variables were included at Step 3, $B(SE) = .04 (.01), \beta = .19, t = 2.90, p = .004$. Furthermore, public self-consciousness, $B(SE) = .05 (.02), \beta = .21, t = 2.90, p = .004$, MFIS-contamination, $B(SE) = .09 (.03), \beta = .24, t = 3.33, p = .001$, and MFIS-uncontrollability/self-bias, $B(SE) = .09 (.03), \beta = .22, t = 2.61, p = .01$ were individual positive predictors of social anxiety. Each step explained additional variance in social anxiety: Depression, $\text{Adj.R}^2 = .17, \Delta R^2 = .17, p < .0005$,

cognitive variables: $\text{Adj.R}^2 = .32$, $\Delta R^2 = .14$, $p < .0005$, and meta-cognitive variables, $\text{Adj.R}^2 = .43$, $\Delta R^2 = .11$, $p < .0005$.

Table 4.12: Hierarchical regression analysis with SIAS as the dependent variable, depression at Step 1, the cognitive variables at Step 2, and the MFIS meta-cognitive variables at Step 3

| Variable | Adj.R ² | ΔR^2 | p | B | $SE B$ | β | t | p |
|---------------------------|--------------------|--------------|--------|-------|--------|---------|------|--------|
| Step 1 | .17 | .17 | <.0005 | | | | | |
| Depression | | | | .09 | .01 | .42 | 6.03 | <.0005 |
| Step 2 | .32 | .14 | <.0005 | | | | | |
| Depression | | | | .04 | .01 | .31 | 4.67 | <.0005 |
| Public self-consciousness | | | | .08 | .02 | .32 | 4.55 | <.0005 |
| The observer perspective | | | | .13 | .07 | .13 | 1.84 | .07 |
| Step 3 | .43 | .11 | <.0005 | | | | | |
| Depression | | | | .04 | .01 | .19 | 2.90 | .004 |
| Public self-consciousness | | | | .05 | .02 | .21 | 2.90 | .004 |
| The observer perspective | | | | .05 | .07 | .05 | .75 | .46 |
| MFIS-positive | | | | -.005 | .01 | -.02 | -.37 | .71 |
| MFIS-contamination | | | | .09 | .03 | .24 | 3.33 | .001 |
| MFIS-uncontrollability | | | | .09 | .03 | .22 | 2.61 | .01 |

The second analysis employed depression at Step 1, anticipatory processing at Step 2 and the MAPS subscales at Step 3. When all variables were accounted for at Step 3 (Table 4.13), depression indicated a marginal positive contribution, $B(SE) = .03 (.01)$, $\beta = .13$, $t = 1.87$, $p = .06$. Anticipatory processing, $B(SE) = .08 (.02)$, $\beta = .42$, $t = 4.52$, $p < .0005$, and MAPS uncontrollability/harm, $B(SE) = .08 (.03)$, $\beta = .21$, $t = 2.87$, $p = .005$, were positive predictors. MAPS sociability, $B(SE) = -.07 (.03)$, $\beta = -.24$, $t = -2.70$, $p = .01$ was a negative predictor of social anxiety. Each step explained additional variance to a significant level: Depression, $\text{Adj.R}^2 = .17$, $\Delta R^2 = .17$, $p < .0005$, cognitive variables: $\text{Adj.R}^2 = .35$, $\Delta R^2 = .19$, $p < .0005$, and meta-cognitive variables, $\text{Adj.R}^2 = .40$, $\Delta R^2 = .06$, $p = .001$.

Table 4.13: Hierarchical regression analysis with SIAS as the dependent variable, depression at Step 1, anticipatory processing at Step 2, and the MAPS meta-cognitive variables at Step 3

| Variable | Adj.R ² | ΔR ² | p | B | SE B | β | t | p |
|-----------------------------|--------------------|-----------------|--------|------|------|------|-------|--------|
| Step 1 | .17 | .17 | <.0005 | | | | | |
| Depression | | | | .09 | .01 | .42 | 6.03 | <.0005 |
| Step 2 | .35 | .19 | <.0005 | | | | | |
| Depression | | | | .05 | .01 | .17 | 2.42 | .02 |
| Anticipatory processing | | | | .10 | .01 | .50 | 7.14 | <.0005 |
| Step 3 | .40 | .06 | .001 | | | | | |
| Depression | | | | .03 | .01 | .13 | 1.87 | .06 |
| Anticipatory processing | | | | .08 | .02 | .42 | 4.52 | <.0005 |
| MAPS-positive | | | | .03 | .02 | .13 | 1.33 | .19 |
| MAPS-uncontrollability/harm | | | | .08 | .03 | .21 | 2.87 | .005 |
| MAPS-sociability | | | | -.07 | .03 | -.24 | -2.70 | .01 |

A final analysis was conducted that included the MCQ-30 subscales as independent variables. This analysis entered depression at Step 1, public self-consciousness, anticipatory processing, and the observer perspective at Step 2, and the three MCQ subscales at Step 3. The meta-cognitive variables (MCQ positive, MCQ negative, and MCQ need for control) did not explain additional variance in social anxiety, Adj.R² = .37, ΔR² = .006, $p = .61$, and were not significant predictors (MCQ positive, $B(SE) = .01 (.02)$, $\beta = .3$, $t = .43$, $p = .67$, MCQ uncontrollability/danger, $B(SE) = .001 (.02)$, $\beta = .002$, $t = .23$, $p = .98$, and MCQ need for control, $B(SE) = -.04 (.03)$, $\beta = -.1$, $t = -1.3$, $p = .10$). Depression, $B(SE) = .04 (.02)$, $\beta = .2$, $t = 2.66$, $p = .009$ and anticipatory processing, $B(SE) = .07 (.02)$, $\beta = .4$, $t = 4.27$, $p < .0005$ were individual positive predictors, while public self-consciousness showed a marginal positive effect, $B(SE) = .04 (.02)$, $\beta = .15$, $t = 1.87$, $p = .063$.

4.3.3.6. Exploratory mediation analyses

The third hypothesis expected that elements of the CAS would mediate the relationship between meta-cognitive beliefs and social anxiety. To explore this, a series of mediation analyses were conducted.

In particular, anticipatory processing was expected to mediate the relationship between the MAPS subscales and social anxiety. The observer perspective self-image and public self-consciousness were expected to mediate the relationship between the MFIS

subscales and social anxiety. Finally, anticipatory processing, the observer perspective, and public self-consciousness were expected to mediate the relationship between MCQ-positive and MCQ-negative and social anxiety. Therefore, in the first occasion, there was one potential mediator (anticipatory processing), whereas in the second and third occasions, there were two and three possible mediators, respectively.

When there was one mediator (anticipatory processing), Baron and Kenny's (1986) method of causal steps mediation analysis was employed. This method requires three regression analyses. To confirm the mediation hypothesis, in the first regression, the independent variable should have a direct effect on the dependent variable. In the second regression, the independent variable should predict the mediator. Finally, in the third regression, the effect of the independent variable on the dependent should become non-significant or should be reduced when controlling for the mediator, while the mediator remains a significant predictor.

On the occasions that more than one mediators were assumed, Preacher and Hayes's (2008) method was employed. This method can test the hypothesis that two or more variables mediate the relationship between the independent and the dependent variable. Preacher and Hayes's (2008) method calculates: a) an overall indirect effect of the independent variable on the dependent variable that is mediated by a set of variables, and b) the extent to which each mediator mediates this effect, on the condition of the presence of the remaining variables (specific indirect effects). Therefore, this method reduces the likelihood of bias due to omitting variables.

This analysis is conducted with the application of a Macros created for use with SPSS (Preacher & Hayes, 2008). It calculates an overall indirect effect, as described above. Moreover, it calculates a total effect that is the effect of the independent variable on the dependent variable and a direct effect that is the effect of the independent variable on the dependent variable when controlling for the mediators. Additionally, it computes the specific indirect effects through each mediator (as discussed above).

Finally, it calculates Sobel's (1982) test of significance and it conducts bootstrapping analysis. The latter is a method of resampling where each case can be selected any number of times or not at all. The new sample (or "resample") is used to repeat the mediation analyses as described above. This process is repeated at least 1000 times (5000 in the current sample), thereby yielding bootstrap confidence intervals of the examined indirect effects. Given that these intervals are based on empirical estimations of the sampling distribution, they are asymmetrical and the assumption of normality is not necessary. This resolves the problem of the assumption of multivariate normality in Sobel's (1982) test. In particular, the Sobel test assumes large samples that can ensure

that the indirect effects as well as the direct and specific indirect effects follow a multivariate normal distribution. However, often, in small samples, such as in the current sample, this is not the case. Therefore, the bootstrap confidence intervals are used to indicate whether an effect could not be attributed to chance without assuming a normal distribution.

4.3.3.6.1. The indirect effects of the MAPS subscales on social anxiety through anticipatory processing

The MAPS-uncontrollability subscale showed an indirect effect on social anxiety through anticipatory processing. In particular, following Baron and Kenny's (1986) method, the first regression showed a significant contribution of the MAPS-uncontrollability subscale on the mediator (anticipatory processing), $B(SE) = 1.1 (.11)$, $\beta = .58$, $t = 9.44$, $p < .0005$. The second regression (c' path) indicated a significant contribution of MAPS-uncontrollability on the independent variable (FNE), $B(SE) = .9 (.15)$, $\beta = .41$, $t = 5.93$, $p < .0005$. Finally, in the third regression, this effect became non-significant (c) when controlling for anticipatory processing, $B(SE) = .28 (.17)$, $\beta = .13$, $t = 1.68$, $p = .09$, while anticipatory processing had a significant effect on social anxiety, $B(SE) = .56 (.09)$, $\beta = .48$, $t = 6.26$, $p < .0005$. Sobel's test ($z = 1.09$) indicated that this was a significant indirect effect, $p = .03$ (Figure 4.3).

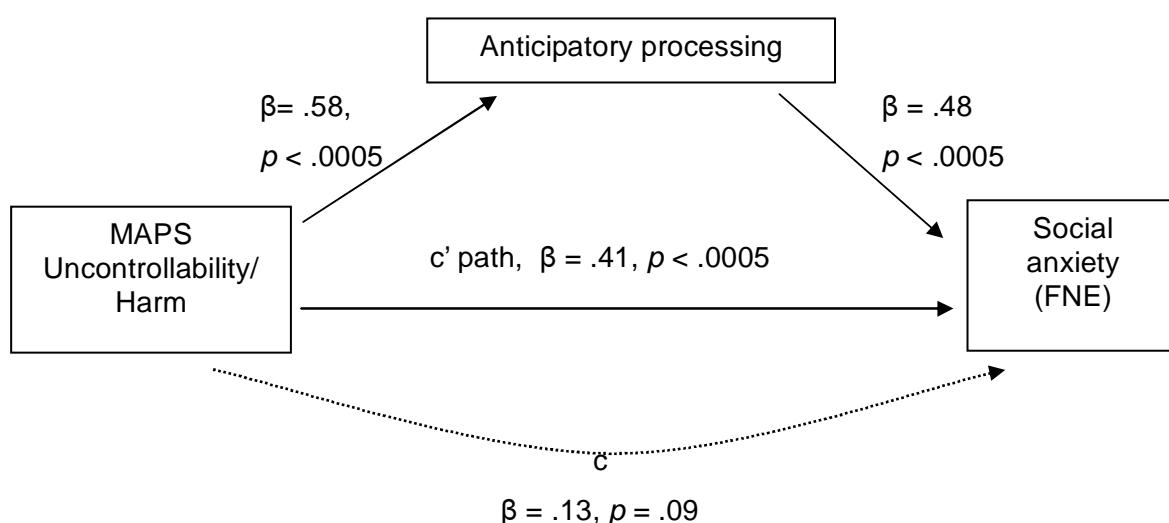


Figure 4.3: The mediator effect of anticipatory processing on the relationship between MAPS uncontrollability/harm and social anxiety (FNE), c' path = direct effect of the independent variable on the dependent variable, c = effect of the independent variable on the dependent variable when controlling for the mediator

The MAPS-positive subscale had an indirect effect on social anxiety measured with SIAS through anticipatory processing. Following Baron and Kenny's (1986) method, MAPS-positive predicted anticipatory processing, $B(SE) = .71 (.06)$, $\beta = .64$, $t = 11.17$,

$p < .0005$ in the first regression. In the second regression (c' path), this subscale predicted the independent variable (SIAS), $B(SE) = .07 (.01)$, $\beta = .33$, $t = 4.64$, $p < .0005$. In the third regression, the effect on SIAS became non-significant (c) when controlling for anticipatory processing, $B(SE) = -.01 (.02)$, $\beta = -.07$, $t = -.9$, $p = .37$, while anticipatory processing remained a significant predictor, $B(SE) = .12 (.02)$, $\beta = .63$, $t = 7.82$, $p < .0005$. According to Sobel's test ($z = 6.27$) this indirect effect was significant, $p < .0005$ (Figure 4.4).

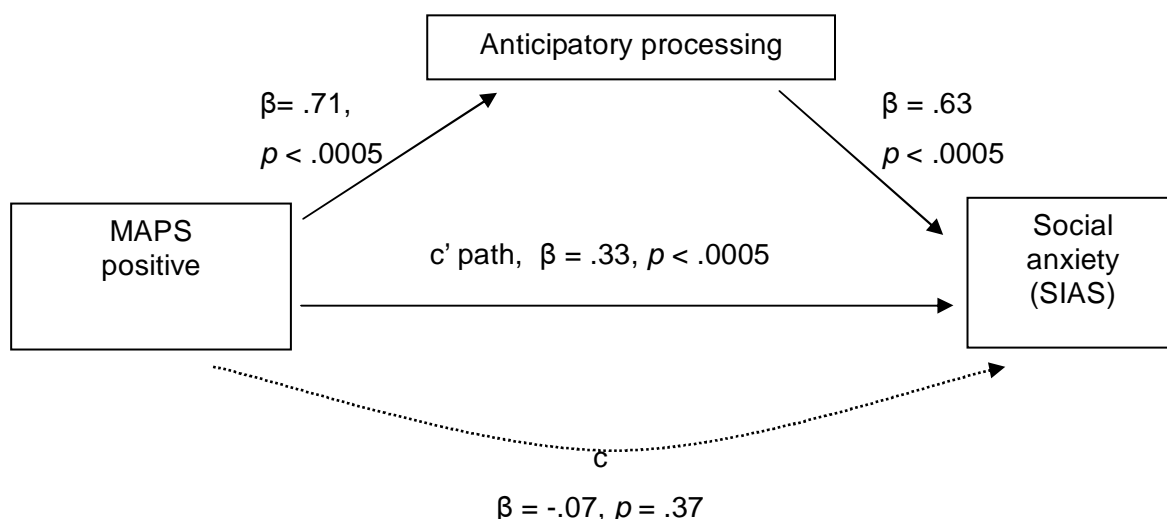


Figure 4.4: The mediator effect of anticipatory processing on the relationship between MAPS-positive and social anxiety (FNE),
 c' path = direct effect of the independent variable on the dependent variable,
 c = effect of the independent variable on the dependent variable when controlling for the mediator

4.3.3.6.2. The indirect effects of the MFIS subscales on social anxiety through the observer perspective, and public self-consciousness

In terms of the MFIS-positive subscale, multiple mediation analysis (Preacher & Hayes, 2008) was employed with two mediators: the observer perspective self-image and public self-consciousness. The results (Figure 4.5) showed that there was an overall indirect effect of MFIS-positive on the FNE scale through the mediators, $\beta(SE) = .30 (.06)$, Sobel's $z = 5.34$, $p < .0005$. The total effect of MFIS-positive on social anxiety was significant, $\beta(SE) = .18(.08)$, $t = 2.26$, $p = .02$. The direct effect of the MFIS-positive subscale on social anxiety when controlling for the mediators was not significant, $\beta(SE) = -.12 (.07)$, $t = -1.65$, $p = .10$. The overall indirect effect was qualified by specific indirect effects through public self-consciousness, $\beta(SE) = .25(.05)$, Sobel's $z = 4.80$, $p < .0005$, with 95% confidence intervals of .17 (lower) and .36 (upper) and through the observer perspective self-image, $\beta(SE) = .05(.02)$, Sobel's $z = 2.11$, $p = .03$, with 95% confidence intervals of .01 (lower) and .11 (upper).

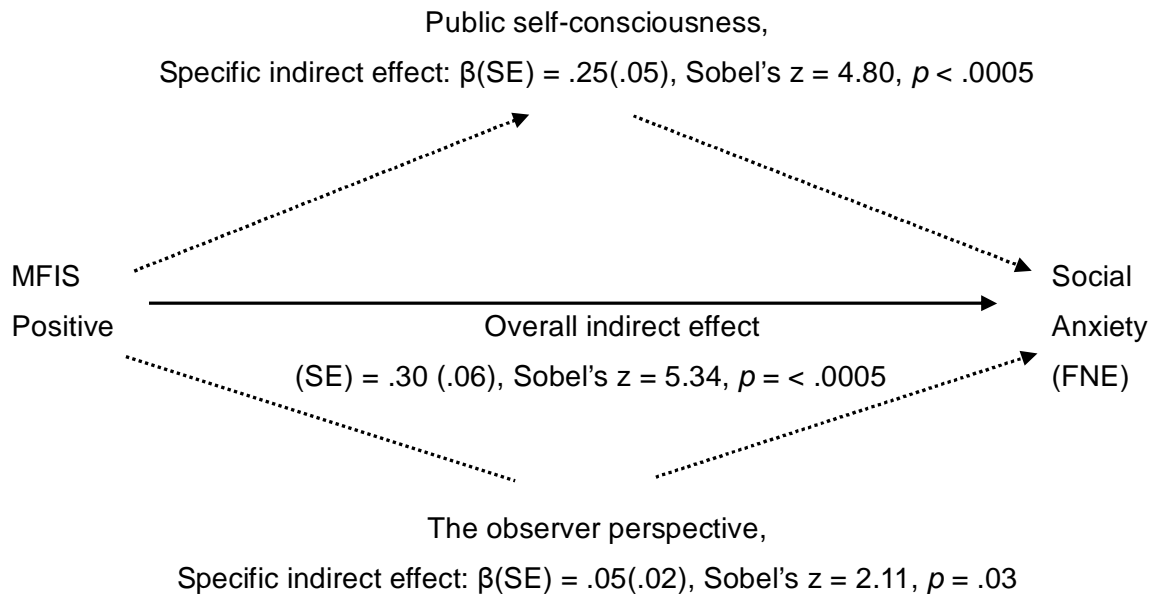


Figure 4.5: Overall indirect and specific indirect effects of MFIS-positive on social anxiety (FNE) through public self-consciousness and the observer perspective self-image

Consistently, the relationship between MFIS-positive and social anxiety measured with SIAS was mediated, as shown by a significant overall indirect effect, $\beta(\text{SE}) = .01(.009)$, Sobel's $z = 4.49$, $p < .0005$. The total effect of MFIS-positive on SIAS was significant, $\beta(\text{SE}) = .06(.01)$, $t = 4.35$, $p < .0005$, and the respective direct effect when controlling for the mediators was not significant, $\beta(\text{SE}) = .02(.01)$, $t = 1.39$, $p = .16$. This overall indirect effect was qualified by a significant specific indirect effect through public self-consciousness, $\beta(\text{SE}) = .03(.008)$, Sobel's $z = 3.84$, $p < .0005$, with 95% confidence intervals of .02 (lower) and .05 (upper). The specific effect through the observer perspective was not significant, $\beta(\text{SE}) = .008(.005)$, Sobel's $z = 1.65$, $p = .10$ (with 95% confidence intervals of -.001 (lower) and .02 (upper)).

Four multiple mediation analyses were conducted with the MFIS-negative and MFIS-uncontrollability subscales as independent predictors in separate analyses, and the FNE and SIAS scales as the dependent variables, respectively. The results indicated that when accounting for the observer perspective self-image, public self-consciousness mediated the relationships between MFIS-negative and FNE, and MFIS-uncontrollability and FNE.

Similarly, the MFIS-negative and MFIS-uncontrollability subscales had indirect effects on social anxiety measured with the SIAS. These effects were mediated by public self-consciousness.

4.3.3.6.3. The indirect effects of MCQ-30 subscales on social anxiety through anticipatory processing, the observer perspective, and public self-consciousness

As described above, multiple mediation analysis (Preacher & Hayes, 2008) reveals any overall indirect effect of the independent variable on the dependent variable through a set of mediators, a total effect of the independent variable on the dependent variable, a direct effect of the independent variable on the dependent variable when controlling for the mediators, and specific indirect effects (through each mediator).

The current results showed a significant overall indirect effect of MCQ-uncontrollability/harm on the FNE scale mediated by anticipatory processing, the observer perspective self-image, and public self-consciousness, $\beta(SE) = .52 (.09)$, $p < .0005$. The respective bootstrap 95% confidence intervals were .35 (upper limit) and .74 (lower limit) indicating that this overall indirect effect was significant. The total effect was significant, $\beta(SE) = .12(.02)$, $t = 5.42$, $p < .0005$. The direct effect of MCQ-uncontrollability/harm on social anxiety when controlling for the mediators was not significant, $\beta(SE) = .22 (.13)$, $p = .10$. The specific indirect effects through each mediator were significant (Figure 4.6):

- Anticipatory processing was a significant mediator, $\beta(SE) = .29(.09)$, with 95% confidence intervals of .11 (lower) and .46 (upper) and Sobel's $z = 3.25$, $p = .001$,
- Public self-consciousness was a significant mediator, $\beta(SE) = .18(.07)$, Sobel's $z = 2.54$, $p = .01$, with 95% confidence intervals of .06 (lower) and .30 (upper)
- The observer perspective was a significant mediator, $\beta(SE) = .05 (.03)$, Sobel's $z = 1.72$, $p = .08$, with 95% confidence intervals of .01 (lower) and .10 (upper).

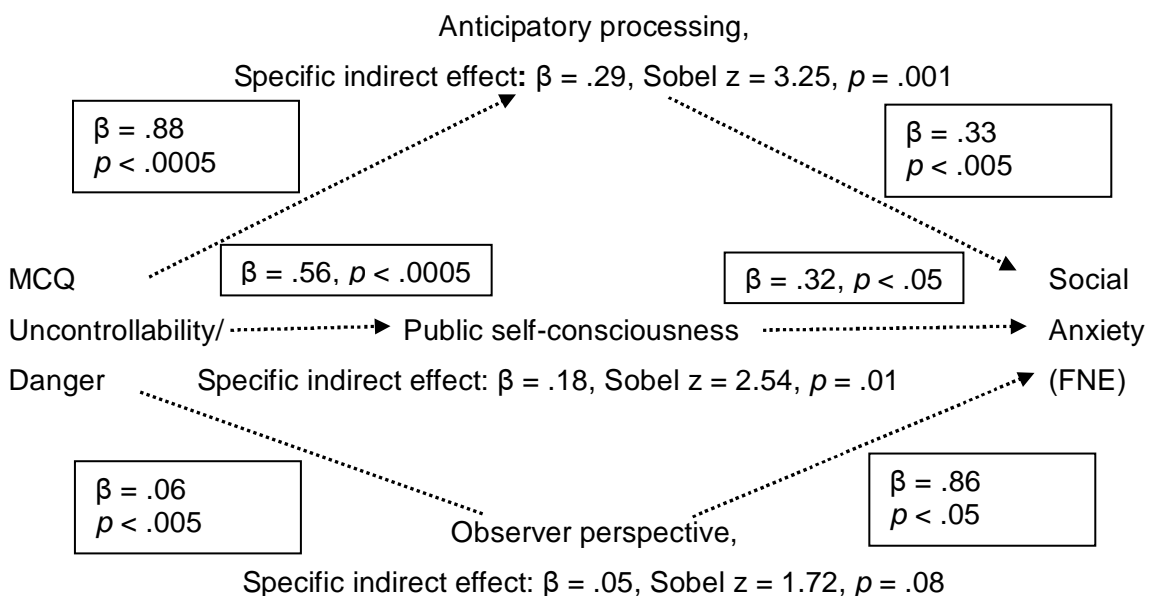


Figure 4.6: Specific indirect effects of MCQ-uncontrollability/danger on social anxiety (FNE) through anticipatory processing, public self-consciousness, and the observer perspective self-image

Finally, there was an overall indirect effect of MCQ-positive on SIAS, $\beta(\text{SE}) = .08 (.01)$, $p < .0005$, with bootstrap 95% confidence intervals of .05 and .11. The total effect was significant, $\beta(\text{SE}) = .08(.02)$, $t = 3.50$, $p < .0005$. The direct effect when controlling for the mediators was not significant, $\beta(\text{SE}) = .002 (.02)$, $p = .92$. Anticipatory processing was a significant mediator, $\beta(\text{SE}) = .06 (.01)$, Sobel's $z = 4.12$, $p < .0005$, with 95% confidence intervals of .03 and .09. The specific effects of the observer perspective self-image ($\beta(\text{SE}) = .004 (.004)$, $p = .27$) and of public self-consciousness ($\beta(\text{SE}) = .01 (.008)$, $p = .13$) were not significant.

Public self-consciousness and the observer perspective mediated the relationship between positive beliefs about focusing on the self-image and social anxiety (FNE). Public self-consciousness had a mediator effect on the relationship between positive beliefs about focusing on the self-image and social anxiety measured with the SIAS when accounting for the observer perspective. Public self-consciousness also mediated the relationships between negative and uncontrollability beliefs about focusing on the self-image and social anxiety (FNE and SIAS) when accounting for the observer perspective. Anticipatory processing, public self-consciousness, and the observer perspective fully and individually mediated the relationship between MCQ-uncontrollability and FNE. Finally, MCQ-positive, had an indirect effect on social anxiety measured with the SIAS through anticipatory processing. All these relationships were positive.

4.4. Discussion

4.4.1. Metacognitions about an image of the self scale

4.4.1.1. Reliability and stability

The MFIS questionnaire assessed meta-cognitive beliefs about focusing on an observer perspective self-image while in social situations. The scale formed three subscales of positive, negative, and uncontrollability beliefs that showed good to excellent internal consistency, and significantly positively correlated with each other. Furthermore, there was acceptable to good stability. Nevertheless, the positive beliefs subscale and the overall scores increased at the retest condition. This could be indicative of these scales' sensitivity to life stressors. The re-administration of the new scales took place between October and November; therefore, the possibility that participants were stressed over forthcoming examinations was not high. Nevertheless, other factors may have triggered participants' beliefs about anticipatory processing. For example, given that there were no pressing examinations and essay marking, this period could have been convenient for socialising and group activities that can provoke self-focused attention and anticipatory processing.

4.4.1.2. The effects of age and gender on scale and subscales

Male participants scored higher than female participants did on the positive beliefs subscale and on the full scale. Gender differences in meta-cognitive beliefs were in line with previous findings (Cartwright-Hatton & Wells, 1997) that males scored higher than females on negative beliefs about thoughts and on cognitive self-consciousness. The current result could indicate a tendency in male participants to justify their use of the observer perspective self-image by expressing positive beliefs about it. Alternatively, it could be that men consider the self-image more important, or that they utilise it in different ways than women do. These assumptions remain to be tested.

According to the cognitive model of social anxiety (Clark & Wells, 1995), the observer perspective self-image should be informed by introspective information. Therefore, it could be that private and public self-consciousness and the observer perspective self-image interact and maintain each other. In that case, gender differences could apply to all three types of self-processing, and could be regulated by respective differences at the meta-cognitive level. Research has produced contradictory results. Hope and Heimberg (1988) did not find gender difference in public self-consciousness in a clinical population that took part in a behavioural simulation task and was video-recorded. However, in a series of three studies, Ingram and his colleagues (1988) found that:

- i) In the presence of a mirror manipulation, women's public self-consciousness was more likely to increase compared with men's,
- ii) While observing their image displayed on a projector, men's public self-consciousness decreased while women's increased, and
- iii) While controlling for clinical levels of depression, femininity (as a role) in the self-focus condition was associated with greater self-focused attention than femininity in the non self-focused condition and than masculinity and androgyny in both conditions. The authors suggested that men could have been attempting to "dampen" their negative emotions by avoiding focusing attention on the self.

In line with the above, Mansell et al. (2003) found that high socially anxious women directed their attention onto an internal probe rather than on external probes in a dot-probe paradigm with images of emotional and neutral faces. Their internal focus was greater than that displayed by low socially anxious women in a social threat condition, while there was no such difference for men. However this gender difference was eliminated when the authors analysed the data according to speech anxiety as opposed to fear of negative evaluation (Mansell et al., 2003).

In contrast to the above, the present study found that men held greater positive beliefs about focusing on the self-image than women. It seems that meta-cognitive beliefs about self-attention may not show the same pattern across gender as attention. However, the differences observed across studies may be an effect of the different paradigms used rather than indicative of a substantive gender effect.

Finally, results showed a positive correlation between positive beliefs and age. This could indicate that people assume greater importance of their self-image as they age, perhaps because their responsibilities grow along with them. However, Hignett and Cartwright-Hatton (2008) found no age effect on the actual perspective taking in two groups of 12-14 and 16-18 year old adolescents. Furthermore, age did not have an effect on the positive relationship between social anxiety and the observer perspective self-image (Hignett & Cartwright-Hatton, 2008). Hence, it could be that age has an effect on the beliefs about the observer perspective self-image but not on the actual perspective taken. These findings need replication and further investigation.

4.4.1.3. Convergent validity

Convergent validity was good with all subscales correlating positively and significantly with the meta-cognitive beliefs about general worry and thoughts. Furthermore, all the MFIS subscales correlated significantly and positively with the observer perspective self-image, and with both private and public self-consciousness.

4.4.2. Metacognitions about anticipatory processing scale

4.4.2.1. Reliability and stability

The second scale was designed to target meta-cognitive beliefs about anticipatory processing. Principal component factor analysis yielded three subscales of positive beliefs, uncontrollability beliefs, and beliefs that anticipatory processing could make one aware of other people's expectations. The subscales showed good internal consistency and significantly positively correlated with each other. The correlations between the test and retest conditions indicated good stability of the scale and subscales. However, similar to the MFIS, the full scale and the positive subscale scores increased in the retest condition. Possible explanations were discussed above.

4.4.2.2. The effects of age and gender on scale and subscales

Age did not have an effect on the scale and subscales. However, male participants indicated a higher overall score than female participants, hence indicating a gender effect.

In terms of gender differences in meta-cognitive beliefs, some research has highlighted that the positive correlation between certain contents of worry and positive beliefs about worry was higher in males than in females (Robichaud, Dugas, & Conway, 2003). The authors suggested that this could be attributed to men's tendency to justify their high levels of worry by expressing positive beliefs about it. Similarly, in the present study, it could be that male participants expressed higher overall levels of meta-cognitive beliefs about anticipatory processing in order to justify their engagement in this process.

Another explanation for the gender effect could be that male participants expressed higher levels of meta-cognitive beliefs because they engage in anticipatory processing in a manner that differs from that of female participants. In line with this, Zlomke and Hahn (2010) found that males' rumination, catastrophising, and life stressors positively predicted worry, whereas refocus on planning was associated with a decline in worry. However, in female participants, self-blame, catastrophising, and life stressors were positive predictors of worry, whereas acceptance and positive re-appraisal were inverse predictors of worry.

That study (Zlomke & Hahn, 2010) utilised the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990) that targets pathological worry. The present study measured anticipatory processing that did not refer to self-blame and the actual content of catastrophising. However, it could be that gender differences in meta-cognitive beliefs reflect differences in the function of the activated strategy (e.g., worry).

4.4.2.3. Convergent validity

Finally, the scale's convergent validity was good. In line with expectations, all subscales significantly and positively correlated with measures of meta-cognitive beliefs about general worry, and with anticipatory processing.

4.4.3. Meta-cognitive and cognitive predictors of social anxiety

4.4.3.1. Correlations between meta-cognitive beliefs, social anxiety, and cognitive processes

Significant positive correlations between meta-cognitive beliefs and social anxiety supported the first hypothesis. More specifically, positive beliefs about the observer perspective self-image and about anticipatory processing moderately correlated (correlations $< .3$) with social anxiety measured with the FNE and the SIAS.

According to the S-REF (Wells & Matthews, 1994), meta-cognitive beliefs maintain the use of maladaptive coping mechanisms expressed in the form of the CAS (e.g., worry, rumination, self-focus, etc). In support of this, positive beliefs correlated with anticipatory processing (correlations $> .45$) and with self-consciousness (most correlations $> .3$). Negative meta-cognitive beliefs indicated positive correlations with the observer perspective self-image ($> .2$), and with self-consciousness ($> .3$).

However, positive beliefs that anticipatory processing can increase one's awareness of other people's expectation did not correlate with social anxiety (FNE), but had a weak correlation with SIAS. These beliefs correlated with the observer perspective self-image and with self-consciousness. This indicated that high levels of these beliefs were associated with an increased focus on the self-image, and on the self as a social object as well as on inner feelings and thoughts. This is in line with the S-REF model (Wells & Matthews, 1994) that suggests a role of meta-cognition in the regulation of attention. However, these beliefs were not associated with the actual perspective taking in social situations. Lack of such correlation could indicate that different mechanisms are implicated in the maintenance of trait self-consciousness and in the tendency to take an observer or field perspective in social situations.

4.4.3.2. Predictors of social anxiety

The second hypothesis was supported as follows:

- Uncontrollability and positive beliefs about the observer perspective self-image were individual predictors of social anxiety. However, the relationship between positive beliefs (MFIS) and social anxiety (FNE) was negative. This is consistent with previous results (Study 1; Gkika & Wells, 2009a) that positive meta-cognitive beliefs about worry were significant but negative predictors of social anxiety. It could be that positive beliefs about worry and about the observer perspective offer relief from social anxiety, for example by normalising worry (“It’s ok to worry”, “It will help me improve for the future”). However, uncontrollability beliefs about focusing on the observer perspective seem to have the opposite effect. In particular, these beliefs were associated with high social anxiety (both FNE and SIAS). Consistent with previous studies (Fenigstein et al., 1975; George & Stopa, 2008; Hope & Heimberg, 1988; Jostes et al., 1999), public self-consciousness was a strong positive predictor of social anxiety (FNE).

The beliefs that focusing on the self-image may contaminate the social situations and create a self-bias were positive predictors of social anxiety (SIAS). Furthermore, depression was a positive predictor of SIAS. These results suggest that different elements of social anxiety (fear of negative evaluation and fear of certain situations) might be regulated by meta-cognitive beliefs. Depression seems to be associated more with the latter rather than with the former.

- Positive beliefs that anticipatory processing could help one understand people’s expectations were individual negative predictors of social anxiety (FNE and SIAS). Similar to above, higher scores on this MAPS subscale were associated with less likelihood to belong in the high social anxiety group. To understand these negative relationships, further studies are necessary that will address whether meta-cognitive beliefs have a role of causality in social anxiety. In line with previous findings (Hinrichsen & Clark, 2003; Vassilopoulos, 2004, 2005a), anticipatory processing was a highly significant predictor of social anxiety. Uncontrollability beliefs about anticipatory processing were also individual positive predictors (SIAS).
- None of the MCQ-30 subscales that were explored were direct individual predictors of social anxiety (FNE and SIAS). However, as discussed below, this was due to the cognitive variables that fully mediated the relationships between the MCQ subscales and social anxiety. These results were in line with the S-REF model (Wells & Matthews, 1994) because although meta-cognitive beliefs contributed to social anxiety, their effect was largely indirect and dependent on thinking styles.

4.4.3.3. Mediated relationships between meta-cognitive beliefs and social anxiety

In line with the S-REF model and the third hypothesis, several elements of the CAS mediated the relationships between meta-cognitive beliefs and social anxiety. In particular, beliefs that anticipatory worry can be harmful and uncontrollable had a positive effect on social anxiety through a positive relationship with anticipatory processing. Hence, it could be that uncontrollability beliefs about anticipatory processing are associated with increased engagement in anticipatory processing thereby maintaining social anxiety. Similarly, positive beliefs about anticipatory processing had an indirect effect on social anxiety measured with the SIAS through anticipatory processing.

Furthermore, positive beliefs about focusing on the self-image had a positive relationship with social anxiety through a positive relationship with public self-consciousness and with the observer perspective self-image. Public self-consciousness also mediated the positive relationship between negative and uncontrollability beliefs and social anxiety (FNE and SIAS). This result was conditional upon the presence of the observer perspective. Therefore, this analysis provided further support for the notion that elements of the CAS, namely public self-consciousness and the observer perspective, mediate the relationship between meta-cognitive beliefs and social anxiety.

Finally, anticipatory processing, public self-consciousness, and the observer perspective mediated the relationship between uncontrollability beliefs about general worry and social anxiety (FNE). Therefore, these beliefs were associated with increased social anxiety through positive associations with the mediators. Positive beliefs about general worry had an indirect effect on social anxiety (SIAS) through anticipatory processing.

Previous results (Study 1) found indirect effects of positive and negative meta-cognitive beliefs about general worry on social anxiety (FNE) through anticipatory processing and the post-mortem. The present study expands on these results by indicating that anticipatory processing, as well as the observer perspective self-image, and public self-consciousness mediated some of the relationships between meta-cognitive beliefs, specific to the mechanisms implicated in social phobia, and social anxiety measured with the FNE scale and the SIAS.

4.4.3.4. Limitations

The present study used a University population. Therefore, the present results should not be generalised to clinical populations. Moreover, the logistic regression revealed medium effect sizes hence raising some concern about the statistical power of the analyses. Moreover, a longer period between the test and retest conditions of the new questionnaires would have been more appropriate in the investigation of the scales' stability. Finally, the interpretation of the scree plots was based on the relevant suggestions of Tabachnick and Fidell (2007). However, these authors suggest that interpretations that are based on the judgments of the researchers might be unreliable (Tabachnick & Fidell, 2007). Nevertheless, the current variables appeared well defined by their respective Factor solutions as indicated by the clear and high loadings displayed on the structure matrices.

The present study provided evidence that a range of meta-cognitive beliefs contributed to social anxiety directly and through anticipatory processing, public self-consciousness, and the observer perspective self-image. However, further research is needed to explore potential causal relationships between these beliefs and social anxiety. An interesting study would be to assess the effect of these beliefs on the relationship between the cognitive mechanisms and state anxiety in social situations. The current study provided two new tools that appear promising in facilitating such research.

CHAPTER 5

Relationships between meta-cognitive beliefs and attentional bias in high and low socially anxious individuals

5.1. Introduction

According to the Self-Regulatory Executive Function Model (S-REF; Wells & Matthews, 1994), one of the main features of the cognitive-attentional syndrome is threat monitoring. Threat monitoring involves selective attention to threatening external information and self-focused attention. In line with this, contemporary cognitive models assert that social phobia is characterised by attentional bias, such as selective attention to negative social feedback (Rapee & Heimberg, 1997) and self-focused attention (Clark & Wells, 1995). The present study is concerned with attentional bias regarding external stimuli.

Growing research investigates attentional bias by using computerised tasks, such as the dot-probe task (MacLeod et al., 1986). In this task, participants are presented with emotional stimuli (e.g., emotionally loaded words or facial expressions) matched with neutral stimuli for a few milliseconds (msec). Then, a probe (e.g., a dot, a letter, or a triangle) replaces one of the stimuli. Usually, several trials take place and participants are asked to respond to the probe as quickly and as accurately as possible. Fast responses show attention towards the stimuli that preceded the probe. Slower responses indicate attention away from these stimuli.

With this paradigm, Asmundson and Stein (1994) found that individuals with social phobia that read threat words aloud were faster in responding to the probes that followed social threat words than to the probes that followed neutral or physical threat words. Words were displayed for 500msec. Such interactions were not found in the control population. These results suggested hyper-vigilance towards social threat words in social anxiety disorder. Furthermore, another study found that attentional bias towards positive and negative social-evaluative words was greater in people who expected to give a speech (Mansell, Ehlers, Clark, & Chen, 2002) than in people who did not. Social anxiety had no effect on attentional bias; however, trait anxiety predicted increased attention to negative social-evaluative words (Mansell et al., 2002). Another study found that comorbid depressive disorder could eliminate the attentional bias towards social threat words found in social phobia without depression (Musa, Lepine, Clark, Mansell, & Ehlers, 2003). However, another study failed to find an effect of social anxiety on attentional bias when controlling for depression (Pishyar et al., 2004).

The conflicting results led to the development of more sophisticated designs that could assess vigilance toward or avoidance of threat words under various conditions, such as different display durations and masked-unmasked conditions. Ononaiye, Turpin, and Reidy (2007) found that high socially anxious individuals attended towards social-evaluative words (as opposed to words of somatic sensations, negative evaluation words, and social situation words) when the words were displayed for 14msec and were then masked for 486msec. Vassilopoulos (2005b) tested the vigilance-avoidance hypothesis by using two display durations: 200msec and 500msec. He found that high socially anxious individuals attended social and physical threat words at 200msec but turned their attention away from them at 500msec. This result remained when controlling for anxiety and depression. No such interaction was found for the low socially anxious individuals.

A modified design that used images of faces matched with pictures of household objects found that social phobic individuals turned their attention away from faces regardless of facial expression (Chen et al., 2002). However, Pishyar et al. (2004) found that high socially anxious individuals attended toward threatening faces and turned their attention away from positive faces whereas the opposite was found for low socially anxious individuals. Another study found that high social phobic individuals were more likely to attend towards angry faces displayed for 500msec than happy faces in either the 500msec or the 1.250msec condition (Mogg et al., 2004).

The above results suggested an attention bias towards social threat words and negative faces in socially anxious individuals or in individuals anticipating a social situation. Moreover, attentional bias for positive information was observed.

More research is needed to explore the exact conditions under which such attentional bias may occur. For example, it could be that socially anxious individuals are more likely to attend towards negative social words when not depressed, and within the first 200msec of their occurrence. Also, it could be that they are inclined to attend towards negative faces as opposed to happy faces, but would avoid faces altogether if they were provided with an alternative option (e.g., objects).

Findings of attentional bias in anxious states are consistent with the S-REF model that incorporates threat monitoring in the CAS of emotional disorders. However, Wells and Matthews (1994) have also proposed that the mechanisms of the CAS are regulated by meta-cognition. Hence, meta-cognitive beliefs would be expected to have an effect on attentional bias. In particular, meta-cognitive beliefs could interact with social anxiety in influencing attentional bias. To the author's knowledge, no studies have investigated the relationship between meta-cognition and attentional bias in social anxiety. Hence, the present study aimed to explore whether meta-cognitive beliefs about focusing on the self-

image and about worry, thoughts, and memory were implicated in attentional bias for positive and negative social evaluative and somatic words.

The study was based on a previous paradigm (Vassilopoulos, 2005b) and replication of previous results was expected. That is high socially anxious people were expected to show a vigilance-avoidance pattern with regards to negative words. Additionally, in line with the S-REF model, and given that previous findings of an effect of social anxiety on attentional bias had not accounted for meta-cognitive beliefs, the current study hypothesised, that meta-cognitive beliefs would interact with social anxiety to influence any effects on attentional bias. Additionally, meta-cognitive beliefs were expected to contribute to attentional bias when controlling for depression. In particular, positive and negative meta-cognitive beliefs were expected to be associated with attentional bias towards negative words (positive relationships).

5.2. Method

5.2.1. Participants

A sample of 349 University of Manchester students and staff completed the screening questionnaire. 118 individuals were chosen to participate in the study according to their scores on the Fear of Negative Evaluation (FNE) scale (Watson & Friend, 1969). Mean age was 22.3 (SD = 4.5); Based on the suggested cut-off points for British populations (Stopa & Clark, 2001), participants who scored 22 or above formed the high social anxiety group (N = 51) and participants who scored seven or below formed the low social anxiety group (N = 43). Eighty-five (72%) were female and 33 (28%) were male. However, 23 participants were excluded from the analyses because they no longer qualified for their respective social anxiety group on the day of the experiment. Therefore, the final sample consisted of 51 high socially anxious individuals and 43 low socially anxious individuals.

In the low socially anxious group, 22 (51%) participants were male and 21 (49%) were female. Mean age was 22.7 (SD = 5.1). In the high socially anxious group, mean age was 22.2 (SD = 4.4). Forty-one (80%) participants were female and 10 (20%) male. Mann-Whitney tests revealed that age was not significantly different between the two groups ($U = 1017$, $Z = -.61$, $p = .54$) but gender was $\chi^2(1) = 9.02$, $p = .003$).

5.2.2. Materials

5.2.2.1. Questionnaires

Participants completed the following questionnaires:

The Fear of Negative Evaluation scale (Watson & Friend, 1969): A 30-item measure of negative expectations in social situations. This questionnaire has been described in previous studies (Study 2, section 2.1.2.2.).

The Social Avoidance and Distress Scale (SADS; Watson & Friend, 1969): A 28-item measure of avoidance of social situations and of social distress. Each item is rated on a true or false scale. Its internal consistency has been excellent and its test-retest reliability over a month has been acceptable to good (Watson & Friend, 1969).

The Depression Anxiety Stress Scale-21 (DASS21; S. H. Lovibond & P. F. Lovibond, 1995): A 21-item measure of mood with three subscales: depression, stress, and anxiety. Each subscale comprises seven items measured on a scale of 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). The scale has shown good internal consistency and concurrent validity (Antony et al., 1998).

The Metacognitions Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004): A 30-item measure of the level of agreement with meta-cognitive beliefs about thoughts and worry. This measure has been described in previous studies (Chapter 2, section 2.1.2.2.).

The Metacognitions about Focusing on an Image of Self (MFIS; Study 3): A 25-item measure of metacognitive beliefs about focusing on a self-image from an observer perspective. This scale consists of three subscales (positive beliefs, negative beliefs that the observer perspective self-image can make one appear unnatural and contaminate social situations, and uncontrollability beliefs). The items were rated on a scale of 0 (do not agree) to 4 (agree very much). The subscales have shown good internal consistency: MFIS positive: .91, MFIS negative: .84, and MFIS uncontrollability: .81. Test-retest reliability was good and ranged between .64 and .78 (Study 3).

The Focus of Attention and Self-Image Scale (FASIS). This scale has 8-items. The first five were modified from the Focus of Attention Questionnaire (Woody et al., 1997). These items measure self-focused attention on a scale of 0 (not at all) to 100 (fully). The remaining three items incorporated the Self-Image Perspective Scale (SIPS; Study 2, section 2.1.2.2.).

In the present study, the first five items were subjected to a principal components factor analysis with direct oblimin rotation. The Kaiser-Meyer-Olkin measure was acceptable (.67) and Barlett's test of sphericity was significant ($p < .001$). The scree plot and the structure matrix agreed on a 2-Factor solution where 2 items loaded on Factor 1 (interpreted as internally focused attention), one item loaded on Factor 2 (interpreted as externally focused attention) and one item loaded on both factors. Reliability of this subscale was acceptable ($\alpha = .68$). Items 1, 3, and 4 formed the self-focused attention variable with $\alpha = .78$. The last three items constituted the SIPS and alpha was .58. The full scale's (FASIS) alpha was .63. This study employed the self-focused attention variable described above and Item 7 as the observer perspective variable.

The Social Cognitions Questionnaire (SCQ; Wells, Stopa, & Clark, 1995): A 22-item measure of cognitions associated with social anxiety grouped in two subscales: negative self beliefs, and fear of performance failure/fear of negative evaluation. This scale has shown excellent internal consistency, good convergent validity, and adequate discriminant validity. In the present study, the scale's alpha was .94, the subscale about failure/FNE showed $\alpha = .85$ and the subscale about self-beliefs showed $\alpha = .92$.

5.2.2.2. Words

Eighty emotionally loaded words were matched with neutral words and were included in the task. The emotional words were divided into four categories: positive social-evaluative, negative social-evaluative, positive somatic, and negative somatic. Each category included 20 words. Some of the words were taken from previous studies (Asmundson & Stein, 1994; Ononaiye et al., 2007; Vassilopoulos, 2005b). Moreover, all word pairs were matched for frequency of use in the English language and for number of syllables. Frequency of use was counted based on the British National Corpus (Burnard, 2007). This is a collection of 100 million words of spoken and written English that was completed in 1994. Frequency counts are available online (Kilgariff, 1995). The list of words can be found in Appendix 5.1.

The words were piloted by 43 people who rated their emotional valence on a scale ranging from 1 to 7 (1=extremely negative, 4=neutral, 7=extremely positive). The words were listed in random order. Twenty-four participants were female (55.8%) and 17 were male (39.5%). Mean age was 25.44 (SD = 8.98). The difference in gender was not significant. Paired t-tests were used for the normally distributed data and Wilcoxon signed rank paired tests were employed for the not-normally distributed data.

The results showed that positive somatic words were rated as significantly more positive ($M = 102.95$) than negative somatic words ($M = 56.90$), $t(39) = -18.85$, $p < .0005$ and than neutral words ($M = 82.28$), $z = -5.16$, $p < .0001$. Also, negative somatic words ($M = 56.92$) differed significantly from their neutral pairs ($M = 81.50$), $z = -5.23$, $p = .0005$. Furthermore, the difference between negative evaluative words ($M = 44.86$) and positive evaluative words ($M = 113.11$), $z = -5.233$, $p < .0005$, and between negative evaluative words and their neutral pairs ($M = 77.47$), $z = -5.233$, $p < .0005$, was significant. Finally, the positive evaluative words were rated significantly more positively than their neutral pairs ($M = 80.6$), $z = -5.234$, $p < .0005$. Therefore, the word combinations were considered suitable for their purpose.

5.2.2.3. The dot-probe task

The dot-probe paradigm was preferred over the Stroop test because it simultaneously presents emotional and neutral words, and therefore it can target attention towards threat words or avoidance of them with greater accuracy. Furthermore, in the dot-probe paradigm, faster reaction times indicate selective attention, whereas the Stroop test measures delayed reactions. These could be attributed to cognitive functioning other than attention. For example, in the Stroop task, certain stimuli might trigger worry that could inhibit rapid responses (Wells & Matthews, 1994).

This study's dot-probe task was based on a modified version (Vassilopoulos, 2005b) of the original task (MacLeod et al., 1986). An Advent laptop with an AMD Turion 64x2 Processor TL60 and a 15.4" widescreen was used. A chin rest ensured a constant distance of approximately 80cm between the participant's head and the monitor. At the beginning of each trial, a 20x20 mm black fixation cross appeared on the centre of the screen for 500msec. Then, a pair of words appeared in horizontal position for either 200msec or for 500msec. The words were displayed in small letters, the size was 30 points, and the font was bold "times new roman". The background was white. The distance between the two probe positions was 16.5cm. In each trial, one of the words was replaced by a black triangle (6x5mm) that appeared in the middle of the respective word and was displayed for 5 msec.

Participants were instructed to respond by pressing the "Z" key when the probe replaced the word on the left and the "M" key when the probe replaced the word on the right. They were asked to do so as quickly as possible while trying to make as few mistakes as possible. The task included 160 trials (80 for the 200msec condition and 80 for the 500msec condition) presented in random order for each participant. Twenty practice trials introduced the task.

5.2.3. Procedure

All participants were tested individually. First, the questionnaires were administered. Then, participants were told that after the computerised tasks, they would participate in a conversation with a stranger about their every day life and daily activities. State anxiety pre and post the social threat induction was rated on a scale of 0 to 100 (0 = not at all anxious, 100 = extremely anxious). Following that, participants completed a dot-probe task with images of faces and household objects. This task was analysed due to an error in its programming. Then, the participants completed the dot-probe task with the words. Finally, they were debriefed and paid.

5.2.4. Overview of analysis

5.2.4.1. Exploration of the new measure, the dot-probe task, and of attentional bias means

The internal reliability and structure of the MFIS were explored with reliability tests and principal component factor analysis.

Previous studies challenged the reliability of the dot-probe task (Schmukle, 2005; Staugaard, 2009). Hence, reliability analyses assessed the internal consistency of the current task for each social anxiety group. To calculate Cronbach's alpha, trials were separated in groups of congruent and incongruent stimuli according to whether the probes followed emotional or neutral words, respectively. Furthermore, trials were divided in terms of their valence. Internal consistency was good with alphas ranging from .81 to .94 (Appendix 5.2).

The magnitude of attentional bias was calculated with the following equation (MacLeod et al., 1986; Vassilopoulos, 2005b): $\text{Bias} = 0.5 [(\text{TrPI} - \text{TIPI}) + (\text{TIPr} - \text{TrPr})]$ where T = threat word, P = probe, r = right, and l = left. Thus, TrPI corresponded to reaction times when the threat word was on the right of the screen while the probe was on the left, and so on. Positive values indicated attention towards threat words and negative values indicated attention away from threat words.

Finally, mean attentional bias in high and low social anxiety groups was explored.

5.2.4.2. The vigilance-avoidance hypothesis

The vigilance-avoidance hypothesis was explored with a mixed-ANCOVA as follows: Duration (200-500 msec) and Word valence (positive-evaluative, negative-evaluative, positive-somatic, and negative-somatic) were the within-subject factors and social anxiety (FNE) was the between-subject factor. This design was used in previous studies that had employed the dot-probe paradigm (Asmundson & Stein, 1994; Chen et al., 2002; MacLeod et al., 1986; Mansell et al., 2003; Mansell et al., 2002; Mogg et al., 2004; Pishyar et al., 2004; Vassilopoulos, 2005b). Effect sizes were estimated with the η^2 statistic. Significant results were followed by paired t-tests and independent t-tests, accordingly. Anxiety and depression groups were based on the suggested moderate levels that were 14-20 for depression and 10-14 for anxiety (S. H. Lovibond & P. F. Lovibond, 1995). The mean was used (17 for depression and 12 for anxiety) to create the respective high and low groups. Participants whose scores were equal to the mean were included in the high depression and anxiety groups, respectively. In depression, 38 participants (26 with low social anxiety and 12 with high social anxiety) scored lower than the mean and 56 participants (17 with low-FNE and 39 with high-FNE) scored higher than or equal to the mean. In anxiety, 48 individuals (13 with low-FNE and 35 with high-FNE) scored higher than or equal to the mean, and 45 individuals (30 with low-FNE and 15 with high-FNE) scored lower than the mean.

5.2.4.3. The interaction effect hypothesis

It was hypothesised that social anxiety and meta-cognitive beliefs would have an interaction effect on attentional bias. To explore this hypothesis, a mixed ANCOVA was designed as follows: Word Valence (negative evaluative-positive evaluative-negative somatic-positive somatic) X Duration (200msec-500msec) X Social anxiety (High-Low) X Meta-cognition (High-Low). However, separating the groups in social anxiety by meta-cognition led to highly unequal sample sizes. Even though analyses of variance are robust to violations of normality, when group sizes are very unequal such violations can be problematic (Tabachnick & Fidell, 2007). In each group, the distribution was not normal for the following variables: Bias for negative somatic words in 500msec in high socially anxious individuals, bias for positive somatic words in 200msec in high and low socially anxious individuals, and bias for negative evaluative words in 500msec in high and low socially anxious individuals. Square root, logarithm, reciprocal, and box cox transformations failed to normalise the data. Therefore, the above analysis was not possible.

It is worth mentioning here that even though it was anticipated that individuals with high social anxiety and low meta-cognition, and vice versa would be infrequent in the general population, it was expected that sufficient numbers would be obtained for the planned statistical analyses. However, the groups were highly unequal (Table 5.1) thus creating problems with some of the assumptions of ANOVA. The fact that out of the 349 individuals that were screened, only 11 scored high in the total MCQ-30 scale and low in the FNE scale is consistent with the S-REF model (Wells & Matthews, 1994) that suggests a role of meta-cognitive beliefs in emotional symptoms.

Table 5.1: Number of participants of FNE (social anxiety) X Meta-cognition groups; examples of the inequality of sample sizes

| | High MCQ uncontrollability | Low MCQ uncontrollability | High MFIS positive | Low MFIS positive | High MFIS negative | Low MFIS negative |
|-------------|-------------------------------|------------------------------|--------------------------|-------------------------|--------------------------|-------------------------|
| High FNE | 36 | 14 | 47 | 4 | 32 | 19 |
| Low FNE | 13 | 30 | 10 | 33 | 8 | 35 |

Following the above limitations, the mixed ANCOVA design was dropped and it was decided to conduct moderation analyses following Baron and Kenny's (1986) method for moderated interaction analysis. This analysis examines the contribution of an interaction variable (in this case Meta-cognition X FNE) on a dependent variable (attentional bias) while controlling for each predictor separately (Meta-cognition and FNE). Nevertheless, the meta-cognitive variables correlated highly with the interaction variables, with correlation coefficients ranging between .82 and .96 and tolerance values below .02. Therefore, multicollinearity made the analyses unfeasible.

To resolve this, the raw data of the independent variables were transformed into z values (Friedrich, 1982; Tabachnick & Fidell, 2007). These z values were entered in regressions with attentional bias as the dependent variable. The results indicated acceptable tolerance and VIF values (reported in Section 5.3.8), hence suggesting no multicollinearity.

5.2.4.4. Predictors of attentional bias

Correlations and regression analysis were designed to explore the potential meta-cognitive predictors of attentional bias in high and low socially anxious groups. Thus, correlation analyses explored the potential correlations between social anxiety, meta-cognitive variables, and attentional bias. Moreover, linear regression analyses that controlled for depression and state anxiety explored the potential meta-cognitive predictors of attentional bias separately for each social anxiety group. The choice of predictors was based on the correlation analyses.

Given the gender difference between the high and low social anxiety groups, all analyses controlled for gender. In the first step of the regression analyses, effect sizes were calculated with Cohen's $f^2 = \frac{R^2}{1 - R^2}$. Moreover, Cohen's $f^2 = \frac{R^2_a - R^2_b}{1 - R^2_a}$ was calculated in the remaining steps of the hierarchical regressions. Effect sizes of .02-.15 were considered small, .15-.35 medium, and above .35 large (Cohen, 1988).

5.3. Results

5.3.1. Examination of the MFIS scale

In the present study, the MFIS scale's alpha was .86, and the subscales' alpha ranged from .72 to .88. This reliability analysis indicated that the omission of two Items would improve the subscale's reliability. These Items were that the self-image "can be controlled when I'm aware of it", and "just happens spontaneously". Therefore, these Items were removed.

Given that the omission of two Items changed the structure of the scale, a principal component Factor analysis was conducted. The KMO test ($KMO = .81$) and Barlett's test of sphericity ($\chi^2 (300) = 1113.89, p < .0005$) indicated that the data were suitable for this analysis.

Direct oblimin rotation was employed to allow for the items to be inter-correlated. Previously (Chapter 4; Study 3), the scale had indicated three Factors, therefore, a 3-Factor solution was specified. However, according to the structure matrix, only one Item loaded on Factor 3. Accordingly, the scree plot suggested that a 2-Factor solution was possible. Therefore, the analysis was repeated by specifying a 2-Factor solution.

The structure matrix indicated that all Items clearly loaded on one or the other Factor with eigenvalues above one. One subscale included positive beliefs about focusing on the self-image and explained 28.85% of the variance. The other subscale included negative and uncontrollability beliefs and explained 19.80% of the variance.

Ultimately, the MFIS-positive subscale included 13 Items, $\alpha = .90$, and the MFIS-negative included 10 Items, $\alpha = .87$. The retained Items are presented in Appendix 5.3.

5.3.2. Manipulation check

Wilcoxon signed rank tests showed that both high and low social anxiety groups reported more anxiety after the threat administration ($M = 49.51$, $SD = 22.94$, and $M = 16.07$, $SD = 17.55$, respectively, $Z = -5.11$, $p < .0005$) compared with before ($M = 28.37$, $SD = 20.04$, and $M = 12.14$, $SD = 17.88$, respectively, $Z = -2.5$, $p = .012$).

Furthermore, the high social anxiety group reported greater state anxiety than the low social anxiety group both before ($U = 516.5$, $Z = -4.34$, $p < .0005$) and after ($U = 270$, $Z = -6.22$, $p < .0005$) the threat.

5.3.3. Outliers

Outlier reaction times were set as values above or below two standard deviations and values below 100msec or above 1000msec. These were removed from the data (1.5%). Reaction times for errors were also removed, resulting in 3% of missing values. Furthermore, two cases were identified as univariate and multivariate outliers. However, these cases were preserved because their scores did not indicate that they could belong to a different population.

5.3.4. Description of the sample

Participants' average depression, anxiety and stress are presented in Table 5.2. High socially anxious individuals scored higher than low socially anxious individuals on social anxiety (FNE; $t(92) = -44.97$, $p < .0005$, equal variances assumed, $F = 2.3$, $p = .13$, and SADS; $U = 129.5$, $Z = -7.3$, $p < .0005$), on depression ($U = 484.5$, $Z = -4.67$, $p < .0005$), and on anxiety ($U = 552.5$, $Z = -4.06$, $p < .0005$).

Table 5.2: Means and standard deviations of anxiety and mood in high and low social anxiety (FNE), N = 94

| Means (SD) | FNE | SADS | Depression | Anxiety |
|------------|--------------|--------------|--------------|-------------|
| Low FNE | 3.12 (2.27) | 2.91 (3.81) | 5.16 (6.06) | 4.28 (4.81) |
| High FNE | 25.90 (2.58) | 14.72 (7.12) | 12.35 (8.44) | 9.88 (6.92) |

Mean attentional bias was examined separately for high and low social anxiety (Table 5.3).

Table 5.3: Means and standard deviations of attentional bias in high and low social anxiety groups, N = 94

| Exposure duration | 200msec | | | | 500msec | | | |
|---------------------|---------|--------|-------|--------|---------|--------|--------|--------|
| | Low | | High | | Low | | High | |
| | M | SD | M | SD | M | SD | M | SD |
| Negative evaluative | 4.912 | 35.901 | -.331 | 25.986 | -7.547 | 34.556 | 1.487 | 36.758 |
| Negative somatic | -1.946 | 28.770 | 3.625 | 28.041 | 2.692 | 29.538 | 3.348 | 36.099 |
| Positive evaluative | -.392 | 30.205 | 1.111 | 40.501 | -8.886 | 22.596 | -1.819 | 37.044 |
| Positive somatic | -.504 | 28.813 | -.389 | 33.064 | -5.414 | 21.311 | 4.401 | 39.043 |

Examination of each group's mean attentional bias suggested that high socially anxious individuals showed an avoidance-vigilance pattern for negative evaluative words and sustained vigilance for negative somatic words. Moreover, the low social anxiety group indicated a vigilance-avoidance pattern for negative evaluative words and an avoidance-vigilance pattern for negative somatic words. These observations appeared to contradict the first hypothesis that was examined in the following analysis.

5.3.5. The vigilance avoidance hypothesis

In order to explore the vigilance avoidance hypothesis, a Mixed-ANCOVA was conducted as follows: Word Valence (with four levels according to the emotional valence of the words: negative evaluative, positive evaluative, negative somatic, and positive somatic) X Duration (200msec and 500msec) X Social Anxiety (high and low FNE). The first two

Factors were treated as the repeated measures factors and social anxiety was entered as the between-subjects factor. Depression and gender were entered as covariates. Depression was included due to previous results (Musa et al., 2003). Gender was included because there was a significant difference in gender between the social anxiety groups.

A second analysis was conducted by replacing social anxiety with trait anxiety as the independent between-subjects factor. This was based on previous results that trait anxiety was predictive of attentional bias (Mansell et al., 2002). It was not considered appropriate to treat trait anxiety as a covariate due to the potential overlap with social anxiety.

Given that analyses of variance, and especially mixed designs, are quite robust to violations of the normal distribution of the data, it was considered safe to proceed with this analysis while caution was taken for potential violations of the assumptions of homogeneity of variance-covariance.

The first analysis indicated that the assumptions of homogeneity of variance-covariance (Box's test $M = 83.98$, $F(36) = 2.11$, $p < .0005$) and of sphericity for Word valence (Mauchly's test $W(5) = .85$, $\chi^2 = 13.72$, $p = .02$) were violated. The second analysis yielded significant Box's test ($M = 87.64$, $p < .0005$) and Mauchly's test of sphericity ($W(5) = .88$, $\chi^2 = 13.90$, $p = .02$). Hence, in the results below, lower-bound significance was considered.

Contrary to the first hypothesis and to previous findings, social anxiety (FNE) and trait anxiety (DASS-21 anxiety subscale) did not show any significant main effects or interactions on attentional bias.

5.3.5.1. The effect of gender and depression on the vigilance-avoidance patterns in attentional bias for negative somatic words

There was a significant interaction of Duration X Gender, $F(1) = 4.22$, $p = .04$, $\eta^2 = .05$. Follow-up paired t-tests were employed to examine attentional bias by gender in each duration. Further independent t-tests were used to explore whether there were differences between the gender groups. All data were normally distributed with non-significant K-S values for both genders.

The results showed that in male participants, there was a vigilance-avoidance pattern for negative somatic words. In particular, in 200msec, male participants attended towards these words ($M = 2.3$, $SD = 20.92$, $SE = 3.64$), whereas in 500msec they showed avoidance ($M = -8.51$, $SD = 28.15$, $SE = 4.89$), $t(32) = 2.04$, $p = .05$. Furthermore, there

was a gender difference regarding attentional bias for these words in 500msec, with female participants displaying vigilance ($M = 6.41$, $SD = 31.78$, $SE = 3.45$) and male participants displaying avoidance, $t(116) = 2.36$, $p = .02$ (equal variances assumed, $F(1) = .08$, $p = .77$).

There was a Duration X Depression interaction, $F(1) = 5.53$, $p = .02$, $\eta^2 = .06$. In particular, people who had moderate depression (above 17 on the DASS; S. H. Lovibond & P. F. Lovibond, 1995) showed a vigilance-avoidance pattern for negative somatic words (200msec: $M = 8.01$, $SD = 21.17$, $SE = 5.13$, and 500msec: $M = -10.38$, $SD = 23.73$, $SE = 5.75$), $t(16) = 2.15$, $p = .05$. Moreover, the group that attended away ($N = 57$) from negative somatic words in 200msec had decreased depression ($M = 7.16$, $SD = 6.69$, $SE = .89$) compared with the group ($N = 61$) that attended toward these words ($M = 10.33$, $SD = 8.72$, $SE = 1.12$), $t(116) = -2.22$, $p = .03$ (equal variances not assumed, $F = 5.79$, $p = .02$).

5.3.6. The potential interaction of social anxiety and meta-cognition on attentional bias

It was hypothesised that social anxiety and meta-cognitive beliefs could have an interaction effect on attentional bias. However, as discussed in Section 5.2.4.3, the unequal sample sizes and the data that were not normally distributed made the planned mixed ANCOVA unfeasible. It was decided to conduct moderated interaction regression analyses instead. As discussed in Section 5.2.4.3, the standardised (z) values were used in these analyses (Friedrich, 1982; Tabachnick & Fidell, 2007). Moderation was confirmed if the interaction variable (meta-cognitive beliefs X social anxiety) had a predictive value on attentional bias when controlling for meta-cognitive beliefs and social anxiety (Baron & Kenny, 1986). All analyses were repeated controlling for gender at Step 1. The inclusion of gender did not change any of the non-significant results. In one analysis (discussed below) gender influenced the moderator effect.

Two analyses yielded significant results, as follows:

5.3.6.1. A moderator effect of positive meta-cognitive beliefs about worry and social anxiety on attentional bias for negative somatic words in 500msec

This analysis did not yield any concern for multicollinearity with tolerance values between .90 and .99 and VIF values between 1.01 and 1.12.

The results showed that positive meta-cognitive beliefs (MCQ-30) interacted with social anxiety (FNE) to impact on attentional bias for negative somatic words in 500msec, $\beta = -.18$, $p = .05$. However, gender was an individual predictor as well, $\beta = -.22$, $p = .02$. Therefore, the moderation analysis was repeated separately for males ($N = 33$) and females ($N = 85$). The results (table 5.4) indicated a moderator effect in females, $\beta = -.34$, $p = .003$. This association was negative, hence indicating that in females, positive meta-cognitive beliefs and social anxiety had a moderator effect on avoidance of negative somatic words in 500msec.

Table 5.4: Moderator effect of positive meta-cognitive beliefs (MCQ-30) and social anxiety on attentional bias for negative somatic words in 500msec

| Variables | <i>B</i> | <i>SE B</i> | β | <i>t</i> | <i>p</i> |
|-----------------------------|----------|-------------|---------|----------|----------|
| FEMALE | | | | | |
| Z values of FNE | -1.68 | 3.73 | -.05 | -.45 | .65 |
| Z values of MCQ positive | 1.69 | 4.00 | .05 | .42 | .67 |
| Z values of MCQpositiveXFNE | -12.85 | 4.26 | -.34 | -3.02 | .003 |
| MALE | | | | | |
| Z values of FNE | .01 | 5.64 | .00 | .002 | .99 |
| Z values of MCQ positive | -6.13 | 5.01 | -.24 | -1.22 | .23 |
| Z values of MCQpositiveXFNE | -.04 | 4.46 | -.002 | -.008 | .99 |

5.3.6.2. A moderator effect of positive meta-cognitive beliefs about the observer perspective self-image and social anxiety on attentional bias for positive evaluative words in 500msec

Similar to above, this analysis did not yield concern for multicollinearity with tolerance values between .88 and 1.00 and VIF values between 1.00 and 1.14.

The results showed that positive beliefs about focusing on the observer perspective self-image interacted with social anxiety to influence attentional bias for positive evaluative words in 500msec. However, this effect was marginal, $B = -4.99$, $SE = 2.85$, $\beta = -.16$,

$t = -1.75$, $p = .08$. Gender and the individual predictors (MFIS-positive and FNE) did not show a significant contribution. Again, this association was negative indicating a moderator effect on avoidance of positive evaluative words in 500msec.

5.3.7. Relationships between attentional bias, social anxiety, depression, state anxiety, and meta-cognitive beliefs

In order to determine the variables that needed to be included in subsequent analyses, a Spearman correlation analysis was conducted (Appendix 5.4). This analysis indicated that the following variables were associated with attentional bias:

- With regards to the low social anxiety group ($N = 43$), negative beliefs about focusing on the self-image (MFIS-negative) showed significant and negative correlations with negative somatic words at 500msec ($-.35$, $p = .02$) and with positive somatic words at 500msec ($-.37$, $p = .02$). Therefore, these beliefs were associated with attention away from somatic words in the 500msec condition. Furthermore, trait anxiety correlated significantly and negatively with attentional bias for negative evaluative words in 200msec, $-.31$, $p = .04$, therefore indicating avoidance.
- With regards to the high social anxiety group ($N = 51$), the following relationships were found:
 - Social anxiety (FNE) was positively associated with positive somatic words at 200msec, $.31$, $p = .03$
 - MCQ-30 uncontrollability beliefs were positively associated with positive somatic words at 500msec, $.31$, $p = .03$
 - Trait anxiety positively correlated with negative evaluative words in 200msec, $.28$, $p = .05$, and negatively correlated with negative somatic words in 500msec, $-.30$, $p = .03$.
 - MCQ-30 need to control thoughts negatively correlated with negative somatic words at 500msec, $-.28$, $p = .05$, and
 - MCQ-30 cognitive self-consciousness negatively correlated with positive somatic words at 200msec, $-.31$, $p = .03$, and with negative somatic words at 500msec, $-.36$, $p = .01$.

Hence, in high socially anxious people, meta-cognitive beliefs about the uncontrollability of worry were associated with vigilance toward positive somatic words at 500msec, whereas the belief that thoughts need to be controlled correlated with avoidance of negative somatic words at 500msec. Finally, higher cognitive self-consciousness was associated with avoidance of positive (200msec) and negative (500msec) somatic words.

5.3.8. Predictors of attentional biases

As discussed in Section 5.2.1, this study collected data from high and low socially anxious individuals, based on the FNE scale (ignoring any scores on the FNE that were between 8 and 21). Hence, separate regression analyses were conducted for high ($N = 51$) and low ($N = 43$) social anxiety groups.

Most variables were normally distributed with non-significant Kolmogorov-Smirnov values (D statistic). However, attentional bias for negative evaluative words in 500msec deviated from normality for both the high ($D(51) = .13, p = .03$) and low social anxiety group ($D(43) = .21, p < .0005$). Furthermore, attentional bias for negative somatic words in 500msec was not normally distributed in the high social anxiety group ($D(51) = .15, p = .009$). However, the latter was corrected with square root transformation. Square root, reciprocal, and logarithm transformations failed to normalise attentional bias for negative evaluative words in 500msec. Hence, this variable was omitted from further analyses.

Seven hierarchical linear regression analyses were conducted with each normally distributed attentional bias as the dependent variable. Based on previous results, Step 1 controlled for gender, and Step 2 controlled for depression and trait anxiety. The meta-cognitive beliefs that had shown significant correlations with the dependent variable were entered at Step 3.

Due to space limitation, this section reports only significant results. In all analyses, average VIF values were less than 2.00 and tolerance values ranged between .60 and 1.00. Therefore, there was no concern for multicollinearity.

5.3.8.1. Predictors of attentional bias in low socially anxious individuals

5.3.8.1.1. The impact of gender

As described above, separate analyses were conducted with each attentional bias as the dependent variable. The results indicated that gender made a contribution to attentional bias in positive evaluative words (200msec) and in negative evaluative words (500msec), as follows:

Gender (being female) predicted attention toward positive evaluative words in 200msec in low socially anxious individuals, $B = 26.98, \beta = 9.05, t = 2.98, p = .005$, and explained a significant proportion of variance, $\Delta R^2 = .16, p = .008, f^2 = .19$.

Furthermore, being female predicted attention away from negative somatic words in 500msec, $B = -1.30$, $\beta = -.31$, $t = -2.10$, $p = .04$, and explained significant proportion of variance in attentional bias for these stimuli, $\Delta R^2 = .109$, $p = .05$, $f^2 = .10$.

5.3.8.1.2. The impact of trait anxiety

Two regression analyses indicated that high trait anxiety was associated with attention towards negative evaluative words in 200msec and attention away from negative somatic words in 200msec.

In particular, in the analysis that employed negative evaluative words (200msec) as the dependent variable, trait anxiety and depression (entered at Step 2 along with gender) explained a proportion of variance in attentional bias for negative evaluative words (200msec), $\Delta R^2 = .18$, $p = .02$, $f^2 = .22$. However, this could be attributed to trait anxiety, because only trait anxiety showed a significant contribution, $B = -3.80$, $\beta = -.51$, $t = -2.90$, $p = .006$, that remained when controlling for uncontrollability beliefs.

In a separate regression analysis (Table 5.5) that employed attentional bias in negative somatic words (200msec) as the dependent variable, at Step 3, with trait anxiety, gender, depression, and uncontrollability beliefs entered, trait anxiety predicted ($\beta = -.43$, $p = .02$) attention away from negative somatic words in 200msec.

5.3.8.1.3. The impact of meta-cognitive beliefs

Uncontrollability beliefs about worry predicted attention towards negative somatic words in 200msec, $B = 3.03$, $\beta = .45$, $t = 2.61$, $p = .01$. These beliefs explained a significant proportion of variance in attentional bias, $\Delta R^2 = .13$, $p = .01$, $f^2 = .18$. As mentioned above, trait anxiety was an individual predictor as well (Table 5.5).

Table 5.5: Predictors of attentional bias for negative somatic words in 200msec

| Variables in each Step | Adj.R ² | ΔR ² | p | B | SE B | β | t | P |
|---------------------------|--------------------|-----------------|-----|-------|------|------|-------|-----|
| Step 1 | -.04 | .06 | .11 | | | | | |
| Gender | | | | 14.13 | 5.60 | .25 | 1.64 | .11 |
| Step 2 | -.05 | .05 | .32 | | | | | |
| Gender | | | | 14.65 | 8.60 | .26 | 1.70 | .09 |
| Depression | | | | .63 | .82 | .13 | .77 | .45 |
| Trait anxiety | | | | -1.57 | 1.03 | -.26 | -1.52 | .14 |
| Step 3 | .17 | .13 | .01 | | | | | |
| Gender | | | | 13.36 | 8.03 | .23 | 1.66 | .10 |
| Depression | | | | .02 | .80 | .004 | .03 | .98 |
| Trait anxiety | | | | -2.55 | 1.03 | -.43 | -2.46 | .02 |
| MCQ uncontrollability | | | | 3.03 | 1.16 | .45 | 2.61 | .01 |

Moreover, in the analysis that included positive evaluative words as the dependent variable, cognitive self-consciousness predicted attention away from positive evaluative words in 500msec, $B = -1.97$, $\beta = -.38$, $t = -2.23$, $p = .03$, and explained additional variance, $\Delta R^2 = .11$, $p = .03$, $f^2 = .13$ (Table 5.6).

Table 5.6: Predictors of attentional bias for positive evaluative words in 500msec

| Variables in each Step | Adj.R ² | ΔR ² | p | B | SE B | β | t | P |
|---------------------------|--------------------|-----------------|-----|-------|------|------|-------|-----|
| Step 1 | -.02 | .001 | .83 | | | | | |
| Gender | | | | -1.52 | 6.97 | -.03 | -.22 | .83 |
| Step 2 | -.05 | .02 | .65 | | | | | |
| Gender | | | | -1.46 | 7.09 | -.03 | -.21 | .84 |
| Depression | | | | .09 | .68 | .02 | .13 | .90 |
| Trait anxiety | | | | .63 | .85 | .13 | .74 | .46 |
| Step 3 | .04 | .11 | .03 | | | | | |
| Gender | | | | 3.50 | 7.11 | .78 | .49 | .62 |
| Depression | | | | .15 | .65 | .04 | .24 | .81 |
| Trait anxiety | | | | 1.18 | .85 | .25 | 1.39 | .17 |
| MCQ uncontrollability | | | | -1.97 | .88 | -.38 | -2.23 | .03 |

5.3.8.2. Predictors of attentional bias in high socially anxious individuals

Cognitive self-consciousness predicted attention away from positive somatic words in 200msec, $B = -3.59$, $\beta = -.44$, $t = -2.72$, $p = .009$, and explained a significant proportion of variance in attentional bias in these words, $\Delta R^2 = .14$, $p = .009$, $f^2 = .16$ (Table 5.7).

Table 5.7: Predictors of attentional bias for positive somatic words in 200msec

| Variables in each Step | Adj.R ² | ΔR^2 | p | B | $SE B$ | β | t | P |
|----------------------------------|--------------------|--------------|-----|-------|--------|---------|-------|------|
| Step 1 | -.04 | .06 | .11 | | | | | |
| Gender | | | | -8.48 | 11.72 | -.10 | -.72 | .47 |
| Step 2 | -.05 | .05 | .32 | | | | | |
| Gender | | | | -8.15 | 12.13 | -.10 | -.67 | .50 |
| Depression | | | | .23 | .61 | .06 | .37 | .71 |
| Trait anxiety | | | | -.14 | .76 | -.03 | -.18 | .86 |
| Step 3 | .17 | .13 | .01 | | | | | |
| Gender | | | | -1.52 | 11.64 | -.02 | -.13 | .90 |
| Depression | | | | .55 | .58 | .14 | .94 | .35 |
| Trait anxiety | | | | .65 | .76 | .14 | .85 | .40 |
| MCQ cognitive self-consciousness | | | | -3.59 | 1.31 | -.44 | -2.72 | .009 |

Moreover, MCQ-uncontrollability beliefs were individual predictors of attention towards positive somatic words in 500msec, $B = 2.91$, $\beta = .33$, $t = 2.17$, $p = .03$. In addition, these beliefs explained a significant proportion of variance in attentional bias, $\text{Adj.}R^2 = .07$, $\Delta R^2 = .09$, $p = .03$, $f^2 = .10$ (Table 5.8).

Table 5.8: Predictors of attentional bias for positive somatic words in 500msec

| Variables in each Step | Adj. R^2 | ΔR^2 | p | B | $SE\ B$ | β | t | P |
|----------------------------------|------------|--------------|-----|-------|---------|---------|-------|-----|
| Step 1 | -.01 | .009 | .51 | | | | | |
| Gender | | | | 9.26 | 13.85 | .09 | .67 | .51 |
| Step 2 | -.06 | .05 | .26 | | | | | |
| Gender | | | | 5.51 | 13.96 | .06 | .39 | .69 |
| Depression | | | | -.72 | .70 | -.16 | -1.03 | .31 |
| Trait anxiety | | | | 1.37 | .87 | .24 | 1.58 | .12 |
| Step 3 | .07 | .09 | .03 | | | | | |
| Gender | | | | 11.41 | 13.71 | .12 | .83 | .41 |
| Depression | | | | -1.21 | .71 | -.26 | -1.70 | .10 |
| Trait anxiety | | | | .95 | .86 | .17 | 1.10 | .28 |
| MCQ cognitive self-consciousness | | | | 2.91 | 1.34 | .33 | 2.17 | .03 |

5.4. Discussion

5.4.1. The effect of social anxiety on the vigilance-avoidance pattern for negative words

Contrary to the first hypothesis, the current dot-probe task failed to find an effect of social anxiety on attention bias for negative words. This failure to replicate previous findings (Vassilopoulos, 2005b) could be attributed to methodological differences. In particular, Vassilopoulos (2005b) employed three categories of words (social-threat, physical-threat, and positive-social) that derived from previous studies and were translated into Greek. The present study employed four categories of words that were displayed in English.

Another reason for the failure to find a vigilance-avoidance effect of social anxiety in the current study could be that the task employed words. A task that utilised faces could have greater ecological validity. However, lack of ecological validity could not explain the vigilance-avoidance pattern found for depression and gender.

In particular, the present study found a main effect of gender with male participants displaying vigilance-avoidance towards negative somatic words and female participants displaying consistent vigilance. Vassilopoulos (2005b) found a gender difference between the high and low social anxiety groups as well. However, his subsequent analyses did not control for gender. Hence, it could be that gender differences had influenced his findings of a vigilance-avoidance effect in high socially anxious individuals. The current study supports such an assumption.

The present study found that moderately depressed individuals showed a vigilance-avoidance pattern in negative somatic words. This adds to the growing research of attentional bias in depression. In particular, Bradley et al. (1997) found that the induction of depressive mood in non-depressed individuals was associated with attention towards depressive words displayed for 500msec. However, in a subsequent study (Bradley et al., 1997), there was no effect of depression in people with trait dysphoria regardless of display duration (14msec followed by masking the stimuli, 500msec, and 100msec). Additionally, Musa et al. (2003) found that patients with social phobia and depression, and non-patients avoided negative words in 500msec. However, social phobic individuals without depression displayed vigilance towards these words. No other duration condition was employed in this study. Hence, the above results suggest that in 500msec, state depressive mood might be associated with vigilance toward negative words, whereas trait depression could be associated with avoidance. The present study extends these findings by suggesting that moderate depression could be associated with a vigilance-avoidance pattern for negative somatic words.

5.4.2. The interaction effect of meta-cognitive beliefs and social anxiety on attentional bias

Mathews (1990) suggested that increased attention towards threat could increase the likelihood that a danger is identified thus initiating worry. However, according to the S-REF model (Wells & Matthews, 1994), this process would involve meta-cognitive beliefs that generate threat monitoring and attentional bias. In line with this, the current study suggested potential interaction effects of meta-cognitive beliefs and social anxiety on attentional bias.

In particular, positive beliefs about worry and social anxiety interacted to influence avoidance of negative somatic words in 500msec in female participants. Therefore, in line with the third hypothesis, it could be that the effect of social anxiety on attentional bias for negative social evaluative words is moderated by meta-cognitive beliefs. This result could be consistent with previous findings (Studies 1 and 3) that indicated a negative relationship between positive meta-cognitive beliefs and social anxiety. According to these

findings, positive meta-cognitive beliefs were inverse predictors of social anxiety when controlling for uncontrollability beliefs and anticipatory processing. The present study showed that positive beliefs about worry combined with high levels of social anxiety might increase avoidance of negative somatic words. These results could be explained if a positive function could be attributed to positive meta-cognitive beliefs in high socially anxious people. That is positive beliefs about worry may lead to avoidance of negative somatic words and therefore, act against social anxiety.

Moreover, positive beliefs about focusing on the observer perspective self-image and social anxiety showed a moderator effect on avoidance of positive evaluative words in 500msec. These results add to previous findings that social anxiety had an impact on attention towards positive stimuli. For example, Taylor et al. (2010) found that social anxiety had an indirect effect on anxiety reactivity during a speech through attention away from positive words. Moreover, Pishyar et al. (2004) found that low socially anxious people attended towards happy faces and away from threatening faces while the reverse was found for the high social anxiety group. The current study suggested that meta-cognitive beliefs could interfere with such effect of social anxiety on attentional bias for positive words.

5.4.3. Predictors of attentional bias

Linear regression analyses revealed that when controlling for depression and gender, trait anxiety predicted attention away from negative somatic words in 200msec. This result differed from previous findings (Mansell et al., 2002) that trait anxiety predicted attention towards negative words in 500msec. This difference could be attributed to the different stimulus durations. Moreover, to conduct the regression analysis, Mansell et al. (2002) combined the high and low social anxiety groups in one sample. Hence, it remains unclear which population their results might be generalised to. The current study found that trait anxiety played a role in attentional bias for negative somatic words in 200msec in the low social anxiety group only.

Furthermore, contrary to the analysis discussed in Section 5.4.1 that found a vigilance-avoidance pattern in moderately depressed individuals, the regression analysis did not reveal an effect of depression on negative somatic words in 200msec. This could be because the vigilance-avoidance pattern was mainly due to increased avoidance in depressed individuals in the 500msec condition.

Consistent with the S-REF model and the second hypothesis of the current study, uncontrollability beliefs about worry were associated with attention towards negative somatic words in 200msec in the low social anxiety group. This could suggest that the

200msec condition involved voluntary and strategic processing or that meta-cognitive beliefs could contribute to automatic attentional functioning. Further research is necessary to clarify this. Moreover, cognitive self-consciousness predicted attention away from positive evaluative words in 500msec. In line with the S-REF, excessive self-processing could have directed attention away from positive information.

In high socially anxious individuals, meta-cognitive beliefs influenced attentional bias for positive information. In particular, cognitive self-consciousness predicted avoidance of positive somatic words at 200msec, and uncontrollability beliefs about worry predicted vigilance toward these stimuli in 500msec. It could be that high socially anxious individuals that were cognitively self-conscious perceived such states as unachievable or irrelevant hence avoided the respective cues. However, high levels of uncontrollability beliefs about worry could have reinforced the need to attend such stimuli subsequently (in 500msec) because the respective physical states might influence worry.

Finally, the current study failed to find a predictive value of meta-cognitive beliefs in attentional bias for negative words in high socially anxious individuals, regardless of the significant correlations between some meta-cognitive beliefs and attentional bias. In particular, the MCQ-30 need for control subscale and cognitive self-consciousness showed significant negative correlations with attentional bias in negative somatic words in 500msec. This is contradictory to the hypothesis that expected positive relationships. However, according to the S-REF, such result could be possible if the negative somatic words triggered the participants' self-focused attention. Self-focused attention could interfere with attentional bias to external stimuli by directing attention towards self-processing. Therefore, cognitive self-consciousness and the need to control thoughts could have triggered self-processing that made the effect of these meta-cognitions on external attentional bias negative. State self-focused attention was not measured in this study. Therefore, exploration of this assumption was not possible.

5.4.4. Limitations

Some limitations were identified as follows. First, the study used an analogue population; hence, generalisation to clinical populations is not possible. Nevertheless, analogous results and sample size inequalities should be expected in clinical populations (Stopa & Clark, 2001). Second, the stimuli used for the dot-probe paradigm lacked the ecological validity that images of faces could have provided. Third, the unequal sample sizes complicated the required statistical analyses. In 349 individuals, the combination of high levels of social anxiety and low levels of meta-cognitive beliefs and vice versa was relatively rare. The addition of the MCQ-30 uncontrollability subscale in the inclusion criteria could have enabled the prompt identification of this problem, hence making

possible the modification of the study's design to cross-sectional. However, a cross-sectional design would have jeopardised the dot-probe task's internal consistency and retest reliability (Schmukle, 2005; Staugaard, 2009).

In conclusion, the present study suggested that gender and depression, rather than social anxiety, were associated with a vigilance-avoidance pattern in negative somatic words. In addition, there was an interaction between meta-cognitive beliefs and social anxiety on attentional bias, and meta-cognitive beliefs predicted attentional bias for certain words. To the author's knowledge, this is the first study that implicated meta-cognitive beliefs in attentional bias. Further research is necessary to explore the findings in more depth.

CHAPTER 6

The impact of meta-cognitive beliefs on state anxiety in high socially anxious individuals anticipating a speech

6.1. Introduction

The Self-Regulatory Executive Function model (S-REF; Wells & Matthews, 1994) suggests that prolonged emotional problems involve engagement in attention demanding thinking processes, such as worry. In line with this, a cognitive-behavioural account of social phobia (Clark & Wells, 1995; Wells & Clark, 1997) has emphasised mechanisms, such as anticipatory processing, that social phobic individuals find difficult to control and manage.

Hinrichsen and Clark (2003) conducted semi-structured interviews to explore the thinking processes employed by socially anxious individuals when anticipating a social event. They found that high socially anxious individuals experienced more thoughts about escaping and avoiding social situations, and more catastrophising thoughts than low socially anxious individuals. Furthermore, consistent with central features of the Clark and Wells (1995) model, high socially anxious participants were more likely to experience a self-image that was negative, distorted, and from an observer perspective. The same authors conducted a second study (Hinrichsen & Clark, 2003) in which participants engaged in either anticipatory processing or in a distraction task before they delivered a speech. Results showed that anticipatory processing was associated with increased anxiety whereas distraction with decreased anxiety in both high and low socially anxious individuals. In a similar paradigm, Vassilopoulos (2005a) found similar result in the high socially anxious group but not in the low socially anxious group.

Moreover, Vassilopoulos (2004) conducted a psychometric study and found that high socially anxious individuals scored higher than low socially anxious individuals on the extent to which anticipatory thoughts were perceived as intrusive, interfering with concentration, negative and resistant. Another study examined participants' thoughts by use of vignettes that encouraged them to imagine having to participate in two challenging social scenarios (Vassilopoulos, 2008a). This study found that high socially anxious individuals were more likely than low socially anxious individuals to engage in mental preparation and in unproductive dwelling on the problem. Furthermore, high socially anxious individuals engaged more than low socially anxious individuals in planning to conceal anxiety and to avoid or escape. Moreover, Fehm and Margraf (2002) showed that compared with a control group, social phobic individuals indicated greater difficulty in controlling worries of social, financial, and agoraphobic content.

These above studies support the notion that social anxiety is associated with maladaptive anticipatory processing. In line with the cognitive model of social phobia (Clark & Wells, 1995; Wells & Clark, 1997), this type of processing was found to involve: i) negative thoughts and predictions, ii) a focus on negative, distorted, and observer perspective self-images, iii) intrusive and resistant thoughts that interfere with concentration, iv) avoidance and escape thoughts, and v) unproductive planning to conceal anxiety.

Nevertheless, little is known regarding the mechanisms maintaining this process. The S-REF model (Wells & Matthews, 1994) implicates meta-cognitive beliefs in the process. Specifically, the model views worry as a coping strategy associated with positive beliefs about its usefulness. In addition, negative beliefs about the uncontrollability of the process contribute to its persistence and the consequent distress. In line with this, two studies conducted for the present PhD (Studies 1 and 3) found that positive and uncontrollability meta-cognitive beliefs were individual predictors of social anxiety, while anticipatory processing mediated the relationship between these beliefs and social anxiety (Gkika & Wells, 2009a, 2009b). Moreover, positive and negative meta-cognitive beliefs were individual predictors of anticipatory processing.

To further explore whether meta-cognitive beliefs could be implicated in anticipatory processing and its impact on social anxiety, high socially anxious individuals were instructed to engage either in anticipatory processing or in a distraction task. Following previous results (Hinrichsen & Clark, 2003; Vassilopoulos, 2005a), the first hypothesis predicted that anticipatory processing would produce greater anxiety than distraction. However, based on findings that positive and uncontrollability beliefs predicted anticipatory processing and social anxiety (Study 1; Chapter 2), the second hypothesis expected that these beliefs would impact on state anxiety either directly (main effect) or indirectly (by interacting with condition). In particular, it was expected that participants with high levels of uncontrollability and positive meta-cognitive beliefs would experience higher levels of state anxiety compared to participants with low levels of these beliefs. Third, it was expected that meta-cognitive beliefs about focusing on the self-image would have a positive effect on the observer perspective image during the speech. Finally, the potential effect of anticipatory processing on participants' predictions about their performance was explored.

6.2. Method

6.2.1. Participants

A sample of 479 University of Manchester students and staff were screened via the University's online research volunteering service. Based on their scores on the Fear of Negative Evaluation scale (FNE; Watson & Friend, 1969), 97 high socially anxious individuals were invited to participate in the actual experiment (FNE > 22, Stopa & Clark, 2001). Seventeen participants were excluded because their FNE score had dropped below 22 at the time of the experiment. The remaining sample consisted of 80 high socially anxious individuals. Half participated in the anticipatory processing and half in the distraction condition. Participants were allocated to each condition with the stipulation that the two groups were matched for gender and FNE scores. Participants were compensated with £6 or course credits for their participation.

6.2.2. Materials

Participants completed the following self-report questionnaires;

The Fear of Negative Evaluation (FNE) scale (Watson & Friend, 1969): A 30-item measure of concern about social evaluations. This measure has been described in Study 1 (Chapter 2, section 2.1.2.2.).

The Self-Statements during Public Speaking (SSPS) Scale (Hofmann & DiBartolo, 2000): A scale that consists of two 5-item measures of positive and negative self-statements about public speaking. It has shown good internal consistency with alphas ranging from .75 to .86. In the present study's sample, positive self-statements' alpha was .68 and negative self-statements' alpha was .78.

The Metacognitions Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004): A 30-item measure of meta-cognitive beliefs about worry and thoughts. The psychometric properties of this measure have been reported in previous chapters (Study 4, section 4.2.2.1.)

The Metacognitions about Anticipatory Processing Scale (MAPS): A 25-item measure of meta-cognitive beliefs about anticipatory processing on a 4-point Likert scale (Do not agree – Agree very much). This measure has shown good internal consistency (with alphas ranging from .82 to .88), and good test-retest reliability, with correlations ranging between .64 and .76. In the present study, reliability was good for the whole scale ($\alpha = .81$), and for the subscales (positive beliefs that anticipatory processing helps in preparation and social performance, $\alpha = .86$, uncontrollability beliefs, $\alpha = .82$, and

positive beliefs that anticipatory processing enables one to adhere to others' expectations, $\alpha = .86$.)

The Metacognitions about Focusing on an Image of the Self scale (MFIS). A 25-item measure of meta-cognitive beliefs about focusing on a self-image in social situations. Following Study 4, two items were excluded and the measure comprised two subscales: positive and negative beliefs about focusing on the self-image. The scale ranged from 0 (do not agree) to 4 (agree very much). In the current sample, MFIS-positive's alpha was .92, and MFIS-negative's alpha was .87.

The Anticipatory Social Behaviours Questionnaire (ASBQ; Hinrichsen & Clark, 2003): A 12-item questionnaire that measures anticipatory processing with good internal consistency ($\alpha = .88$). In the ASBQ-state, the instructions and the Likert scale were modified in order to refer to the past 10 minutes. In the current sample, alpha was .90.

The Self-Image Perspective Scale (SIPS): This 3-item measure has been described in previous chapters (Chapter 2, Section 2.1.2.2.).

The State -Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983): A measure of anxiety that comprises two 20-item scales of state and trait anxiety. The trait scale has shown good stability over 20-104 days with correlation coefficients ranging between .73 and .86, whereas the state scale has shown low stability ($r = .33$). Both scales have shown good to excellent internal consistency with median alphas above .90 (Spielberger et al., 1983). In the present study, the trait scale was administered once and the state anxiety scale was administered three times: following the threat administration, the manipulation, and the speech.

A Panasonic RX17 VHC-C-movie camera was used to record the speeches. At the request of the ethics committee, all speeches were recorded and recordings were destroyed immediately after debriefing the participants.

6.2.3. Procedure

Participants took part in the experiment individually. Initially, they were asked to read the information sheet and sign the consent form. Then, they completed eight questionnaires (FNE, SSPS, STAI-Trait, MCQ-30, MAPS, MFIS, ASBQ, and SIPS). On completion of the questionnaires, participants were told: "In about ten minutes you will be asked to give a 3-minute speech. You will be given the topic 3 minutes beforehand to prepare. Your speech will be recorded and the tapes will be used to rate your performance for social skills. So, I would like you to try and make a good impression!". After the threat administration,

participants completed the STAI-state and were asked how confident they were that they would be able to make a good impression, on a scale of 0 (not at all) to 100 (extremely).

Then, participants were instructed to engage either in anticipatory processing or in a distraction task for 10 minutes. Following that, they were administered the STAI-state and ASBQ-state scales, and asked again to rate their level of confidence in their performance. At the request of the ethics committee, the speech topic could not be controversial or challenging. Therefore, the topic was “How are you going to spend your summer holidays?”. Participants had three minutes for preparation. During this time, they were allowed to make notes. The speech lasted three minutes. Following the speech, participants completed the STAI-state and SIPS scales. At the end of the experiment, participants reported how much they had believed the threat. All participants reported belief levels of 80% or above. Finally, they were debriefed and paid.

The instructions for the anticipatory processing task were based on previous studies (Hinrichsen & Clark, 2003; Vassilopoulos, 2005a), as follows:

“I would like you to prepare for the speech by following the steps below. Please spend a few minutes on each of the steps and make sure you go through all of them in the order in which they are given. Please make sure you follow all of the steps.

- iii) Try to think of a particular social situation that you felt did not go well, where you felt uncomfortable or felt that others formed an unfavourable impression of you.
- iv) Try to analyse in as much detail as possible what could go wrong while you are giving this speech and what you can do to prevent it.
- v) Try to think about what you should do to create a favourable impression”.

The distraction task consisted of pages with random coloured letters. Participants were asked to circle all the blue “C”s and red “W”s that they could find. They were also told: “This is not about being quick, and you do not need to rush, but please, try and be accurate. Try not to miss any of the required letters. So, try and focus on this as much as possible”.

6.2.4. Overview of analysis

The G*power 3.0.10 software (Erdfelder et al., 1996) was used to conduct a power analysis for repeated measures ANOVA designs that incorporate between-subjects variables. This analysis indicated that a sample size of 64 participants (approximately 15 per group) would suffice for a power greater than .90. Nevertheless, it was anticipated that meta-cognitive beliefs would be generally high (see Study 4) and in order to increase

variability, it was decided to recruit 80 participants. To test the main hypothesis, mixed - ANOVAs were employed in order to explore the potential main effect and interactions of positive and uncontrollability meta-cognitive beliefs (high and low levels), condition (anticipatory processing and distraction), and time (pre and post speech) on state anxiety. Condition and meta-cognitive beliefs were entered as between-subject factors, and time was treated as the repeated measures variable. State anxiety was the dependent variable.

To investigate the potential effect of meta-cognitive beliefs on the observer perspective self-image, a separate univariate two-way ANOVA was planned as follows: condition (anticipatory processing – distraction) X meta-cognitive beliefs (high – low), with the observer perspective self-image treated as the dependent variable.

Finally, independent t-tests were employed to investigate potential differences between groups in relation to their predictions about their performance. The groups were based on condition and on time (pre-speech and post-speech).

6.3. Results

6.3.1. Sample description

Each condition involved 34 female and 6 male participants. In the distraction condition, participants' mean age was 20.90 (SD = 2.72) and mean scores were, $M = 25.73$ (SD = 2.68) for social anxiety, $M = 13.95$ (SD = 4.2) for positive self-statements, and $M = 11.78$ (SD = 5.13) for negative self-statements. In the anticipatory processing group, mean age was 22.7 (SD = 4.43), social anxiety was $M = 25.65$ (SD = 2.6), positive self-statements were $M = 13.58$, (SD = 3.86), and negative self-statements were $M = 12.85$ (SD = 5.11). There were no significant differences between the groups in the above variables.

6.3.2. Manipulation check

Participants in the anticipatory processing condition engaged in greater anticipatory processing ($M = 31.75$, SD = 6.25) compared with the distraction group, ($M = 20.35$, SD = 8.1), and this difference was significant, $Z = -5.62$, $p < .0005$. State anxiety before the manipulation was similar in both groups (Distraction: $M = 47.23$, SD = 9.61, Anticipatory processing, $M = 49.51$, SD = 10.22), $t(77) = -1.025$, $p = .31$.

6.3.3. Data screening

All analyses yielded Box's tests with non-significant values ($p > .20$), hence indicating that the assumption of homogeneity of variance-covariance was not violated. Furthermore, all Lavene's tests were non-significant ($p > .10$). Therefore, the assumption of homogeneity of variances was upheld. Cook's and Leverage distances did not raise concerns for multivariate outliers with all values being less than .07. All groups had reasonably equal sample sizes ranging between 34 and 44.

Finally, the dependent variables were normally distributed:

1. In the distraction group, state anxiety before the speech indicated skewness of .35, SE = .38, and state anxiety after the speech indicated skewness of .20, SE = .38.
2. In the anticipatory processing group, state anxiety before the speech showed skewness that was .41, SE = .37, and state anxiety after the speech showed skewness that was .29, SE = .37.

6.3.4. Main effects on state anxiety

Consistent with the first hypothesis, all the analyses indicated a significant main effect of condition, $F(1) = 5.35$, $p = .02$, $\eta^2 = .07$, $F(1) = 5.34$, $p = .02$, $\eta^2 = .08$, and $F(1) = 6.43$, $p = .01$, $\eta^2 = .08$, respectively. Anticipatory processing was associated with greater anxiety ($M = 45.32$, $SE = .99$) than distraction ($M = 41.67$, $SE = 1.0$).

Separate mixed-ANOVAs for each meta-cognition questionnaire (MCQ-30, MAPS, and MFIS) explored the second hypothesis. Consistent with this hypothesis, the analysis that included the MCQ-30 subscales as a between-subject factor yielded a significant effect for uncontrollability beliefs, $F(1) = 5.91$, $p = .018$, $\eta^2 = .08$. Examination of the means indicated that people with high uncontrollability beliefs about worry experienced more state anxiety ($M = 45.24$, $SE = 1.01$) than people with low levels of these beliefs ($M = 41.75$, $SE = .97$). In order to examine if this difference was significant at pre- and post-speech, t-tests were employed. Results indicated that the difference was significant in state anxiety before the speech, $t(78) = -2.32$, $p = .021$, when equal variances were not assumed (Lavene test, $F = 4.67$, $p = .034$). This was not the case in anxiety after the speech, $t(77) = -.45$, $p = .65$. Means and standard deviations are presented in Table 6.1.

Table 6.1: Means and standard deviations in state anxiety before and after the speech for high and low uncontrollability belief groups

| | State anxiety Mean (SD) | | |
|----------------------------|-------------------------|-----------------|-----------------|
| | Pre | Post | Overall |
| High MCQ-uncontrollability | 50.08 (13.34) | 40.39 (7.06) | 45.24 (1.01) |
| Low MCQ-uncontrollability | 43.93 (9.82) | 39.68 (6.92) | 41.75 (.97) |

The analyses that included the MAPS and MFIS scales did not yield any significant main effects.

There was a significant effect of time. This indicated that state anxiety decreased after the speech ($M = 40.52$, $SE = .77$) compared with before ($M = 46.23$, $SE = 1.32$). Given that separate analyses were conducted for each type of meta-cognitive belief, slightly different values were revealed in each analysis, as follows: with the MCQ-30 subscales entered, $F(1, 71) = 12.86$, $p = .001$, $\eta^2 = .15$, with the MAPS subscales, $F(1, 62) = 17.90$, $p < .0005$, $\eta^2 = .22$, and with the MFIS subscales, $F(1, 69) = 15.22$, $p < .0005$, $\eta^2 = .18$.

6.3.5. Interaction effects on state anxiety

6.3.5.1. Uncontrollability beliefs

There was a significant interaction of time and uncontrollability beliefs about anticipatory processing (MAPS), $F(1, 62) = 4.54$, $p = .04$, $\eta^2 = .07$ (Figure 6.1). Examination of the means indicated that the decrease in state anxiety from pre-speech ($M = 49.05$, $SD = 12.26$) to post-speech ($M = 38.79$, $SE = 7.44$) was greater for the group with high levels of uncontrollability beliefs compared with the group with low levels of these beliefs (pre-speech, $M = 44.70$, $SD = 11.26$, post-speech, $M = 41.23$, $SD = 6.31$). To explore whether this result was due to the groups' difference in state anxiety before the speech, independent t-tests were employed. Results were non significant, $t(78) = -1.65$, $p = .10$, (equal variances assumed, $F = .04$, $p = .84$). Hence, the difference in the decrease of state anxiety from pre to post-speech could be attributed to greater reduction in the high uncontrollability group compared with that in the low uncontrollability group.

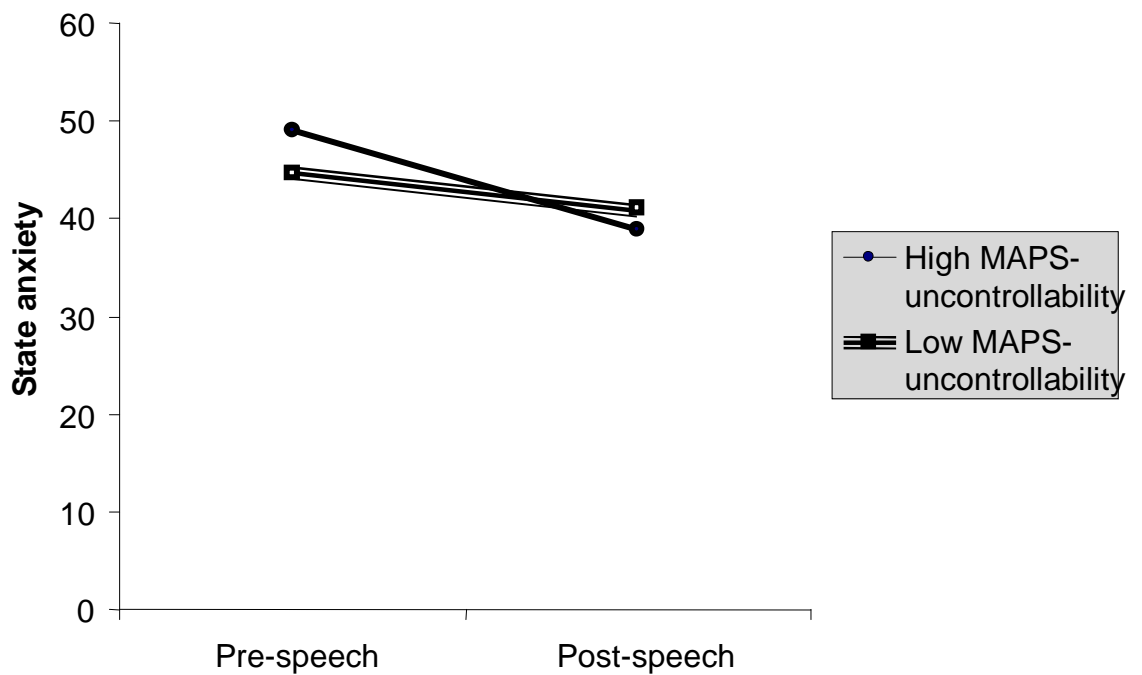


Figure 6.1: The interaction effect of time (pre to post speech) and uncontrollability beliefs (high and low levels) on state anxiety.

There was also a marginal three-way interaction between time, condition, and uncontrollability beliefs about anticipatory processing, $F(1, 62) = 3.50$, $p = .07$, $\eta^2 = .05$. One-way ANOVAs conducted separately for each condition revealed a significant difference between the high ($M = 54.56$, $SD = 12.82$) and low ($M = 46.09$, $SD = 10.73$) MAPS-uncontrollability groups in state anxiety before the speech, in the anticipatory processing condition, $F(1, 38) = 5.17$, $p = .03$.

6.3.5.2. Positive meta-cognitive beliefs

Consistent with the second hypothesis, there was a marginal three-way interaction of time (pre and post speech) X condition X positive beliefs that anticipatory processing could help in preparation and social performance, $F(1, 62) = 2.93$, $p = .09$, $\eta^2 = .04$. Follow-up one way ANOVAs that were conducted separately for each condition indicated that the difference lay in state anxiety after the speech in the distraction group, $F(1) = 7.93$, $p = .008$. People with low positive beliefs about anticipatory processing experienced less anxiety ($M = 36.84$, $SD = 11.27$) after the speech than people with high levels of such beliefs ($M = 42.05$, $SD = 5.98$). In other words when distracted, people with high levels of positive beliefs about anticipatory processing reported more anxiety after the speech than those with low levels of such beliefs.

In addition, another three-way interaction was significant between time X condition X positive beliefs about focusing on a self-image, $F(1, 69) = 4.14$, $p = .04$, $\eta^2 = .06$ (Figure 6.2). In the anticipatory processing condition, groups with high ($M = 52.41$, $SE = 2.47$) and low ($M = 46.23$, $SE = 2.81$) meta-cognitive beliefs showed a decrease in their anxiety after the speech ($M = 40.04$, $SE = 1.48$, and $M = 41.35$, $SE = 1.69$, respectively). However, in the distraction condition, the group with low positive beliefs showed a decrease in state anxiety from pre ($M = 45.89$, $SE = 2.66$) to post speech ($M = 37.10$, $SE = 1.59$), whereas the group with high positive beliefs showed maintained anxiety (pre speech, $M = 41.42$, $SE = 2.66$, post speech, $M = 41.63$, $SE = 1.59$). One-way ANOVAs were conducted separately for the distraction and the anticipatory processing conditions to identify any significant effects. The analysis, indicated a significant effect of meta-cognitive beliefs on state anxiety after the speech in the distraction group, $F(1,37) = 5.70$, $p = .022$. Similar to above, people with high positive beliefs about focusing on the self-image experienced more state anxiety ($M = 41.63$, $SD = 6.93$) after the speech than people with low levels of such beliefs ($M = 37.11$, $SD = 4.45$), $t(34) = -2.83$, $p = .007$. No significant differences were found in the anticipatory processing condition.

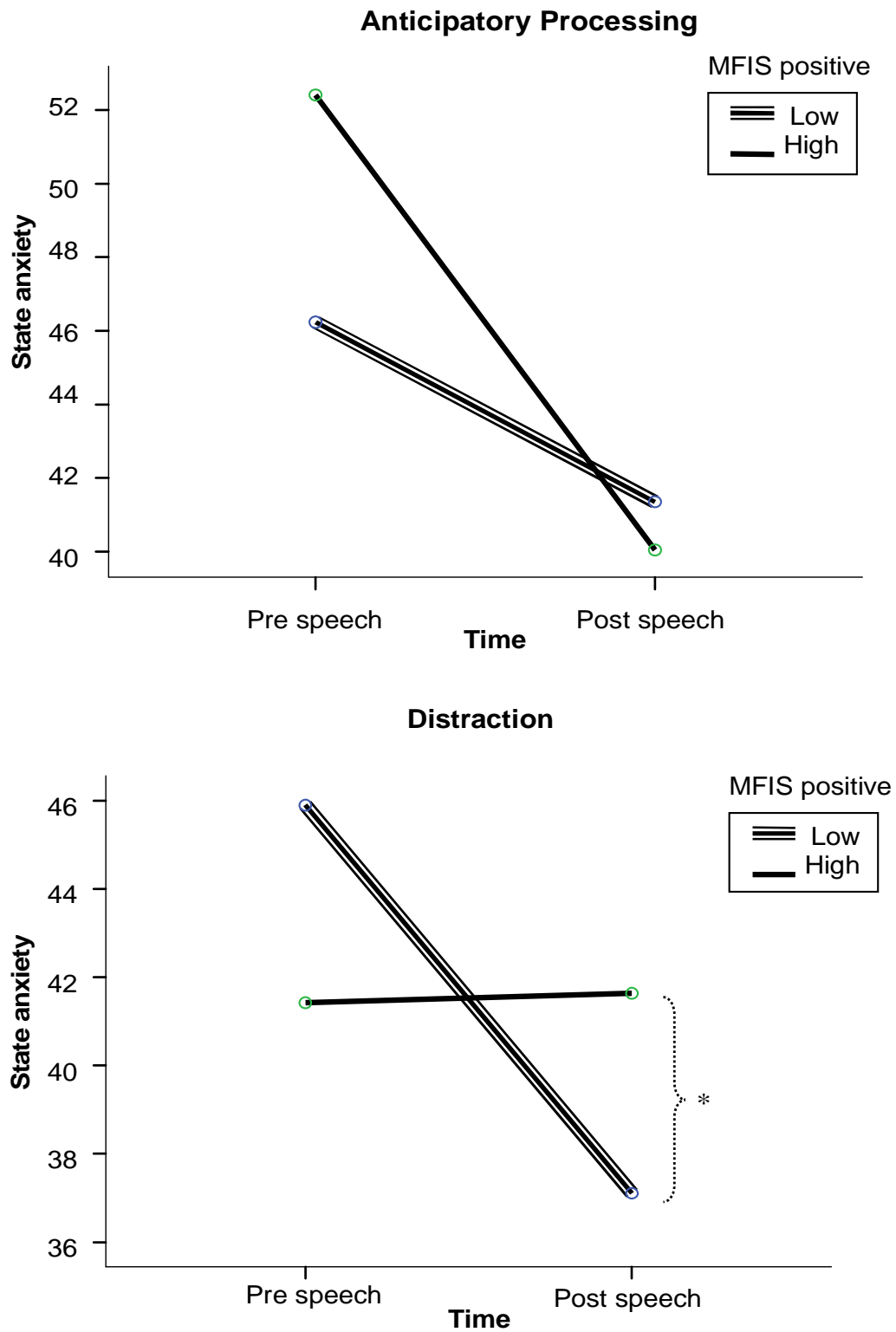


Figure 6.2: Three-way interaction effect between high and low levels of positive meta-cognitive beliefs about focusing on the self-image, time (pre to post speech), and condition (anticipatory processing and distraction), * = significant difference

Additional analyses revealed a significant interaction of time X positive beliefs about general worry (MCQ-30 subscale), $F(1, 71) = 6.78, p = .01, \eta^2 = .08$. Similar to above, t-tests showed that people with low levels of positive beliefs about worry experienced less anxiety after the speech ($M = 48.05, SD = 6.42$) than people with high levels of these beliefs ($M = 42.51, SD = 6.89$), $t(77) = -2.98, p = .004$. Paired-samples t-tests revealed that state anxiety decreased after the speech ($M = 38.05, SD = 6.42$) compared with before ($M = 48.02, SD = 11.9$), $t(43) = 4.82, p < .0005$, only in the group with low positive beliefs.

This was different from the above results in that the reduction in state anxiety was observed in both conditions (anticipatory processing and distraction). However, in order to explore whether the pattern was similar to that of metacognitive beliefs about anticipatory processing and about focusing on the self-image, the interaction was further investigated in the anticipatory processing and the distraction conditions. It was expected that the maintenance of state anxiety would be more evident in the distraction condition than in anticipatory processing. Indeed, in the anticipatory processing condition, the groups with low and high MCQ-30 positive beliefs groups showed a decrease from pre-speech ($M = 51.3, SE = 2.61$ and $M = 48.5, SE = 2.61$, respectively) to post-speech ($M = 39.35, SE = 1.48$ and $M = 41.85, SE = 1.48$, respectively). However, in the distraction condition, participants with low levels of MCQ-30 positive beliefs showed a decrease from pre-speech ($M = 45.29, SE = 2.38$) to post-speech ($M = 36.95, SE = 1.35$), whereas participants with high levels of such beliefs showed a slight increase in their state anxiety from pre-speech ($M = 41.4, SE = 3.01$) to post-speech ($M = 43.4, SE = 1.71$). Nevertheless as shown above, the three-way interaction of time X condition X MCQ-30 positive beliefs was not significant, $F(1) = .633, p = .43, \eta^2 = .008$.

In summary, all positive meta-cognitive beliefs indicated a similar pattern. When distracted, people with low levels of these beliefs reported a decrease in their anxiety from pre to post speech, whereas high levels of these beliefs were associated with maintenance of state anxiety after the challenge was over. When encouraged to employ anticipatory processing, state anxiety was higher at pre-speech compared to when distraction was used.

6.3.6. The effect of meta-cognitive beliefs and anticipatory processing on the observer perspective self-image

The perspective of the self-image experienced during the speech was not normally distributed, as indicated by significant Kolmogorov-Smirnov tests, $p < .0005$, and by the positive skewness of the scores in the distraction group, $-1.28, SE = .37$. Logarithm, square root, and reciprocal transformations failed to normalize the data. Therefore,

exploration of the effects and interactions of condition X meta-cognitive beliefs were not possible. It was decided to investigate the potential differences in the perspective taken in each condition when each condition was further separated into meta-cognition groups. The analyses were conducted by splitting the file into anticipatory processing and distraction datasets, while the grouping variables were high and low levels of meta-cognitive beliefs.

The results showed that the high and low meta-cognition groups did not differ significantly in their observer perspective in the anticipatory processing and the distraction conditions. In particular, the perspectives taken by the group that engaged in anticipatory processing ($M = .93$, $SD = 1.59$) and the group that engaged in distraction ($M = 1.13$, $SD = 1.45$) were not significantly different, $Z = -.54$, $p = .58$, and were from an observer perspective regardless of the level of meta-cognitive beliefs.

6.3.7. Confidence about performance

The two assessments of confidence in one's performance (0 = not at all to 100 = extremely) before and after the manipulation were normally distributed both in the anticipatory processing group (skewness $-.61$, $SE = .374$ and skewness $-.49$, $SE = .374$) and in the distraction group (skewness $-.46$, $SE = .374$ and $-.56$, $SE = .374$).

In the anticipatory processing condition, participants' confidence did not change from pre to post-manipulation, $t(39) = 1.24$, $p = .22$. The distraction group tended to report improved confidence at Time 2 ($M = 50.7$, $SD = 17.13$) compared with Time 1 ($M = 47.73$, $SD = 16.15$), $t(-1.9)$, $p = .06$.

Furthermore, participants in the anticipatory processing condition did not differ in their confidence estimations from participants in the distraction condition at Time 1, $t(78) = -.47$, $p = .64$, and at Time 2, $t(78) = .77$, $p = .44$.

In the distraction group, mean confidence about the performance was 47.73% ($SD = 16.159$) before the manipulation and 50.70% ($SD = 17.130$) after the manipulation. In the anticipatory processing group, mean confidence was 49.58% ($SD = 19.015$) before the manipulation and 47.40% ($SD = 21.035$) after the manipulation.

6.4. Discussion

6.4.1. Main effects and interactions of anticipatory processing and distraction on state anxiety

Consistent with the first hypothesis and with previous findings (Hinrichsen & Clark, 2003; Vassilopoulos, 2005a), the present study found that compared with anticipatory processing, distraction was associated with decreased state anxiety.

Other studies found similar results in various emotional disorders. For example, distraction combined with exposure was associated with reductions in subjective units of distress in people with mild fear of needles and injections (Penfold & Page, 1999). Moreover, in a sample of undergraduate students, Blagden and Craske (1996) found that a distraction condition that incorporated index cards of neutral statements was associated with greater decrease in tension and anxiety compared with a condition that involved concentrating on a stressful experience while listening to sad music.

These studies and the current findings suggest that brief distraction (approximately 10 minutes) could be an adaptive coping strategy. However, the distraction tasks varied, and in some studies, distraction was combined with the actual exposure task whereas in others, it was combined with anticipatory anxiety. Other studies (Hadjistavropoulos, Hadjistavropoulos, & Quine, 2000; Schmid-Leuz, Elsesser, Lohrmann, Jöhren, & Sartory, 2007) used distraction with longer exposure tasks of up to 60 minutes. In these studies, attentional focus was associated with greater reductions in anxiety compared with distraction. For example, Schmid-Leuz et al. (2007) found that people with dental phobia experienced greater habituation and reduction in anxiety when they combined exposure with attentional focusing (conversing about feelings and the details of the dental stimuli). Similarly, Hadjistavropoulos et al. (2000) found that health anxious individuals benefited more from attending and monitoring their feelings during a physiotherapy session compared with a distraction and avoidance condition.

These studies offer support to the notion that attentional focus towards the feared stimuli and the related feelings could make exposure more effective. However, the later study also found that non-anxious individuals reported greater worry about injury and decreased coping strategies in the attend/monitor condition compared with the distract/avoid condition. It could be that non-anxious individuals who were asked to focus on their feelings engaged in rumination that would not have occurred under different circumstances.

6.4.2. The impact of meta-cognitive beliefs on state anxiety

The present study employed a brief exposure task to explore factors that could interfere with the effects of distraction and self-processing. In line with the S-REF model and the second hypothesis, compared with low levels of uncontrollability beliefs, high levels of these beliefs were associated with greater anxiety before the speech in the anticipatory processing condition. Hence, it could be that in socially anxious individuals, meta-cognitive beliefs about the uncontrollability of worry and engagement in anticipatory processing interact to increase state anxiety before entering challenging social situations. Therefore, in line with the S-REF model, meta-cognition might play an important role in the impact of self-processing on state anxiety.

However, these beliefs were not associated with anxiety after the speech was finished. It could be that after the speech, participants realised that their worry was manageable and controllable, thus disconfirming their uncontrollability beliefs. In line with this, McLean and Broomfield (2007) found that high worriers who engaged in thought suppression (some participants reported using distraction as a strategy to suppress their thoughts) experienced more control over their intrusions during a week's efforts to suppress thoughts compared with a group that was instructed to observe and report thoughts. This could be because disconfirmation of beliefs about the uncontrollability of worry took place. Nevertheless, McLean and Broomfield's (2007) study did not assess levels of state anxiety. Rather it employed a weekly diary of intrusive worries. Therefore, it is not clear if disconfirmation of beliefs influenced state anxiety in their study. On the other hand, the present study did not assess the levels of meta-cognitive beliefs after the task; therefore, it can only be presumed that disconfirmation took place. It is also likely that after the speech, participants were relieved that the challenge was over and uncontrollability beliefs were temporarily de-activated.

In terms of positive meta-cognitive beliefs, when high socially anxious participants were distracted, positive beliefs seemed to maintain anxiety after the challenge was over (or even to increase it slightly when positive beliefs about general worry were high). This could be an indication that engagement in the S-REF is sensitive to attentional processes. Inhibition of worry by means of distraction could have maintained high socially anxious individuals' anxiety because high levels of positive beliefs indicated that the use of worry would be beneficial and the usual plan of processing was thwarted. This could explain previous results (Studies 1 and 3) that positive meta-cognitive beliefs had a negative relationship with social anxiety. It could be that these beliefs are stress-reducing (e.g., they serve a normalising and comforting role) in social anxiety or that they are similar to those of non-anxious individuals. When a distraction task is "forced", it contradicts these beliefs and state anxiety is maintained. However, MAPS uncontrollability beliefs were

associated with increased state anxiety before the speech regardless of distraction. Hence, positive and negative meta-cognitive beliefs influenced state anxiety in different ways, and the effect of positive beliefs was modified by the use of distraction or worry.

This could have clinical implications in exposure. For example, reducing uncontrollability beliefs might enable the reduction of anxiety before challenging social tasks. Additionally, challenging positive meta-cognitive beliefs might enable the abandonment of the self-processing plan of worry, thus reducing anxiety in social situations when distraction is employed. Further research is necessary to explore this assumption.

6.4.3. Meta-cognitive beliefs and the observer perspective

In relation to the third hypothesis, the two conditions (anticipatory processing and distraction) did not differ in the perspective taken during the speech. Participants' experience of their self-image was rated as above zero, hence indicating an observer perspective. This supports previous findings (Hinrichsen & Clark, 2003, Wells, Clark, & Ahmad, 1998) that high socially anxious individuals focus on an observer perspective self-image when in social situations. However, the assumption that meta-cognitive beliefs and anticipatory processing would influence the perspective taken by participants was not supported. People who had scored high in meta-cognitive beliefs did not differ in their perspective from people who had scored low in such beliefs, regardless of condition.

Given that the participants were socially anxious and experienced mostly an observer perspective self-image, this result could be attributed to limited variability in the perspective taken.

6.4.4. Participants' predictions about their performance

Finally, given that the sample consisted of high socially anxious individuals, it was not surprising that the group that participated in anticipatory processing did not differ in their predictions from the group that participated in distraction. Overall confidence rates did not go over 50%, with 0 being not at all confident and 100 being extremely confident. Anticipatory processing did not seem to worsen participants' predictions about their performance. However, distraction appeared to be associated with a slight improvement.

6.4.5. Limitations

The present study has the following limitations: First, peak anxiety while giving the speech was not assessed. Therefore, this study targeted the shift of state anxiety through time and not the actual anxiety during the speech. Additionally, no objective measures of anxiety were employed (such as heart rate measures). Another limitation is that this study did not control for depression. Previous studies found that the influence of anticipatory processing on anxiety is stable when controlling for depression (Vassilopoulos, 2004), but it remains unclear if the effects and interactions of meta-cognitive beliefs would also remain the same. Moreover, the present study utilised an analogue population. Nevertheless, the cut-off point used to form the high socially anxious group suggests that analogous results would be expected in social phobic populations. This assumption remains to be tested.

The results discussed here propose that positive and negative meta-cognitive beliefs influenced state anxiety in several ways. Negative beliefs showed an effect on state anxiety before the social event. In the distraction condition, positive beliefs maintained anxiety after the event was over. Therefore, the present study suggests that meta-cognitive therapy (Wells, 2009) that targets both worry and meta-cognitive beliefs could be promising in the treatment of social anxiety and social phobia.

CHAPTER 7

Detached mindfulness versus thought challenging in high socially anxious individuals: A comparison

7.1. Introduction

Drawing on an information processing approach, the S-REF model (Wells & Matthews, 1994) has suggested that social anxiety is maintained by a characteristic Cognitive Attentional Syndrome (CAS). Elements of the CAS, such as anticipatory processing and the post-mortem, are incorporated in contemporary cognitive models of social anxiety disorder (Clark & Wells, 1995; Rapee & Heimberg, 1997). In addition, these models of social phobia focus on schemas that involve underlying assumptions and negative automatic thoughts.

Cognitive-behavioural therapy (CBT) has developed a variety of interventions that target such assumptions and negative thoughts. In line with Beck et al.'s model (1985), these interventions are considered part of cognitive restructuring. For example, Heimberg et al. (1995) have proposed a cognitive-behavioural group therapy protocol (CBGT) that has been helpful in the treatment of social anxiety disorder and as effective as monoamine oxidase inhibitors (MAOIs) in treating several social anxiety symptoms (Heimberg et al., 1998; Otto et al., 2000). This therapeutic protocol incorporates techniques, such as thought records, that identify and challenge in-situation negative automatic thoughts and cognitive distortions. This is consistent with various CBT protocols that have applied thought records in order to explore and challenge the accuracy of negative automatic thoughts in social situations (Greenberger & Padesky, 1995; Wells, 1997). Such thought records have become common practice in CBT and are broadly used to help service users evaluate biased thoughts. Consistent with the principles of CBT, thought records are considered most efficient when applied within the frame of a Socratic dialogue (Greenberger & Padesky, 1995; Heimberg & Becker, 2002).

In line with this, Mattick et al. (1989) found that cognitive restructuring was associated with greater improvements than exposure alone in a behavioural test and in scores on avoidance at a follow-up assessment. Overall, cognitive restructuring was more effective than exposure and than the waiting list in treating scrutiny fears from pre-treatment to post-treatment and from pre-treatment to a 3-month follow-up. In this study, cognitive restructuring was based on Rational Emotive Therapy (Ellis, 1962). Moreover, Hope et al. (1995) found that CBGT (with cognitive restructuring) was associated with greater improvement than exposure alone (CBGT without cognitive restructuring) in a behavioural approach test, but there was no such association with cognitive measures and overall social anxiety scales. On the contrary, they found that exposure demonstrated broader

improvements than CBGT in elements of social phobia and in cognitive measures. Hence, the extent to which cognitive restructuring adds important value to the established behavioural techniques remains controversial (Hofmann, 2008; Longmore & Worrell, 2007; McMillan & Lee, 2010; Worrell & Longmore, 2008).

Furthermore, little is known about how and why cognitive restructuring techniques work. A recent study (Rodebaugh, Jakatdar, Rosenberg, & Heimberg, 2009) explored whether cognitive restructuring affected high socially anxious individuals' mood in different ways depending on their level of purposeful engagement in thinking about past social events. They found that socially anxious individuals who had scored low on purposeful engagement benefited from cognitive restructuring (via a structured writing task); that is their negative mood improved more than the mood of those who did not employ cognitive restructuring techniques (unstructured writing task). Individuals who had scored high on purposeful engagement reported improved mood in both conditions. Therefore, it could be that cognitive restructuring benefited socially anxious individuals that would not normally engage in productive processing of past social events. This would suggest that certain mechanisms (e.g., rumination) could interfere with cognitive restructuring interventions. Hence, interrupting these mechanisms could enable healthier thought processing.

In line with this, the S-REF model (Wells & Matthews, 1994) suggested therapeutic advances that are based on the notion that the CAS is maintained by meta-cognition. In particular, Wells and Matthews (1994) have placed the CAS at the centre of emotional disorders. According to this model, assumptions and negative automatic thoughts are products or contents of the CAS (for example of worry and of self-focused attention) whereas the CAS is regulated and maintained by meta-cognition (i.e. meta-cognitive knowledge and procedural plans).

Following this approach, cognitive re-appraisal of negative thoughts could facilitate an evaluation of the validity of thoughts that would be unlikely to directly influence the CAS. However, meta-cognitive techniques could influence the CAS more directly (Figure 7.1). Furthermore, Wells and Matthews (1994) suggested that such techniques would enable: meta-cognitive awareness, control over the S-REF, the development and execution of adaptive strategies, and disconfirmation or modification of beliefs. In social anxiety, this suggestion remains to be tested.

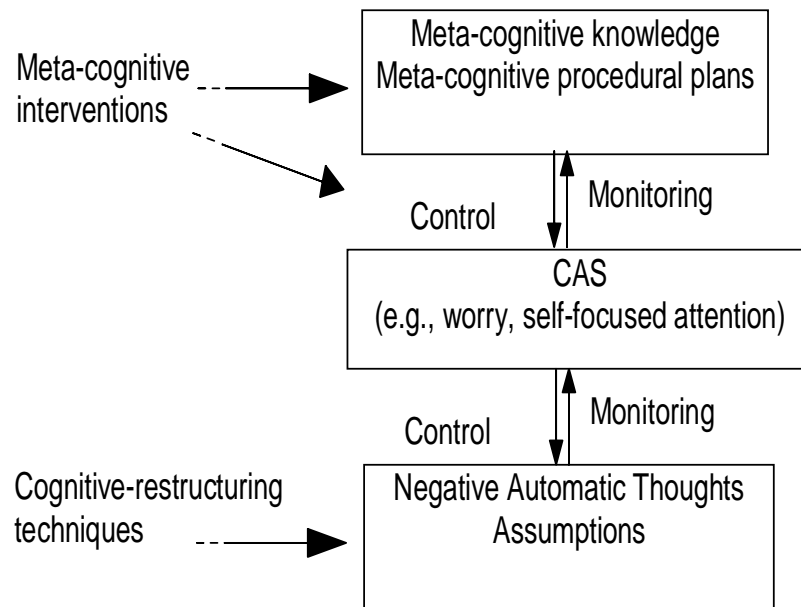


Figure 7.1: The hypothesised target areas of cognitive and meta-cognitive interventions according to the S-REF model (Wells & Matthews 1994)

Up to date, there is only indirect evidence that changes at the meta-cognitive level might be effective in the therapy of social anxiety. Previous studies conducted toward the completion of the present PhD found that several meta-cognitive beliefs were individual predictors of social anxiety (Gkika & Wells, 2009a, 2009b). In addition, McEvoy et al. (2009) found that the reduction of post-mortem processing after group CBT was correlated with reductions in meta-cognitive beliefs about the uncontrollability of thoughts and about the need to control thoughts. Furthermore, uncontrollability beliefs were associated with reductions in social anxiety when measured with the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) but not when measured with the Social Phobia Scale (SPS; Mattick & Clarke, 1998). Group CT reduced all types of meta-cognitive beliefs measured, with the exception of positive beliefs about worry (McEvoy et al., 2009).

Other techniques that enable meta-awareness and an evaluative attitude toward thinking processes have been found helpful in social anxiety. For example, Wells and Papageorgiou (1998) found that patients with social anxiety disorder experienced greater reduction in anxiety and belief levels after exposure that aimed to increase external attention compared with exposure based on a habituation rationale. Exposure that directs attention to external stimuli could help collect information that disconfirms both negative assumptions about others' reactions and the belief that attentional focus is uncontrollable. On the contrary, McEvoy and Perini (2008) found that group CT for social anxiety disorder with attention training, a meta-cognitive technique aimed at increasing attentional flexibility (Wells, 1990), was not associated with greater improvements than group CT with relaxation. However, this study incorporated attentional training to a protocol that already

employed techniques to modify self-focused attention. Hence, it was unlikely that attentional training would add much extra advantage. Moreover, the above studies did not apply direct meta-cognitive techniques in social anxiety. Rather, they utilised exposure with a meta-cognitive element (Wells & Papageorgiou, 1998) or they added a meta-cognitive technique to an already established CBT protocol (McEvoy & Perini, 2008). So far the potential contribution of a technique with a direct meta-cognitive focus in the treatment of social anxiety has not been tested.

This study aimed at investigating the impact of a meta-cognitive intervention (namely detached mindfulness) versus cognitive restructuring on features of the CAS (worry and the observer perspective self-image), and on anxiety and belief levels. The investigation of individual techniques in social anxiety could add to our understanding of the mechanisms through which individual techniques are effective, and it could help us identify unnecessary procedures or non-compatible combinations of techniques.

Detached mindfulness was introduced by Wells and Matthews (1994) as a way “to promote a meta-cognitive detachment from thoughts while maintaining objective awareness of them” (p.305). Gradually, detached mindfulness developed (Wells, 2002; Wells, 2009) into a distinct and therefore testable feature of meta-cognitive therapy that aims: to enable meta-cognitive awareness, to postpone conceptual processing, to interrupt perseverative thinking, and therefore to allow for control over cognitive functioning, such as worry and attentional focus (Wells, 2009).

This approach is distinct from meditation mindfulness (Segal, Williams, & Teasdale, 2002) because it is based on an information processing perspective (Wells and Matthews 1994), it promotes a self-concept that is independent from the content of thoughts, it is brief, and it does not incorporate meditation. Detached mindfulness is also distinguished from the mindfulness applied in acceptance and commitment therapy (Hayes, Strosahl, & Wilson, 1999). The latter focuses on accepting and being open and curious towards thoughts and feelings, while detached mindfulness discourages any engagement with thoughts. It is the view of metacognitive therapy (Wells, 2009) that any engagement with thoughts, whether to avoid or control them or to challenge and evaluate them, would result in triggering maladaptive coping plans, such as worry and self-focused attention. Alternatively, the model suggests a state of mind where the thoughts are acknowledged but left alone. This state requires meta-awareness, cognitive decentering, attentional detachment, low conceptual activity, and low goal directed coping (Wells, 2005, 2009).

The ability to generate a detached and mindful mentality or a mode of meta-awareness has been linked to decreased worry inclination (Sugiura, 2004). Specifically, Sugiura (2004) conducted a psychometric study with college students and found that detached objectivity significantly negatively correlated with negative appraisals about personal problem solving ability and with worry proneness. Detached mindfulness directly predicted decreased worry inclination, and this relationship was mediated by negative appraisals. However, the potential contribution of detached mindfulness in the treatment of social phobia has not been explored.

In order to test the efficiency of detached mindfulness in social anxiety, the present study compared the effectiveness of detached mindfulness with that of thought challenging in high socially anxious individuals. Detached mindfulness aimed to enable meta-awareness and interrupt conceptual processing while thought challenging aimed to promote critical evaluation of negative automatic thoughts and cognitive restructuring. A cross-over repeated measures paradigm similar to that of Wells and Papageorgiou (1998) was employed. The aim was to compare detached mindfulness with Socratic thought challenging in terms of their outcome on anxiety, level of belief in negative thoughts, worry, and the observer perspective self-image. It was expected: a) that both techniques would be associated with a decrease in worry, anxiety, negative beliefs, and the observer perspective self-image, and b) that detached mindfulness would be associated with greater improvements.

7.2. Method

7.2.1. Design

A cross-over repeated measures design was employed. Every participant practised both techniques hence controlling for variability within the sample. Carry-over effects are considered a disadvantage of cross-over designs (Senn, 2002), however in this study, they were reduced by keeping the techniques as brief as possible and by introducing a filter task between the two techniques. The two conditions were counter-balanced across subjects to control for order effects. This design was considered advantageous because time limitations did not allow for recruiting larger samples and because repeated measures designs increase sensitivity to detecting treatment effects.

7.2.2. Participants

205 individuals were screened, of which 16 fulfilled the inclusion criteria and were invited to participate in the experiment. Twelve female individuals completed the experiment, one refused, and three were excluded because their social anxiety had dropped at the time of

the experiment. Participants' mean age was 19.17 (SD = 1.69). All participants scored 22 or above on the Fear of Negative Evaluation (FNE) scale (Watson & Friend, 1969) at the screening phase and at the time of the experiment. Inclusion criteria were the following: 1) a score of 22 or above on the FNE scale, 2) a score of 13 or below on positive self-statements and of 12 or above on negative self-statements on the Self-Statements during Public Speaking Scale (SSPS; Hofmann & DiBartolo, 2000), and 3) a score of 21 or below on the Depression subscale of the Depression Anxiety Stress (DASS) Scale (S. H. Lovibond & P. F. Lovibond, 1995). Mean scores on the day of the experiment are presented in Table 7.1.

Table 7.1: Participants' mean scores (and standard deviations) on social anxiety, social avoidance, and positive and negative self-statements during public speaking

| N=12 | Mean | SD |
|-------------------------------------|-------|------|
| Fear of negative evaluation scale | 26 | 2.69 |
| Social avoidance and distress scale | 17.33 | 5.28 |
| Positive self-statements | 10.17 | 4.42 |
| Negative self-statements | 17.08 | 3.98 |

For the six participants that received the thought challenging manipulation first mean age was 19.5, and means on the descriptive measures were: FNE, $M = 26$ ($SD = 3.22$), SADS, $M = 18.67$, ($SD = 3.78$), positive self-statements, $M = 9.67$, ($SD = 2.58$), and negative self-statements, $M = 17.33$ ($SD = 2.87$). For the six participants that received the detached mindfulness manipulation first, means were as follows: age, $M = 18.83$, ($SD = .75$), FNE, $M = 26$, ($SD = 2.37$), SADS, $M = 16$, ($SD = 6.54$), positive self-statements, $M = 10.67$, ($SD = 5.99$), and negative self-statements, $M = 16.83$, ($SD = 5.15$). There were no statistically significant differences between the two groups in the above measures.

7.2.3. Materials

7.2.3.1. Questionnaires

Social anxiety was measured with the Fear of Negative Evaluation scale (Watson & Friend, 1969): A 30-item measure of anxiety over anticipated negative social evaluations. The measure uses a true-false scale. It is considered efficient for identifying analogue populations for studies on social anxiety disorder; the suggested cut-off point for forming high socially anxious groups in the UK is 22 (Stopa & Clark, 2001).

Social anxiety specific to public speaking was measured with the Self-Statements during Public Speaking scale (Hofmann & DiBartolo, 2000): A 10-item questionnaire consisting of two 5-item subscales, the Positive Self-Statements (SSPS-P) and the Negative Self-Statements (SSPS-N). Internal consistency has been high for both SSPS-P ($\alpha = .84$) and SSPS-N ($\alpha = .83$). This measure uses a Likert scale ranging from 0 (do not agree at all) to 5 (agree extremely).

Distress over social situations and avoidance was measured with the Social Avoidance and Distress Scale (Watson & Friend, 1969). This measure consists of 28 items rated on a true-false scale. Its internal consistency was found to be excellent and its test-retest reliability has ranged from .68 to .79.

Mood was measured with the Depression Anxiety Stress Scale (DASS-21; S. H. Lovibond & P. F. Lovibond, 1995): A 21-item measure of negative emotional states and specifically of depression, anxiety, and stress. It utilises a scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). Its internal consistency has been high for all subscales: depression ($\alpha = .97$), anxiety ($\alpha = .92$), and stress ($\alpha = .95$). For this study, the depression subscale was used to exclude participants with severe levels of depression.

Credibility was examined on a scale of 0 (not at all helpful) to 100 (entirely helpful). After the introduction of each technique and before individual practice, participants were asked how helpful they thought each technique would be.

7.2.3.2. Dependent variables

Assessment of the dependent variables took place immediately after participants gave their speech.

Worry was measured with the State-Anticipatory Social Behaviours Questionnaire (S-ASBQ), adapted from the Anticipatory Social Behaviours Questionnaire (Hinrichsen and Clark 2003). This is a 12-item measure of worry in social situations as described by Clark and Wells (1995) in their cognitive model of social anxiety disorder. Adaptations made were related to the measure's suggested time-frame in order to target state worry (e.g., instead of thinking of the past few months, participants were asked to consider the few minutes before the speech). The scale ranged from 1 (not at all) to 4 (very much).

The observer perspective was measured on a scale of -3 (entirely looking out at the situation) to +3 (entirely observing myself) where 0 represented equally balanced perspective (Wells et al., 1998). Participants were asked: "While you were giving your

speech, to what extent was your impression of yourself one of looking out and observing what is going on around you, or to what extent was your impression one of observing yourself; that is looking at yourself as if from someone else's point of view?"

State anxiety was measured on a scale of 0 (not at all anxious) to 100 (the most anxious I have ever been). Similarly, belief in negative thoughts was measured on a scale of 0 to 100 (0=do not believe the thought at all, 100=absolutely convinced the thought is true), and the perceived efficiency of each manipulation was assessed on a scale 0 (not at all helpful) to 100 (entirely helpful).

7.2.4. The filter task

Participants were given two sheets of paper with random coloured letters. Instructions were to circle all the blue "C"s and red "W"s that they could find. They were advised not to hurry but to try and be accurate, try not to miss any, and therefore try and focus on it as much as possible. This task was used to reduce carry-over effects.

7.3. Procedure

Initially, participants were provided with a link to the online screening questionnaires. Participants who fulfilled the inclusion criteria were contacted and invited to participate in the second part of the experiment.

On arrival, participants were asked to read the participant information sheet, sign a consent form, and complete the FNE scale. If their FNE score was still 22 or above they were given the SSPS and the SADS scales. If not, they were debriefed and not included further. The first participant was randomly assigned to an order of manipulation. Thereafter, each participant was allocated to the reverse order of manipulation than the previous one. This was considered preferable to random allocation due to the limited number of participants that fulfilled the inclusion criteria. Completion of the questionnaires was followed by an interview during which key negative automatic thoughts were identified. These thoughts were linked to the rationale for thought challenging. Participants were also asked to express at least one positive and one negative belief about worry. These beliefs were linked to the rationale for detached mindfulness. Then they were asked to rate how much they believed their negative automatic thoughts at the time of occurrence, on a scale of 0 (do not believe the thought at all) to 100 (entirely convinced the thought is true). The most compelling thought (rated 80% or above) was chosen as the dependent variable. Then, participants were told that all speeches would be recorded and that their performance would be rated for social skills.

Following the interview, participants were left alone for 5 minutes. The experimenter told them that she needed to make some photocopies. When the experimenter returned, a speech topic was randomly selected and the participant was allowed 3 minutes to prepare a 3-minute speech. Then, participants gave a baseline speech that was followed by assessment.

After the first speech, the participants and the experimenter undertook either detached mindfulness or thought challenging for 15 minutes, following which participants were asked how helpful they thought this technique would be. Then, the participants practised the technique for five minutes. Following practice, the second topic was randomly selected. Again, participants had three minutes to prepare a 3-minute speech and the speech was followed by assessment.

The instructions for each of these techniques are presented in Appendix 7.1.

This speech was followed by a 5-minute filter task in order to wash out carry-over effects. After that, the participants and the experimenter went through the second manipulation (either detached mindfulness or thought challenging) for 15 minutes and the sequence of credibility check, speech preparation, speech delivery, and assessment was repeated.

Finally, participants were debriefed and compensated with either £15 or course credits. The experiment lasted approximately two and half hours. All participants were tested individually.

7.4. Overview of analysis

The difference between each condition and baseline was explored by comparing the six individual scores at baseline with their respective scores after detached mindfulness when detached mindfulness was delivered first, and the remaining six scores at baseline with the scores after thought challenging when thought challenging was delivered first. The data after the second interventions were ignored in this first set of analyses. Given the small sample size ($N=6$), Wilcoxon paired tests (exact significance) were employed.

For the main analysis, a “change” variable was computed for each manipulation (detached mindfulness and thought challenging). The change due to detached mindfulness was computed by subtracting the scores after detached mindfulness from the baseline scores when detached mindfulness was administered first and from the scores after challenging thoughts when detached mindfulness was administered second. The change due to thought challenging was calculated by subtracting the scores after thought challenging from the baseline scores when challenging thoughts was practised first and from the

scores after detached mindfulness when challenging thoughts was practised second. It was then possible to compute the mean change in the dependent variables due to each condition and to conduct Wilcoxon paired t-tests to compare these means. Again, the Wilcoxon exact test was employed because it is more suitable for small sample sizes. Correlation coefficients were calculated to indicate the respective effect sizes.

Finally, the mean change in each dependent variable after each technique was observed in terms of the order of delivery.

7.5. Results

Normal distribution was explored by checking the histograms, the skewness and kurtosis z values, and the Kolmogorov-Smirnov test of normality (Table 7.2). Anticipatory processing was normally distributed for both conditions but the remaining variables were not. Because of the small sample size, non-parametric tests were used for all analyses.

Table 7.2: Normality check for the change scores that were treated as dependent variables (TC=thought challenging, DM=detached mindfulness, OP=observer perspective), N=12

| Variable N=12 | Skewness z | Kurtosis z | Kolmogorov-Smirnov | p |
|------------------|--------------|--------------|--------------------|---------|
| Anxiety TC | -3.88 | 6.23 | .31 | .003 |
| Anxiety DM | 4.03 | 6.21 | .34 | < .0005 |
| Belief TC | 0.44 | 0.58 | .15 | .20 |
| Belief DM | 1.38 | 0.56 | .27 | .02 |
| OP TC | 0.37 | -1.18 | .18 | .20 |
| OP DM | 0.60 | -0.79 | .30 | .003 |
| Worry TC | -0.07 | -0.63 | .14 | .20 |
| Worry DM | 0.05 | -0.21 | .11 | .20 |

The negative thoughts that were identified and rated are presented in Appendix 7.2. During the interview, all participants rated their belief as equal or more than 80% (0=do not believe the thought at all, 100=entirely convinced the thought is true). However, three participants reported decreased belief levels (less than 80%) at baseline (participants 2, 4, and 5). They reported that even though they would normally believe the thought more than 80% (as reported in the interview) nevertheless this was not their experience at the first (baseline) speech. They explained that this was because they did not find the speech

in front of the experimenter and a camera as intimidating as a speech in front of a larger audience.

7.5.1. Credibility check

Mean credibility for thought challenging was 65% ($Md = 72.50$, $N = 12$) and for detached mindfulness 67.9% ($Md = 67.50$, $N = 12$). A Wilcoxon signed ranks test showed that this difference was not significant, $z = -.60$, $p = .59$, $r = -.12$. Furthermore, participants rated their expectancy of how helpful thought challenging would be as 61.17% ($Md = 72.5$, $N = 6$) when thought challenging was delivered first and as 65.83% when it was delivered second ($Md = .67.50$, $N = 6$). This difference was not significant, $U = 17$, $z = -.16$, $p = .92$, $r = .03$. Finally, participants rated their expectancy of how helpful detached mindfulness would be as 67.5% ($Md = .67.50$, $N = 6$) when detached mindfulness was delivered first and as 68.33% ($Md = 70$, $N = 6$) when it followed thought challenging. This difference was not significant, $U = 16.50$, $z = -.24$, $p = .85$, $r = .05$. Similarly, credibility ratings between the tasks were not different when they were delivered first, $z = -.63$, $p = .75$, $r = -.14$, and when delivered second, $z = -.55$, $p = .56$, $r = .11$.

7.5.2. Differences between baseline and each manipulation

Both thought challenging and detached mindfulness appeared to reduce anxiety, worry, level of belief in negative thoughts, and the observer perspective from baseline to the time of the second speech (first technique). Thought challenging significantly reduced anxiety ($z = -2.22$, $p = .03$), while there was a trend to reduce all other variables (Table 4). Detached mindfulness (Table 7.3) significantly reduced belief levels ($z = -2.20$, $p = .03$), worry ($z = -2.20$, $p = .03$), the observer perspective ($z = -2.33$, $p = .03$), and anxiety ($z = -2.22$, $p = .03$).

Table 7.3: Differences between baseline scores and the scores after each condition at the time of first delivery (TC=thought challenging, DM=detached mindfulness, OP=observer perspective), and corresponding effect sizes, N=6

| Paired variables (N=6) | Baseline Mean/ Mean after manipulation (SD) | z statistic | Exact <i>p</i> | $r = \frac{Z}{\sqrt{N}}$ N=Number of observations |
|--|--|----------------|----------------|---|
| BaselineWorry/ WorryTC, when TC first | 29.33 (3.14)/ 26.17 (4.07) | -1.90 | .094 | -.54 |
| BaselineWorry/ WorryDM when DM first | 31 (4.47)/ 21.17 (3.76) | -2.20 | .031 | -.63 |
| BaselineOP/ OP TC, when TC first | .83 (1.6)/ .67 (1.03) | -.14 | 1.00 | -.04 |
| BaselineOP/ OP DM, when DM first | 2 (.63)/ .17 (.41) | -2.33 | .031 | -.67 |
| BaselineAnxiety/ AnxietyTC when TC first | 49.17 (26.15)/ 34.17 (26.53) | -2.22 | .031 | -.64 |
| BaselineAnxiety/ AnxietyDM, when DM first | 61.83 (17.66)/ 42.17 (22.27) | -2.23 | .031 | -.64 |
| BaselineBelief/ Belief TC, when TC first | 79.17 (14.97)/ 54.83 (34.23) | -1.79 | .094 | -.51 |
| BaselineBelief/ Belief DM when DM first | 84.17 (16.85)/ 45 (17.88) | -2.20 | .031 | -.63 |

7.5.3. Overall change due to each manipulation (N=12)

Mean changes and standard deviations are presented in Table 7.4. The difference in mean change attributable to each technique was significant for all variables except anxiety (Table 7.5).

Table 7.4: Means and standard deviations of change due to each manipulation

| Mean change (Standard Deviation) | Anxiety | Belief levels | Observer perspective | Worry |
|-------------------------------------|---------------|---------------|-------------------------|-------------|
| Thought Challenging | 6.5 (21.77) | 8 (30.56) | .08 (1.50) | 1.08 (4.81) |
| Detached Mindfulness | 13.58 (15.88) | 28.67 (21.98) | 1.42 (.99) | 7.50 (3.72) |

In particular, detached mindfulness showed greater change than thought challenging in worry ($z = -2.80$, $p = .003$), level of belief ($z = -2.04$, $p = .04$), and the observer perspective ($z = -2.22$, $p = .031$). Furthermore, detached mindfulness reduced anxiety ($z = -.68$, $p = .54$) more than thought challenging, but this difference was not significant. These differences are illustrated in Figure 7.2.

| Variables (N=12) | z Statistic | Exact p | r |
|----------------------|-------------|-----------|------|
| Anxiety | -.68 | .54 | -.13 |
| Belief | -2.04 | .04 | -.41 |
| Observer perspective | -2.22 | .03 | -.45 |
| Worry | -2.80 | .003. | -.57 |

Table 7.5: Results of the Wilcoxon paired tests that explored the difference between the change attributable to detached mindfulness and the change attributable to thought challenging in anxiety, belief levels, the observer perspective, and worry

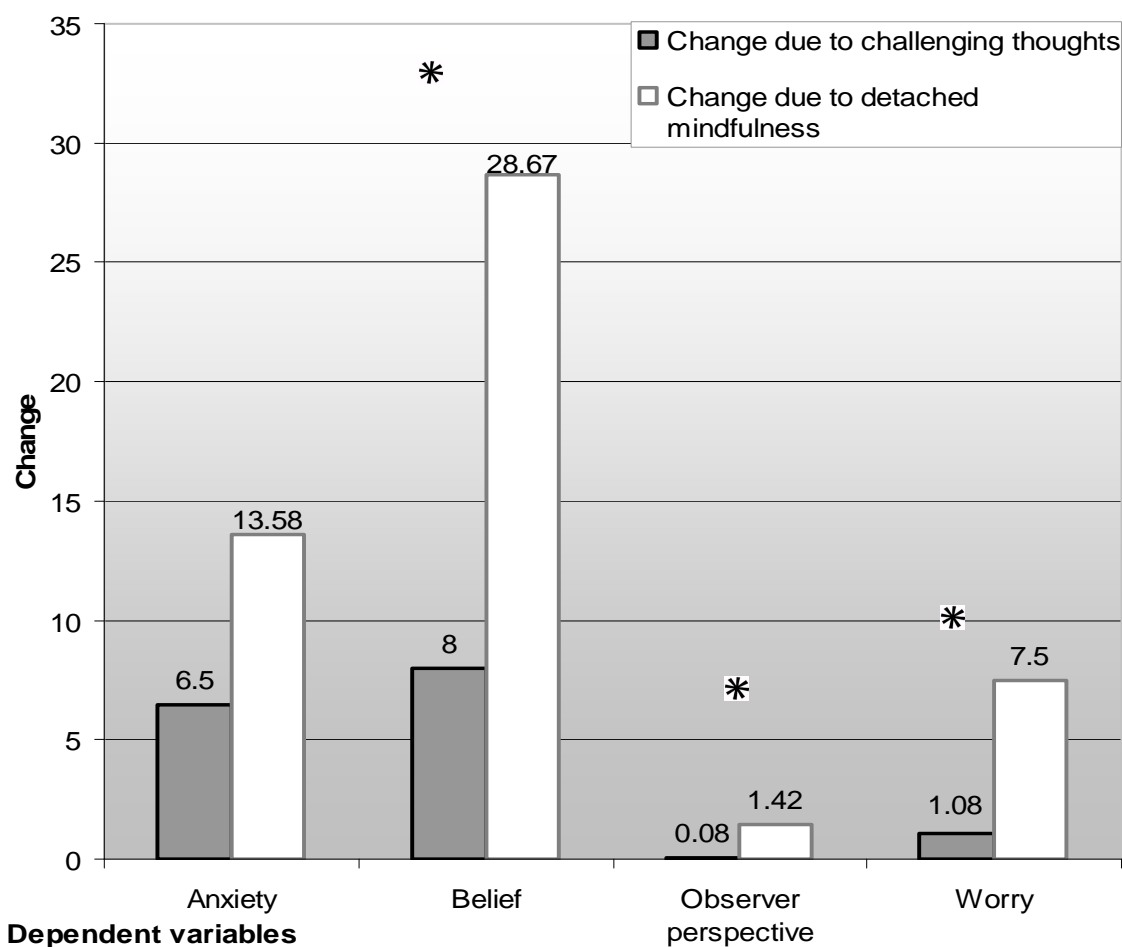


Figure 7.2: Mean change in anxiety, belief, observer perspective, and worry due to detached mindfulness and thought challenging: comparison of means (* = significant differences)

7.5.4. Further observations of the changes due to each manipulation with respect to each manipulation's order of delivery

Observation of the mean change (Figure 7.3) associated with each manipulation according to the order of its delivery (first or second) suggested that detached mindfulness showed improvements in all variables regardless of its order of delivery. However, when thought challenging followed detached mindfulness, anxiety, belief levels, and worry seemed to increase.

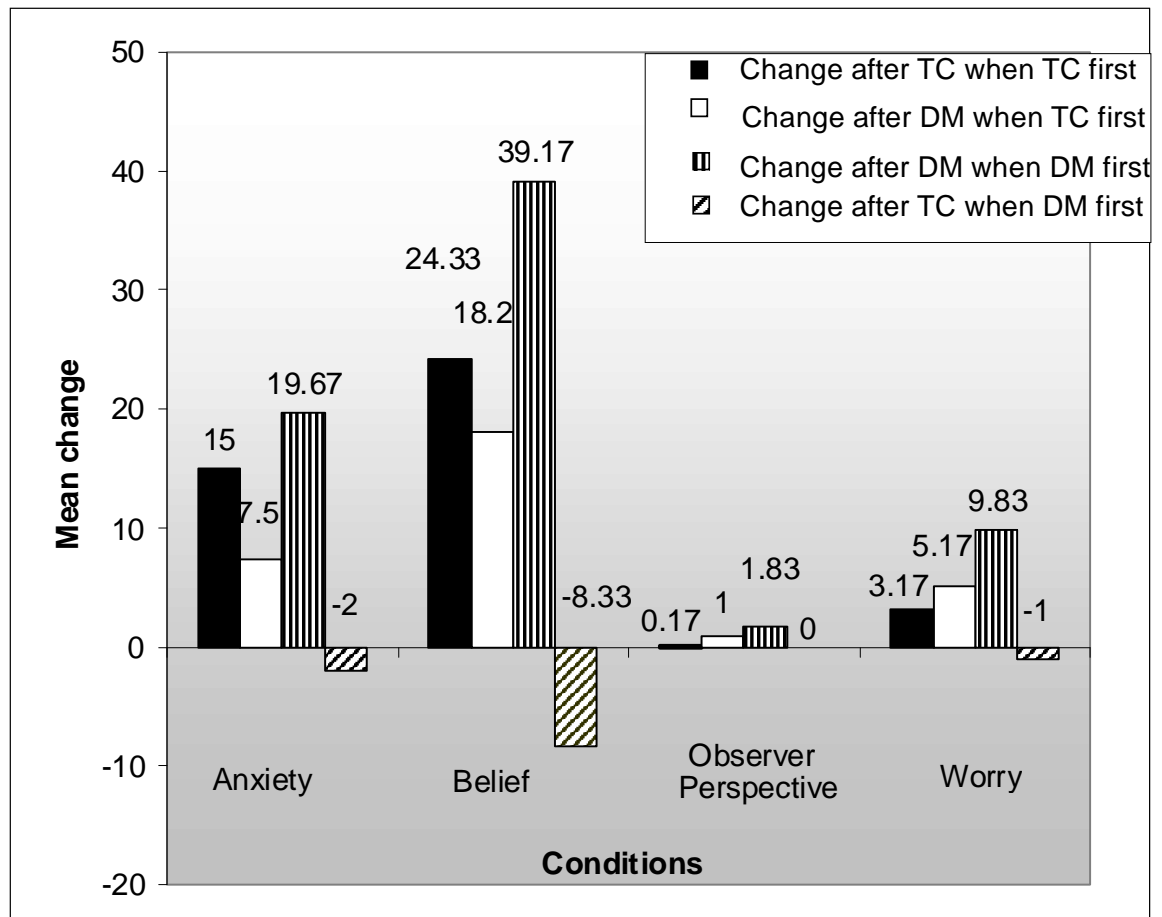


Figure 7.3: Mean changes after each manipulation in relation to the order that each manipulation was delivered (first or second), TC=Thought Challenging, DM= Detached Mindfulness, N=6

7.5.5. Perceived helpfulness

On a scale of 0 (not at all) to 100 (extremely helpful), participants found thought challenging 60.4/100 ($Md = 60$, $N = 12$) and detached mindfulness 76.7/100 ($Md = 80$, $N = 12$) helpful. This difference was not statistically significant, $Z = -1.58$, Exact $p = .12$. Moreover, participants perceived the two techniques as similarly helpful regardless of order of delivery. In particular, when thought challenging was delivered first, participants

perceived detached mindfulness as 71.67% helpful ($Md = 77.50$, $N = 6$) and thought challenging as 59.17% helpful ($Md = 60$, $N = 6$), $z = -.74$, $p = .53$, $r = -.21$. When detached mindfulness was delivered first, detached mindfulness was perceived as 81.67% helpful ($Md = 80$, $N = 6$) and thought challenging as 61.67% helpful ($Md = 70$, $N = 6$).

7.6. Discussion

Consistent with the first hypothesis, this study found that detached mindfulness and thought challenging were followed by reductions in anxiety, worry, belief levels, and the observer perspective. However, these reductions reached statistical significance after detached mindfulness, whereas following thought challenging, only anxiety indicated a statistically significant decrease.

In line with the second hypothesis, detached mindfulness illustrated greater change than thought challenging in all dependent variables. This difference was statistically significant for the observer perspective, level of belief, and worry. It did not reach significance for anxiety even though the difference was large. This was probably due to the large standard deviation and the small sample size. A further observation was that the change due to detached mindfulness seemed to be independent of whether the manipulation was delivered first or second. In contrast, thought challenging appeared to be followed by an increase in worry, anxiety and negative beliefs when delivered after detached mindfulness. However, this observation should be interpreted with caution given the small sample and the lack of statistical analysis.

Generally, the results support the idea that a meta-cognitive perspective could be beneficial in the treatment of social anxiety (Wells, 2007). Moreover, the results suggest that cognitive and emotional change might not be directly dependent on modifying belief level through challenging the content of negative automatic thoughts. Consistent with the S-REF model (Wells & Matthews, 1994) using meta-cognitive strategies of detached mindfulness modified several important components of cognitions and decreased levels of belief.

More specifically, after applying detached mindfulness, participants were more able to adapt either a more balanced perspective or a field perspective. Such shift in perspective taking could enable the disconfirmation of negative predictions and could decrease anxiety in social situations. In line with this, a previous study has shown that externally focused attention during exposure was linked to a reduction in anxiety and negative beliefs (Wells & Papageorgiou, 1998). Furthermore, McManus et al (2009) found that engagement in behavioural experiments that banned safety behaviours was associated with reduced occurrence of the observer perspective self image compared with

engagement in experiments that allowed for the employment of safety behaviours. The present study suggests that detached mindfulness might be useful in helping individuals take a more balanced or a field perspective that could offer them more accurate social feedback and a better sense of control over their attentional focus. This is probably due to the development of meta-awareness and the interruption of in-situation conceptual processing. However, further studies are needed to investigate how detached mindfulness could be combined with exposure and behavioural experiments.

Moreover, detached mindfulness was related to a greater change in anticipatory worry compared with thought challenging. This suggests that detached mindfulness could be appropriate for targeting the CAS. According to the meta-cognitive approach (Wells & Matthews, 1994), reducing the CAS should have an effect on anxiety and level of belief. This was not directly tested in the present study. Detached mindfulness seemed to generate greater change than thought challenging in anxiety and belief levels but it was not clear whether this was a consequence of interrupting worry and the observer perspective or whether it was a direct effect of detached mindfulness.

The S-REF model (Wells & Matthews, 1994) also predicts that engagement with thoughts, whether to suppress or to challenge them, would trigger the CAS, and especially worry and rumination (Wells, 2009). In line with this suggestion, thought challenging appeared to be followed by an increase in worry, anxiety, and belief in negative thoughts when delivered after detached mindfulness. Given that carry-over effects were controlled by the filter task and by keeping the interventions as brief as possible, these results could indicate that thought challenging might not be consistent in its outcome. It may be that there is a specific incompatibility between different techniques. Whilst thought challenging did not lead to worse outcomes when presented first, detached mindfulness did appear to alter the subsequent effect of thought challenging. However, detached mindfulness did not appear to produce negative effects at all. More studies with larger samples and appropriate statistical analyses are needed to explore this assumption further.

Overall, the present study offers preliminary support to the use of detached mindfulness in the treatment of social anxiety. Nevertheless, there are some limitations that need to be taken into consideration. First, all variables were measured with self-report scales. Therefore no objective measures of anxiety or attention were obtained. Second, it could be argued that the experimenter biased participants' responses by unknowingly communicating her expectations or by delivering the techniques in a way that favoured one from the other. However, this is unlikely, given that both techniques were rated as equally credible by the participants. Third, carry-over effects or repeated exposure to the speech could account for some of the improvements. Even though this could be the case, counter-balancing the conditions and using the filter task should have minimised such

effects. Furthermore, brief exposure alone is unlikely to produce large changes. It has been shown that cognitive change needs to happen for exposure to produce significant changes, especially when exposure is brief (Salkovskis, Hackmann, Wells, Gelder, & Clark, 2006) such as in this study. Moreover, an analogue female sample was used, hence prohibiting potential generalisation to clinical and male populations. Nevertheless, the use of strict inclusion criteria allows for the expectation that similar results would be found in a clinical population. Further studies are needed to examine this. Finally, even though the thought records could be checked for compliance to the instructions, a self-report measure of detached mindfulness was not employed. Hence, it could be that participants did not comply with the detached mindfulness instruction. Nevertheless, after the practice and assessment, the experimenter asked participants whether they were able to engage in the process and whether they encountered any difficulties. Therefore, potential non-compliance would have probably been identified.

In conclusion, detached mindfulness appears to be a promising technique in social anxiety. However, more studies are necessary to examine its potential effectiveness in social anxiety disorder, either as a stand-alone technique or within the framework of meta-cognitive therapy. This study suggests that combining some techniques in some sequence may be counter-productive. If this is substantiated by future studies it would have important implications concerning therapy.

CHAPTER 8

General Discussion

8.1. Overview of main hypotheses

Drawing on a generic meta-cognitive account of emotional disorders (S-REF; Wells & Matthews, 1994), the present PhD investigated the role of meta-cognitive beliefs in social anxiety.

According to the S-REF model (Wells & Matthews, 1994), meta-cognition consists of meta-cognitive knowledge, meta-cognitive experiences, strategies, and procedural plans. These factors are considered to be involved in the control of cognition and give rise to patterns of thinking that cause psychological distress.

In emotional disorders, this meta-cognitive system gives rise to the Cognitive Attentional Syndrome (CAS) that involves worry, rumination, threat monitoring, and unhelpful coping behaviours. Repetitive processing or recycling thoughts can distract from practical solutions and increase negative mood. Strategies, such as threat monitoring, are also a problem because they maintain a sense of danger.

Drawing on the S-REF model and on more traditional schema models, Clark and Wells (1995) developed a cognitive model of social phobia. In particular, the model proposed that the main maintaining factors of the disorder are self-focused attention, anticipatory processing, and post mortem processing. Self-focused attention involved focusing on a self-image, as if viewed through the eyes of other people. Anticipatory processing involved worries about forthcoming social situations, and the post-mortem involved dwelling on previous social experiences. Furthermore, maladaptive behaviours, such as avoidance and safety behaviours, play an important role in the maintenance of the disorder. Clark and Wells (1995) also implicated the activation of schemas (maladaptive and rigid assumptions and rules for living) as the basic triggers of the vicious cycles of social anxiety. According to the S-REF, these beliefs may be stored in long-term memory along with meta-cognitive knowledge, but a “pure” meta-cognitive approach would not need recourse to such schemas (Wells and Matthews, 1994).

The role of the CAS in social anxiety has gained empirical support. For example, several studies found that self-focused attention was associated with social anxiety (George & Stopa, 2008; Mansell et al., 2003). Furthermore, in another study, socially anxious individuals reported that in social situations they experience self-images from an observer perspective, while they shift to a field-perspective when in non-social situations (Wells et al., 1998). Moreover, social anxiety was associated with anticipatory processing

(Hinrichsen & Clark, 2003; Vassilopoulos, 2004, 2005a), post-mortem processing (Fehm et al., 2007; Kocovski, Endler, & Rector, 2005; Mellings & Alden, 2000), and safety behaviours (McManus et al., 2008; Wells, Clark et al., 1995).

However, there is limited research regarding the meta-cognitive belief systems that are proposed to trigger and regulate the CAS. For example, one study (Pinto-Gouveia et al., 2006) found that certain core beliefs (related to themes of rejection) were associated with social anxiety compared with a mixed group of other anxiety disorders. This offered preliminary support for the notion that core-beliefs might play a role in social phobia, but does not address the role of meta-cognition. Further research is necessary to investigate the potential contribution of such beliefs to the maintenance cycles of social phobia that involve maladaptive cognitive mechanisms and behaviours.

Two studies have shown that socially anxious people had stronger meta-cognitive beliefs compared with people with low social anxiety (Dannahy & Stopa, 2007) and with non-anxious individuals (Wells & Carter, 2001). Furthermore, a change in meta-cognitive beliefs through cognitive-behaviour therapy was associated with improved treatment outcome (McEvoy et al., 2009), especially in terms of depression and the post-mortem.

The present PhD aimed to expand the investigation of the role of meta-cognitive beliefs in social anxiety. Based on the S-REF model of emotional disorders, the hypotheses tested are discussed below.

8.1.1. Meta-cognitive predictors of social anxiety

In study 1, it was hypothesised that there would be a positive association between social anxiety and meta-cognitive beliefs. To explore this, the study employed the Metacognitions Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004). The MCQ-30 measures positive beliefs about worry, beliefs that worry is harmful and uncontrollable, cognitive self-consciousness, cognitive confidence, and beliefs about the need to control thoughts. The S-REF model emphasises positive and negative meta-cognitive beliefs. Negative beliefs involve beliefs about the dangerousness and uncontrollability of cognitive processes. In particular, these beliefs were expected to reveal significant positive correlations with social anxiety. Moreover, it was hypothesised that positive and negative meta-cognitive beliefs would correlate positively with anticipatory processing, focusing on the observer perspective self-image, and the post-mortem.

Additionally, three research questions were generated. First, following the S-REF model (Wells & Matthews, 1994), meta-cognitive beliefs were expected to be individual predictors of social anxiety independently of the cognitive mechanisms.

Second, the optimal set of unique predictors of social anxiety was investigated. According to the S-REF model, cognitive and meta-cognitive variables would be individual predictors of social anxiety. Anticipatory processing, the post-mortem, the observer perspective self-image, and meta-cognitive beliefs were examined to indicate the variables that were able to explain additional variance in social anxiety, hence expanding our understanding of the disorder.

Finally, the S-REF model suggests that meta-cognitive beliefs influence emotional problems through regulating the CAS; that is the cognitive mechanisms. Hence, the third research question investigated whether meta-cognitive beliefs would have an effect on social anxiety through anticipatory processing and the post-mortem. Moreover, it was expected that negative meta-cognitive beliefs would have a moderator effect on the relationship between social anxiety and the cognitive mechanisms (anticipatory processing and the post-mortem).

Such investigation was considered a necessary starting point for the present PhD. Meta-cognitive beliefs were considered the representations (or verbal expressions) of people's understanding of their self as a cognitive being. Hence, the hypothesis that meta-cognitive beliefs might correlate with and predict social anxiety would offer preliminary support to the notion that meta-cognitive activity and people's interpretations of such activity plays a dynamic role in social anxiety.

8.1.2. Meta-cognitive beliefs about the cognitive mechanisms in social anxiety

Following Study 1, it appeared that meta-cognitive beliefs about general worry played a contributing role in social anxiety. However, the study used a measure of meta-cognition not specifically designed for social anxiety. Further relationships might emerge from a measure of meta-cognitive beliefs that are specific to the cognitive mechanisms implicated in the disorder. This would be consistent with findings that meta-cognitive beliefs vary in their content depending on the mechanisms and the problems investigated. For example, studies have elicited meta-cognitive beliefs that are specific to depression and alcohol abuse (e.g., Papageorgiou & Wells, 2001b; Spada & Wells, 2008). Assessment of these beliefs could facilitate the investigation of the role of meta-cognition in specific fields. Hence, beliefs about the cognitive mechanisms implicated in social phobia could be relevant in research on the disorder and could illuminate new variables associated with the maintenance of social anxiety.

In line with this, Study 2 explored high and low socially anxious people's meta-cognitive beliefs about anticipatory processing, the observer perspective self-image, and post-mortem processing. This study's design involved semi-structured interviews. No specific hypotheses were generated. The aim was to elicit positive and negative meta-cognitive beliefs about the cognitive mechanisms that were suggested to maintain social anxiety. Nevertheless, in exploration of potential differences between the high and low social anxiety groups, the results were quantified and statistically analysed.

The semi-structured interviews were based on meta-cognitive profiling (Wells, 2002). This involved questions about the advantages and disadvantages of the cognitive mechanisms, as well as about relevant control strategies and stop signals. In line with the S-REF, it was expected that participants who reflected on challenging social situations would express positive and negative meta-cognitive beliefs, as well as various adaptive and maladaptive ways of coping. Furthermore, it was assumed that these beliefs would be stronger in high socially anxious individuals compared with low socially anxious individuals. As mentioned above, participants' meta-cognitive beliefs were categorised and quantified in order to investigate potential differences between the groups.

8.1.3. New measures of meta-cognition in social anxiety

The meta-cognitive beliefs elicited were used to develop two new measures of meta-cognitive beliefs about anticipatory processing and about focusing on the observer perspective self-image. The third study explored the psychometric properties of these questionnaires. Furthermore, Study 3 investigated whether these meta-cognitive beliefs could add to our understanding of social anxiety by highlighting relationships other than those indicated in Study 1 with meta-cognitive beliefs about general worry.

A cross-sectional design was employed with measures of meta-cognitive beliefs about general worry (MCQ-30), as well as of anticipatory processing (ASBQ), self-consciousness (SCS), and the observer perspective (SIPS; Item 2). The hypotheses were that the negative meta-cognitive belief scales would show positive significant correlations with social anxiety measured with the FNE scale (Watson & Friend, 1969) and with the SIAS (Mattick & Clarke, 1998), whereas positive beliefs would indicate inverse relationships. Furthermore, it was expected that meta-cognitive beliefs would be predictors of social anxiety while controlling for the cognitive mechanisms, depression, and public self-consciousness.

Study 1 had already found significant direct and indirect relationships between meta-cognitive beliefs about general worry and social anxiety. Therefore, the new questionnaires would be considered beneficial if they could explain additional variance in social anxiety.

Finally, it was expected that the cognitive mechanisms (anticipatory processing, the observer perspective self-image, and public self-consciousness) would mediate the relationship between meta-cognitive beliefs and social anxiety.

8.1.4. The interaction effect of meta-cognitive beliefs and social anxiety on attentional bias

Findings from other studies indicated that high socially anxious people showed a vigilance-avoidance pattern with negative words presented in 200msec and 500msec, respectively (Vassilopoulos, 2005b). Moreover, another study found that high socially anxious individuals avoided emotional faces that were presented in parallel with household objects for 500msec (Chen et al., 2002). In line with the S-REF, these studies support the notion that threat monitoring and avoidance strategies are activated in social anxiety. The fourth study investigated whether meta-cognitive beliefs could influence such monitoring.

Following this, two dot-probe tasks were designed to explore whether meta-cognitive beliefs interacted with social anxiety in influencing attentional bias for words and faces in high socially anxious people compared with people with low social anxiety. However, the dot-probe task that employed images of emotional faces was dropped from the analysis due to an error in its programming.

The dot-probe task that employed words was based on a previous paradigm (Vassilopoulos, 2005b). Therefore, the results were expected to replicate the earlier study's findings. Hence, the high social anxiety group was expected to reveal a vigilance-avoidance pattern for negatively valenced words.

However, the previous studies did not assess meta-cognitive beliefs that according to the S-REF model could have influenced such bias. Thus, previous results might have been due to a moderator effect of meta-cognition on the relationship between social anxiety and attentional bias. Therefore, in line with the S-REF model, Study 4 hypothesised that there would be an interaction between meta-cognitive beliefs and social anxiety that would influence the vigilance-avoidance pattern of attentional bias in emotional words. Furthermore, it was expected that meta-cognitive beliefs would be individual predictors of attentional bias.

8.1.5. The effect of meta-cognitive beliefs on state anxiety in high socially anxious individuals engaging in anticipatory processing or distraction

Previous findings showed that in people with high social anxiety, anticipatory processing was associated with increased state anxiety in social situations (Mellings & Alden, 2000). Moreover in other studies, anticipatory processing was associated with increased state anxiety whereas distraction was associated with a decrease in state anxiety (Hinrichsen & Clark, 2003; Vassilopoulos, 2005a). However, according to the S-REF, the manipulation of the CAS (in the current study anticipatory processing) should be influenced by meta-cognitive activity. Therefore, the fifth study aimed to investigate whether meta-cognitive beliefs could affect state anxiety in high socially anxious individuals that engaged in either anticipatory processing or a distraction task. An experimental design was employed with high socially anxious people engaging in either condition after the administration of a social threat (speech).

Following previous results, the study hypothesised that anticipatory processing would be associated with greater state anxiety compared with distraction. However, consistent with the S-REF model, the main hypothesis was that meta-cognitive beliefs would influence the relationship between condition (anticipatory processing or distraction) and anxiety reactivity; that is state anxiety before and after the speech. It was also hypothesised that meta-cognitive beliefs would have an impact on the perspective taken during the speech. Further exploratory analysis investigated the participants' predictions about their performance in each condition.

8.1.6. The investigation of a meta-cognitive therapeutic intervention versus a traditional cognitive-therapy technique

Finally, following previous results (Studies 1-5) that supported the role of meta-cognition in social anxiety, it was decided to explore whether a therapeutic technique that enables change at the meta-cognitive level could be helpful in social anxiety.

In particular, people with high levels of social anxiety applied detached mindfulness (Wells, 2009) and a thought record with Socratic questions in anticipation of a social task (speech). A cross-over experimental design was employed to enable the comparison of the techniques in terms of their effect on negative beliefs, anxiety, worry, and the observer perspective self-image.

Detached mindfulness was employed to facilitate meta-awareness and to introduce a detached way of relating with thoughts. Such a mental state could interrupt maladaptive self-processing, such as worry and rumination. Thought challenging aimed at cognitive

restructuring through collecting the evidence for and against compelling thoughts and through generating balanced responses to distorted thoughts. This way, participants could challenge the accuracy and validity of their negative thoughts.

It was hypothesised that both interventions would be associated with reductions in worry, anxiety, beliefs, and the observer perspective self-image. However, the S-REF proposes that change in the meta-mode should have a direct effect in interrupting the CAS, hence enabling an exodus from maladaptive S-REF activity and the reduction of anxiety. Detached mindfulness was expected to be associated with greater improvements than thought challenging because it directly interrupts sustained conceptual processing (i.e. the CAS).

Having provided an overview of the studies conducted, in the next section, the results are summarised and the novelty of the findings is considered.

8.2. Review of results and novelty of findings

8.2.1. Do meta-cognitions contribute to social anxiety? A preliminary study

In line with the S-REF model and the first hypothesis, the first study showed that social anxiety significantly positively correlated with uncontrollability beliefs about worry. However, the positive correlation between positive beliefs and social anxiety did not reach significance. This is likely to be because the relationship is indirect and dependent on aspects of the CAS, such as anticipatory processing.

The S-REF model predicted that meta-cognitive beliefs would play a role in the regulation of the CAS (second hypothesis). Consistently, positive and negative meta-cognitive beliefs significantly and positively correlated with anticipatory processing, post-mortem processing, and the observer perspective self-image. Hence, the study shows that meta-cognitive beliefs were associated with social anxiety and with the cognitive mechanisms implicated in social phobia.

When examining the individual predictors of social anxiety, positive meta-cognitive beliefs, uncontrollability beliefs, and anticipatory processing were individual predictors of social anxiety. Anticipatory processing explained 42% of the variance in social anxiety, while an additional 3% was explained by positive and negative meta-cognitive beliefs. Mediation analysis revealed that anticipatory processing partly mediated the relationship between uncontrollability beliefs and social anxiety.

However, even though positive beliefs had a direct effect on social anxiety when controlling for uncontrollability beliefs and anticipatory processing, these beliefs had a marginal contribution to social anxiety when treated as the only independent variable in the mediation analysis. This suggests that the indirect effect of positive beliefs on social anxiety through anticipatory processing was based on a relationship that could have been attributable to chance. However, the regression analysis that revealed an individual predictive value of positive beliefs on social anxiety when controlling for negative beliefs makes it possible that the above mediation could be substantive. As discussed in Chapter 2, uncontrollability beliefs and/or anticipatory processing might have acted as suppressor variables on the relationship between positive beliefs and social anxiety.

Finally, the research question regarding a positive moderator role of negative beliefs on the relationship between the cognitive mechanisms and social anxiety was not supported. The moderation analyses revealed no significant effect. This could be because of the use of an analogue population. Social phobic individuals are expected to have more rigid meta-cognitive beliefs that entrap them in prolonged worry and rumination, thereby influencing their ability to cope with their daily activities. On the contrary, the current sample consisted of students that were apparently able to function in their every daily lives.

Nevertheless, the above results offered preliminary support to the notion that meta-cognitive beliefs had an impact on social anxiety and on the cognitive mechanisms implicated in the maintenance of the disorder. These meta-cognitive beliefs were about general worry and thoughts. Thus far, only one study found that negative beliefs about rumination might be associated with high social anxiety (Dannahy & Stopa, 2007). However, these authors used a modified version of the Metacognition Questionnaire with unknown psychometric properties. Furthermore, their analysis used parametric tests with non-parametric data. Hence, the results might be unreliable. The present study used a cross sectional design with suitable sample size and validated measures.

The relationships found indicated that meta-cognitive beliefs could be implicated in social anxiety. For example, uncontrollability beliefs had a direct effect on social anxiety and an indirect effect via anticipatory processing. This is consistent with the S-REF that proposed that meta-cognitive beliefs influence emotional problems by regulating the CAS. However, positive beliefs about worry indicated an inverse predictive relationship with social anxiety when controlling for uncontrollability beliefs. That is high levels of social anxiety were associated with low levels of these beliefs. This result could be due to a moderator effect of uncontrollability beliefs on positive beliefs. Alternatively, it could be that positive beliefs serve a normalising function that relieves self-criticism and anxiety. However, these beliefs were also associated with increased anticipatory processing, and as mentioned above,

anticipatory processing mediated the relationship between uncontrollability beliefs and social anxiety. Moreover, the suggested indirect effect of positive beliefs on social anxiety through anticipatory processing was positive. Hence, there could be a sequence of positive beliefs reinforcing anticipatory processing and of uncontrollability beliefs and anticipatory processing increasing social anxiety.

Finally, in further support of the S-REF model, several meta-cognitive beliefs correlated with the cognitive mechanisms. Hence, the architecture proposed by the S-REF model could account for the present results, with meta-cognitive beliefs influencing the CAS and social anxiety. Following the above, further exploration was deemed appropriate.

8.2.2. Investigation of the nature of meta-cognitive beliefs in social anxiety and the construction of two new questionnaires

The second study revealed that almost all participants had positive and negative beliefs about anticipatory processing, focusing on the observer perspective self-image, and post-mortem processing. Compared with low socially anxious individuals, high socially anxious people seemed to believe largely that anticipatory processing could help them become self-aware in forthcoming social situations. This belief was of importance because positive beliefs could maintain engagement in anticipatory processing, but also because it implies that high socially anxious individuals perceived self-awareness as beneficial. In effect, high socially anxious individuals reported that they focused on their observer perspective self-image until they felt confident that it was disconfirmed.

Furthermore, high socially anxious individuals reported that they engaged in anticipatory processing more frequently and for a longer period than low socially anxious individuals. Moreover, on a scale of 0 (completely uncontrollable) to 10 (completely controllable), the high social anxiety group reported greater uncontrollability of and more time spent trying to control anticipatory processing compared with the low social anxiety group. Additionally, there were some differences in the strategies that were perceived as helpful in controlling anticipatory processing. In particular, more high-FNE individuals than low-FNE individuals reported that anticipatory processing could be controlled by trying to think of something else (distraction).

With regards to the observer perspective self-image, the high social anxiety group reported experiencing the image more frequently than the low social anxiety group. Furthermore, the former group reported that their images lasted longer and were more uncontrollable, and that they spent more time trying to control them compared with the latter group. Additionally, high socially anxious people seemed to hold on to their self-image until it was disconfirmed in the social situation.

Regarding post-mortem processing, high socially anxious people reported perceiving it as more uncontrollable compared with low socially anxious people. More High-FNE individuals than low-FNE individuals reported that the post-mortem could make them want to avoid future social situations and that it was a distraction from more important things. Finally, the two groups differed in that high socially anxious people were more likely to think that speaking to somebody about their experience and their ruminations could help them control the process.

In summary, these results indicated that people with high and low levels of social anxiety had positive and negative meta-cognitive beliefs about the cognitive mechanisms implicated in social phobia. However, the high social anxiety group seemed to believe to a greater extent that these mechanisms were uncontrollable. Furthermore, there were some differences in positive beliefs and in the strategies applied to control the mechanisms. Following this, two questionnaires were developed to measure individual differences in meta-cognitive beliefs about anticipatory processing and the observer perspective self-image.

8.2.3. The development of two measures of meta-cognitive beliefs in social anxiety: psychometric properties and relationships between beliefs, cognitive mechanisms, and social anxiety

8.2.3.1. The Metacognitions about Focusing on an Image of the Self (MFIS) scale

The new measures were analysed for their structure and psychometric properties. The MFIS revealed the following three Factors:

- 1) Beliefs that focusing on the self-image could improve its management and one's presentation in social situations. For example, such beliefs were that focusing on the self-image "Helps me present the person I want to be", and "Helps me communicate my strengths",
- 2) Beliefs that focusing on the self-image could influence a person's behaviour thus contaminating the social situation. For example, that the self-image "Stops me from being myself", and "Stops me from acting naturally",
- 3) Beliefs that focusing on the self-image was uncontrollable and could reinforce a negative self-bias. For example, that the self-image "Makes me see myself in a bad way" and "Enters my mind against my will".

The scale and subscales showed good internal consistency, with alphas ranging from .81 to .91. Moreover, stability was good with test-retest correlations ranging between .64 and .78. Nevertheless, the full scale and the first subscale scores increased slightly in the retest condition. There was approximately a month's distance between the test and retest conditions.

Finally, there was good convergent validity with the MCQ-30 subscales, the observer perspective, and private and public self-consciousness. Therefore, the MFIS scale was found to be reliable and could be used to assess meta-cognitive beliefs about focusing on the self-image in subsequent studies.

8.2.3.2. The Metacognitions about Anticipatory Processing Scale (MAPS)

The MAPS revealed three Factors as follows:

- 1) Beliefs that anticipatory processing could aid in the preparation for a social situation and in improving performance (e.g. "Helps me visualise how to present myself" and "Helps me plan the situation so that I don't get nervous"),
- 2) Beliefs that anticipatory processing is uncontrollable and dangerous for one's wellbeing and social performance (e.g., "Is something I have no control over", "Could be harmful for my wellbeing"),
- 3) Beliefs that anticipatory processing could enable one to anticipate other people's expectations and needs (e.g., "Helps me understand what is expected of me" and "Helps me ensure I do not upset people").

This scale and its subscales showed good internal consistency with alphas ranging from .82 to .91 and good stability with test-retest (over a month) correlations between .64 and .76. Again, the scores on the scale and the first subscale (positive beliefs) increased slightly in the retest condition. Finally, convergent validity was good with the MAPS subscales correlating positively and significantly with the MCQ-30 subscales and with anticipatory processing. Hence, the MAPS was considered a reliable measure that could be used in subsequent studies.

8.2.3.3. Relationships between the new measures, social anxiety, and the cognitive mechanisms implicated in social phobia

All subscales apart from MAPS-sociability (beliefs that anticipatory processing enables one to be aware of other people's expectations) correlated positively and significantly with social anxiety (FNE and SIAS), the observer perspective, and self-consciousness (private

and public). The MAPS-sociability subscale did not correlate with the FNE scale and the observer perspective.

Consistent with previous studies on self-consciousness (George & Stopa, 2008), public self-consciousness was an individual positive predictor of social anxiety. Furthermore, in line with the S-REF and the study's hypotheses, positive and uncontrollability beliefs about focusing on the self-image were individual predictors of social anxiety (FNE). The relationship between positive beliefs and social anxiety was borderline negative. It is worth noting that these predictors were found when controlling for depression. Therefore, consistent with Study 1, high levels of uncontrollability beliefs were associated with high anxiety whereas high levels of positive meta-cognitive beliefs, when controlling for negative beliefs, were associated with the low social anxiety group.

In further analysis, anticipatory processing was a positive predictor of social anxiety (FNE). Similar to the results of Study 1, the MAPS sociability subscale did not correlate with the FNE. However, when controlling for depression, anticipatory processing, and the remaining MAPS subscales, these positive beliefs revealed a significant contribution and a negative relationship.

The above analyses suggested that positive meta-cognitive beliefs consistently indicated inverse relationships with fear of negative evaluation when controlling for negative beliefs and cognitive mechanisms. As discussed previously, it could be that positive beliefs, even though positively associated with the CAS, played a normalising role in social anxiety. Such a role could reassure socially anxious people that their cognitive functioning is normal and beneficial, while reinforcing engagement in the CAS. Nevertheless, high levels of negative beliefs appeared to play a role in the maintenance of both the CAS and social anxiety. Hence, it could be that, after the initiation of the CAS, negative meta-cognitive beliefs interfere with coping as CAS elements are seen as dangerous and uncontrollable.

The exploratory analysis revealed that several meta-cognitive beliefs along with cognitive mechanisms and depression predicted social anxiety measured with the SIAS. More specifically, depression, public self-consciousness, and negative and uncontrollability beliefs about the observer perspective self-image were individual predictors of SIAS. In addition, depression, anticipatory processing, uncontrollability beliefs about anticipatory processing, and MAPS-sociability were individual predictors of SIAS. All these relationships were positive apart from MAPS-sociability that showed an inverse relationship with social anxiety. This was consistent with the above findings with the FNE scale.

Finally, in line with the current study's expectations, a series of mediation analyses revealed several positive indirect effects of meta-cognitive beliefs on social anxiety measured with the FNE and the SIAS. Anticipatory processing mediated the relationship between the MAPS-uncontrollability subscale and social anxiety (FNE) and between the MAPS-positive subscale and social anxiety measured with the SIAS. This is partly consistent with Study 1 that found an indirect effect of uncontrollability and positive beliefs on social anxiety via anticipatory processing. Hence, replication of these results strengthened their reliability. Moreover, public self-consciousness and the observer perspective mediated the relationship between the MFIS-positive subscale and the FNE scale, whereas public self-consciousness was found to be a mediator in the relationship between these beliefs and the SIAS. Negative and uncontrollability beliefs had an indirect effect on social anxiety (FNE and SIAS) through public self-consciousness. In addition, anticipatory processing, public self-consciousness, and the observer perspective mediated the relationship between the MCQ-30 uncontrollability subscale and social anxiety (FNE), whereas anticipatory processing mediated the relationship between the MCQ-30 positive subscale and the SIAS. All relationships were positive.

These results highlighted that the new meta-cognitive measures could be promising in the study of meta-cognitive beliefs in social anxiety. In effect, the subscales showed good internal consistency, stability, and convergent validity. Nevertheless, stability would need to be re-examined within a longer timeframe. Furthermore, age and gender appeared to influence some of the subscales. In further exploration of the scales, Study 4 reported a supplementary analysis of the MFIS with regards to its structure and reliability, and consequent alterations.

In brief, in line with the S-REF, meta-cognitive beliefs were associated with and explained additional variance in social anxiety (FNE), when controlling for depression and gender. Moreover, anticipatory processing and public self-consciousness showed a significant contribution. According to the S-REF, this could be explained by considering the architecture of cognitive and meta-cognitive functioning. At the meta-level, meta-cognitive beliefs activate maladaptive strategies and maintain the CAS. The CAS involves anticipatory processing and public self-consciousness, hence increasing the focus on the self as a "social object" and worry about forthcoming social situations. Prolonged engagement in the CAS is likely to maintain the S-REF and negative emotion, hence reinforcing meta-cognitive beliefs about the uncontrollability of these cognitive mechanisms.

So far, research has focused on cognitive mechanisms as the main maintaining factors of social phobia. However, the present study suggested that meta-cognitive beliefs could be implicated in the maintenance of social anxiety both directly and through the CAS.

Nevertheless, no causal relationships could be presumed due to the cross-sectional design.

8.2.4. Relationships between meta-cognitive beliefs and attentional bias in high and low socially anxious individuals

The S-REF model (Wells & Matthews, 1994) suggested that attentional factors in the form of threat monitoring are part of the CAS. In social anxiety, Clark and Wells' (1995) model emphasised the role of self-focused attention, whereas Rapee and Heimberg's model (1997) highlighted the role of selective attention towards negative external information (e.g., negative social feedback). In support of the first assertion, Study 3 found that public self-consciousness predicted social anxiety. Moreover, Study 1 found a significant correlation between focusing on an observer perspective self-image and social anxiety. Both these mechanisms correlated with meta-cognitive beliefs, hence providing support for the S-REF model that implicates meta-cognitive beliefs in the regulation of the CAS.

The fourth study was concerned with the second assertion. In particular, the study investigated whether meta-cognitive beliefs could be associated with attentional bias regarding emotional words in high and low socially anxious individuals.

Initially, the MFIS scale showed decreased reliability that required deletion of two items and further exploration. Principal components analysis indicated that the adoption of a two-Factor solution would be appropriate. The two Factors reflected positive and negative beliefs about focusing on the observer perspective self-image. The amended scale showed good reliability and was included in subsequent analyses.

Contrary to expectations derived from earlier studies of attentional bias, the dot-probe task failed to convey an effect of social anxiety. High and low socially anxious individuals did not show significant differences in terms of their attentional bias in emotional words in 200msec and 500msec. On the contrary, gender revealed a significant effect with male participants engaging in a vigilance-avoidance pattern for negative somatic words. Hence, it could be that the previously discovered vigilance-avoidance effect (Vassilopoulos, 2005b) was influenced by a difference in gender between the high and low social anxiety groups. Indeed, that study found a gender difference between the groups that was not controlled for in the main analysis.

Moreover, depression showed a significant effect with moderate levels of depression being associated with vigilance-avoidance for negative somatic words. Therefore, it could be that gender and depression rather than social anxiety had a significant effect on the initial attention towards negative somatic stimuli and the subsequent avoidance. However,

this earlier study could not account for any potential effect of meta-cognition on attentional bias.

The present study aimed to bridge this gap and hypothesised that meta-cognitive beliefs would interact with social anxiety to influence attentional bias. In terms of this hypothesis, the results were promising. In particular, interaction variables consisting of meta-cognitive beliefs X social anxiety were used to conduct moderation analyses with attentional bias as the dependent variable. The results indicated a moderator effect of positive beliefs about worry and social anxiety on attention away from negative somatic words in 500msec. Moreover, positive beliefs about focusing on the observer perspective self-image interacted with social anxiety to marginally influence attention away from positive evaluative words in 500msec. Hence, it appeared that in 500msec when voluntary attentional activity is likely to occur, positive beliefs about worry had a positive function; that is to direct attention away from negative somatic words. This expands previous findings that positive meta-cognitive beliefs had an inverse relationship with social anxiety. However, positive beliefs about the observer perspective self-image showed a marginal moderator effect with social anxiety on attention away from positive evaluative words. Such bias would be likely to influence the information processed by socially anxious people. In effect, if people avoid processing positive evaluative information, then their interpretation of the social event might be negatively biased. Once again, positive beliefs appeared to have a dual role with positive and negative effects. Further research is necessary to establish these results.

With respect to the hypothesis concerning individual predictors of attentional bias, the Vassilopoulos (2005b) study supported previous findings that trait anxiety contributed to attentional bias (Mansell et al., 2002). Additionally, the current study was able to clarify the predictive value of trait anxiety in the low socially anxious group that showed attention away from negative somatic words in the 200msec condition.

Moreover, uncontrollability beliefs about general worry predicted attention towards negative somatic words in 200msec. It could be that low socially anxious people who believed that their worry was uncontrollable were prone to attend to negative somatic words. Such attentional bias could indicate that threat monitoring was activated. Hence, attention was directed towards negative stimuli even when these were displayed for only 200msec. On the contrary, high trait anxiety was related to attention away from negative somatic words in the 200msec condition. It could be that low anxiety levels predisposed attention towards negative somatic words because meta-cognition dictated that such a strategy could be beneficial under certain circumstances.

Furthermore, cognitive self-consciousness predicted attention away from positive evaluative words in 500msec in low socially anxious people. This could be because cognitive self-consciousness is a marker of attention toward thoughts. Such a process could be thwarted by positive information and therefore requires attention away from such material.

Most importantly, in high socially anxious individuals, cognitive self-consciousness predicted attentional bias away from positive somatic words in 200msec, while uncontrollability beliefs predicted attention towards positive somatic words in 500msec. Therefore, it could be that cognitive self-consciousness inhibited socially anxious individuals from attending towards positive somatic information in 200msec whereas uncontrollability beliefs about worry facilitated such attentional bias in 500msec. Nevertheless, regression analyses do not allow for the assumption of causality, hence more research is necessary.

In summary, it appeared that gender and depression played a significant role in attentional bias for negative words in high and low socially anxious individuals. However, with regards to positive beliefs, certain interaction effects between these meta-cognitive variables and social anxiety were observed. Furthermore, meta-cognitive beliefs seemed to predict attentional bias in both the 200msec and the 500msec conditions. This suggests that attentional focus in 200msec could be voluntary, or that meta-cognition could play a role in involuntary attentional functioning. To the author's knowledge, this study was the first to explore the potential role of meta-cognition in attention. The results were encouraging and highlighted the need for further research.

8.2.5. The impact of meta-cognitive beliefs on state anxiety in high socially anxious individuals anticipating a speech

Previous findings showed that in high socially anxious individuals, anticipatory processing was associated with an increase in state anxiety whereas distraction was associated with either maintained anxiety levels (Hinrichsen & Clark, 2003) or a decrease in state anxiety (Vassilopoulos, 2005a). The present study aimed to examine whether such effects could be influenced by meta-cognitive beliefs in high socially anxious people.

Consistent with the above studies and the first hypothesis, distraction was associated with reductions in state anxiety compared with anticipatory processing. Moreover, there was a main effect of time indicating that anxiety decreased after the challenge was over.

Consistent with the second hypothesis, people with high uncontrollability beliefs about worry experienced more state anticipatory anxiety than people with low levels of such beliefs. It seemed that uncontrollability beliefs had an impact on the anxiety experienced before the speech regardless of whether the individuals participated in anticipatory processing or distraction. This is in line with S-REF model (Wells & Matthews, 1994) that suggests an effect of uncontrollability beliefs on anxiety. The present study clarified that this effect could be direct. However, as mentioned above, anticipatory processing had a direct effect on state anxiety as well.

Moreover, there was a significant interaction effect of time and uncontrollability beliefs about anticipatory processing on state anxiety. In particular, people with high levels of these beliefs reported greater decrease in state anxiety from pre to post speech compared with people who had low levels of such beliefs. This was qualified by a marginal three-way interaction between time, condition, and uncontrollability beliefs about anticipatory processing. Consistent with above, the group that perceived anticipatory processing as uncontrollable reported greater anxiety than the group with low uncontrollability beliefs before the speech in the anticipatory processing condition. Hence, in line with the S-REF model, uncontrollability beliefs had a stronger negative effect when the CAS (anticipatory processing) was activated.

In addition, in the anticipatory processing condition, people reported less anxiety after the speech compared with before. However, in the distraction condition, such decrease was only observed in the group with low positive meta-cognitive beliefs. In particular, high levels of positive beliefs were associated with a maintenance of anxiety from pre to post-speech. In brief, when distracted, people with low levels of positive meta-cognitive beliefs experienced a decrease in their anxiety when the challenge was over. However, high levels of state anxiety were maintained at post-speech in people with high positive meta-cognitive beliefs.

In summary, the S-REF model predicted that meta-cognitive beliefs might regulate emotional and cognitive responses to threat. In line with this, the present study showed that when positive meta-cognitive beliefs were high, people in the distraction group experienced maintained levels of state anxiety from pre to post speech. This could be because positive beliefs called for the activation of anticipatory processing as a strategy that would help them perform better. When distraction interfered with the activation of the plan, the threat remained unchallenged and state anxiety was maintained. When the plan was reinforced in the anticipatory processing condition, state anxiety decreased after the challenge was over.

The decrease that followed the completion of the speech could be attributed to the disconfirmation of negative beliefs (e.g., that worry would be uncontrollable and would influence performance in a negative way). Therefore, it could be that uncontrollability beliefs were associated with increased anticipatory state anxiety, whereas positive meta-cognitive beliefs were associated with the maintenance of state anxiety when the preferred coping strategy (worry) was inhibited. Hence, it could be that challenging meta-cognitive beliefs might have an effect on exposure tasks in the treatment of social anxiety.

Finally, the study highlighted that on average, participants experienced observer perspective self-images during the speech and had low confidence in their performance.

8.2.6. Detached mindfulness versus thought challenging in high socially anxious individuals: A comparison

Following the above results, it appeared that meta-cognitive beliefs were associated with social anxiety (measured with various questionnaires, such as the FNE and SIAS), with attentional bias, and with state anxiety. Hence, the application of meta-cognitive therapeutic techniques could be beneficial in socially anxious people. Therefore, the final study was designed to examine whether detached mindfulness (Wells, 2009) could be useful in the treatment of social anxiety. This technique was compared with a well established intervention in cognitive-behaviour therapy: thought challenging with Socratic questions (Beck et al., 1985; Greenberger & Padesky, 1995; Heimberg & Becker, 2002). A cross-over design was employed and the participants gave three speeches. The first speech served as the baseline, the second and third speeches followed the two interventions.

The results showed that when comparing baseline scores with those that followed the first intervention, thought challenging was associated with significant reductions in anxiety, whereas detached mindfulness was associated with reductions in all the dependent variables (anxiety, beliefs, worry, and the observer perspective). An observation of the graph of the mean scores after each manipulation in relation to the order of delivery indicated that regardless of order of delivery, participants reported improvements after detached mindfulness. However, the people who received detached mindfulness first which was followed by thought challenging reported worsening of anxiety, belief levels, and worry after the second technique. As mentioned earlier, this observation should be interpreted with caution due to the lack of a statistical analysis.

Overall, detached mindfulness was associated with greater improvements than thought challenging in worry, negative beliefs, and the observer perspective. Anxiety was also reduced more in the detached mindfulness condition compared with thought challenging;

however, this difference was not significant. Nevertheless, participants perceived the two techniques to be equally helpful.

This study offered preliminary support to the notion that detached mindfulness could be useful in the treatment of social anxiety. According to the S-REF, this could be because detached mindfulness interrupted the CAS and reinforced change at the meta-level. Hence, by being detached from thoughts and by observing them as mental events, individuals could develop a healthier relationship with their thinking processes. Thus, detached mindfulness could challenge rigid meta-cognitive beliefs and reduce engagement in the CAS.

Challenging the content of thoughts and reasoning with them was not associated with the same degree of improvements. According to the S-REF, this could be because challenging thoughts encouraged engagement in thought analysis, hence placing the thought at the centre of attention. This could then trigger worry and other elements of the CAS. Hence, the final study of this PhD suggested that detached mindfulness could be a useful technique in the treatment of social anxiety disorder.

8.3. Implications for the theoretical background of social anxiety disorder

Cognitive theories of anxiety disorders (Beck et al., 1985; Ellis, Gordon, Neenan, & Palmer, 2001) have emphasised the role of negative thoughts in the maintenance of anxiety. In particular, Beck et al. (1985) have proposed that negative automatic thoughts and cognitive distortions, such as all or nothing thinking, play a crucial role in anxiety disorders. Underlying assumptions, core beliefs, and rules for living are suggested to make the individual vulnerable in experiencing such thoughts. Hence, schematic constructs undermine the individual's responses to stressful events and situations.

In social anxiety disorder, social situations are suggested to activate maladaptive schemas and cognitive distortions. Counter-effective behaviours and negative cognitions make negative emotions overwhelming and difficult to control. Safety behaviours and avoidance inhibit the disconfirmation of thoughts and anxious predictions, hence maintaining the vicious cycle. Therefore, emphasis is given to core beliefs and assumptions, negative automatic thoughts, cognitive distortions, and maladaptive behaviours.

In addition, two cognitive models of social phobia (Clark & Wells, 1995; Rapee & Heimberg, 1997) suggested that social situations activate schematic beliefs that trigger biased information processing. For example, based on the S-REF model of emotional disorders (Wells & Matthews, 1994), Clark and Wells (1995) implicate anticipatory processing, self-focused attention and the observer perspective, and post-mortem

processing in the maintenance of the disorder. Rapee and Heimberg (1997) discuss the role of selective attention to negative external information as well. These models have gained empirical support and these mechanisms have been associated with social anxiety disorder.

With regards to Clark and Wells' (1995) model, Wells (1997) suggested that anticipatory processing and the post-mortem could be targeted by challenging positive and negative meta-cognitive beliefs. This suggestion is in line with the S-REF model (Wells & Matthews, 1994) that proposed a regulating and controlling role of meta-cognition in emotional disorders. Nevertheless, in social anxiety disorder, this role remains largely unexplored. Hence, interventions that target meta-cognitions were not incorporated in the earlier treatment protocols.

The present PhD expands on Clark and Wells' (1995) cognitive model of social anxiety and proposes alterations that align this model with a meta-cognitive account of emotional disorders (the S-REF model). All the studies of the present PhD have highlighted the importance of incorporating a meta-cognitive account in the theoretical background of social anxiety.

First, several meta-cognitive beliefs appear to be associated with social anxiety independently of the cognitive mechanisms that have been emphasised as the maintaining factors. Studies 1 and 3 showed that uncontrollability beliefs were positively associated with social anxiety and that anticipatory processing, public self-consciousness, and the observer perspective mediated this relationship. Positive meta-cognitive beliefs appeared to have a negative direct effect on social anxiety when controlling for uncontrollability beliefs and cognitive mechanisms, but a positive correlation with the maladaptive cognitive mechanisms.

Figure 8.1 illustrates the potential relationships between meta-cognitive beliefs and social anxiety.

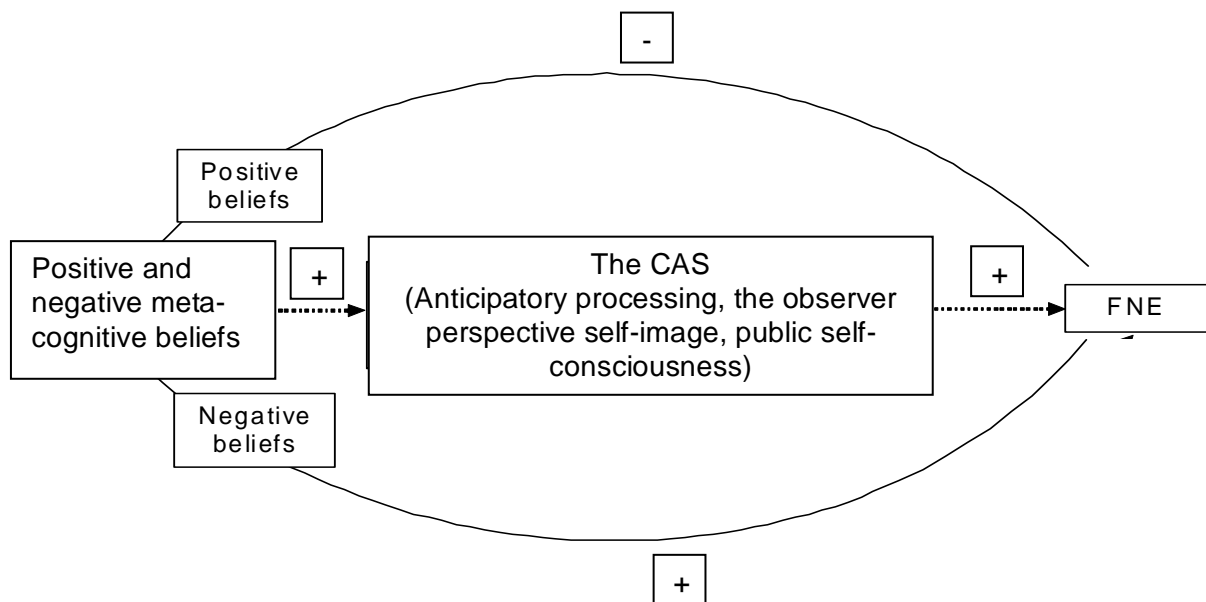


Figure 8.1: The suggested relationships between meta-cognitive beliefs, cognitive mechanisms, and social anxiety (+ indicates positive relationships, - indicates negative relationships, dotted lines indicate indirect effects) as derived from the current studies

Hence, certain meta-cognitive beliefs could be considered in the formulation of social anxiety. These are positive beliefs and uncontrollability beliefs about worry, positive beliefs and uncontrollability beliefs about focusing on the self-image, uncontrollability beliefs about anticipatory processing, and positive beliefs that anticipatory processing could enable one to anticipate other people's expectations and needs. The latter set of beliefs could be related to fears of insulting or causing discomfort to others. The fear of causing insult is interesting because it could be worthwhile investigating it in relation to Taijin Kyofusho and to the Olfactory Reference Syndrome, and meta-cognitions might provide a point of convergence between social anxiety and these syndromes.

In the above diagram, post-mortem processing was omitted. This was because the post-mortem was not a significant predictor of social anxiety when controlling for anticipatory processing. In particular, Study 1 found that the post-mortem and anticipator processing were highly correlated (.64). However, this correlation did not produce concerns for multicollinearity in the subsequent regression analyses (average VIF and tolerance values were normal). Therefore, consistent with Papageorgiou (2006), it could be argued that the two mechanisms were distinct but overlapped in their main characteristics. The first study's results were consistent with previous findings that worry fully mediated the relationship between rumination and depression (Muris et al., 2004).

Increased levels of positive meta-cognitive beliefs were predictive of decreased levels of social anxiety. Initially, this may appear to contradict the S-REF model that expects meta-cognitive beliefs to maintain emotional disorders. However, on a closer look it seems that the relationship between positive beliefs about anticipatory processing and social anxiety

becomes positive when mediated by anticipatory processing. According to the S-REF, high levels of positive beliefs about worry are likely to initiate and maintain engagement in worry, thus influencing the disorder. Therefore, in social anxiety, it could be that positive beliefs maintain the disorder when they trigger and maintain prolonged engagement in anticipatory processing. If anticipatory processing is successfully reduced (e.g., by detached mindfulness, see study 6), it could be that positive beliefs about worry act in a normalising way, hence offering reassurance that a certain amount of worry is beneficial and controllable. However, uncontrollability beliefs were associated with high levels of social anxiety in a direct and indirect way.

Study 5 suggested that when positive beliefs were high and anticipatory processing was inhibited, state anxiety was maintained after a speech was completed. This could be because the person was not allowed to perform a cognitive activity that they perceived as beneficial. Hence, their anxiety and sense of threat was maintained. When anticipatory processing was reinforced, then state anxiety decreased to the levels of the people with low meta-cognitive beliefs after the challenge was over. Therefore, positive beliefs may have a positive role when not engaging in a social event and a negative role when anticipatory processing is inhibited in the face of an actual social event.

Moreover, Study 5 showed that that exposure could be more beneficial when positive beliefs are challenged beforehand, while allowing for negative meta-cognitive beliefs to be challenged through the exposure task.

Following the above, the present PhD suggests that meta-cognitive beliefs could be incorporated in the current formulation of social anxiety to the degree that they contribute to vicious maintenance cycles. This could reinforce the assessment of positive and negative meta-cognitive beliefs about the maladaptive cognitive mechanisms, and could enable a deeper understanding of the factors that regulate persistent engagement in worry and rumination in social anxiety. This is important given that a focus on core-beliefs and high standards fails to do so.

8.4. Clinical implications

The notion that a meta-cognitive focus in treating social anxiety could be beneficial is not new (Hartman, 1983; Nelson et al., 1999; Wells, 2007; Wells, 2009; Wells & Matthews, 1994). In effect, several meta-cognitive strategies have been proposed in the treatment of social anxiety, including shifting attention towards others in social situations (Hartman, 1983), and challenging meta-cognitive beliefs and the CAS (Clark & Wells, 1995; Wells, 2007). Moreover, other meta-cognitive techniques, such as detached mindfulness (Wells,

2005; Wells & Matthews, 1994) and attentional training (Wells, 1990; Wells & Matthews, 1994), as well as meta-cognitive therapy (Wells, 2009) could be helpful in social anxiety.

According to the S-REF, change in meta-cognition should be linked to treatment outcome. So far, only one study has found that cognitive-behavioural group therapy was associated with change in meta-cognitive beliefs (McEvoy et al., 2009). This change correlated with treatment outcome, especially with reductions in rumination and depression. Hence, it could be that cognitive-behaviour therapy produced change at the meta-level, hence enabling improvements in psychopathology. Could it then be that meta-cognitive strategies might act in a more direct way and be more beneficial than traditional strategies in treating social anxiety?

The final study of this PhD suggests that detached mindfulness could be a helpful technique in people suffering from high levels of social anxiety. This technique was more helpful than thought challenging via a thought record.

According to the S-REF, detached mindfulness enables people to gain a distance from their thoughts, and to observe them at the meta-level, hence avoid engaging in repetitive thinking. Therefore, detached mindfulness could directly target the CAS and alter emotion. These suggestions were supported by the results of the final study that found detached mindfulness to be more effective overall compared with thought challenging. Nevertheless, replication in a larger and clinical sample is necessary.

The present results suggest that meta-cognitive therapeutic techniques might target the CAS in a direct way and produce quicker results compared with traditional cognitive-behavioural techniques. This suggestion gained some empirical support by a case series that employed a brief form of cognitive therapy consistent with the S-REF (Wells & Papageorgiou, 2001a). This type of therapy involved exposure that challenged self-focused attention and avoidance strategies, and video feedback techniques. However, it targeted worry and rumination more indirectly and delivered more intense experiments. The authors found that people's symptoms improved in a relatively brief period. Nevertheless, to the author's knowledge, Study 6 is the first study that employed detached mindfulness in social anxiety, hence directly linking meta-cognitive change to the treatment of the disorder.

Moreover, Study 5 indicated that positive and negative meta-cognitive beliefs had an impact on anxiety reactivity during a speech. Hence, manipulating these beliefs might enhance the effectiveness of brief exposure tasks. In particular, the study suggested that the completion of the speech might have disconfirmed beliefs that worry is uncontrollable and can interfere with performance. Participation in the task might have challenged

anxious predictions that the speech would be disastrous. Hence, exposure could benefit from a focus on disconfirming uncontrollability beliefs about worry as well as anxious predictions.

Uncontrollability beliefs were associated with increased anxiety before the speech. Therefore, challenging these beliefs before exposure could motivate participants to engage in challenging tasks. Positive beliefs interacted with distraction to maintain anxiety after the challenge was finished. This could be illustrative of the consequences of thought suppression when positive beliefs are strengthened and activated. Therefore, challenging these beliefs could enable participants to review the importance of worry and weaken the urge to engage in it when facing a social challenge.

Study 4 found an interaction effect of meta-cognitive beliefs and social anxiety on attentional bias for positive evaluative words in 500msec. Moreover, meta-cognitive beliefs were associated with attentional bias in high and low socially anxious individuals. It follows, that meta- cognitive interventions, such as attentional training (Wells, 1990; Wells, 2009), could be useful in the treatment of social phobia. Wells et al. (1997) have offered preliminary support for this assertion. However, another study found that attentional training did not add value to the treatment of social phobia when compared with relaxation (McEvoy & Perini, 2008). Nevertheless, this could have been due to a methodological flaw in the latter study. These authors combined attention training with CBT that already incorporated exposure plus external attention. Thus, it is unlikely that there would be greater benefit offered. Hence, further research is necessary to explore the effectiveness of attentional training in social phobia.

Other studies have applied a different form of attention training by utilising the dot-probe task to coach participants to attend to positive or neutral stimuli. For example, Li et al. (Li, Tan, Qian, & Liu, 2008) found that a week's attention training to enhance focusing on happy faces was associated with increased attention towards these faces, as well as with decreased self-reported social anxiety compared with the control group that received no such training. Moreover, a randomised controlled trial compared a dot-probe task designed to direct attention away from threatening and towards neutral faces with a task that did not manipulate attention (Amir et al., 2009). The authors found that this form of attention training was associated with greater improvements in social anxiety at post-treatment and at a 4-month follow-up compared with the control group. Schmidt et al. (2009) found similar results.

Finally, Krebs et al. (2010) employed two dot-probe tasks that prompted attention to threatening or neutral words. Half the sample received explicit instructions for the task and half minimal. The sample consisted of non-clinical participants with no excessive worry. After the task, participants engaged in an instructed worry period followed by assessment of negative intrusions. The results showed that explicit instructions were associated with increased negative intrusions over the worry period in the condition that prompted to attend to threat. With minimal instructions, negative intrusions were greater during the worry period compared with before regardless of whether the dot-probe task prompted for threatening or neutral words. Therefore, it could be that minimal instructions combined with biased attention towards threat were associated with the intrusive and persistent nature of worry. This would be in line with the S-REF that implicates worry and attentional bias in the CAS. Following Study 4, it could be that meta-cognitive beliefs about worry and attention could influence attentional bias as well as its interaction with worry. Further research is necessary to explore this assumption.

In summary, verbal reattribution techniques could challenge positive and negative beliefs about the cognitive mechanisms implicated in social anxiety disorder. Alteration of these beliefs might have a direct effect on social anxiety, as well as an indirect effect by influencing anticipatory processing, the observer perspective, and the post-mortem. Detached mindfulness could enable socially anxious individuals to develop a healthy and detached relationship with their thoughts, as opposed to engaging in worry and rumination. Such interruption of the CAS should decrease state anxiety in social situations and social anxiety in general. Moreover, challenging meta-cognitive beliefs could enhance the effectiveness of exposure and of behavioural experiments. Finally, manipulating meta-cognitive beliefs could enhance the effectiveness of attention training techniques by influencing attention, worry, and the relationship between these two mechanisms.

8.5. Limitations

Each study's limitations have been discussed in the respective chapters. Nevertheless, this section summarises general limitations, thus pointing to future directions for the research in social phobia.

The present PhD employed analogue populations that mainly consisted of University students and staff. The criteria used for the high and low social anxiety groups adhered to the suggested cut-off points for British populations (Stopa & Clark, 2001). In effect, strict criteria were adopted, according to which the scores of high socially anxious people on the Fear of Negative Evaluation scale (Watson & Friend, 1969) were 22 or above and of low socially anxious people were 7 or below. These strict criteria (instead of more flexible cut-off points, such as upper and lower percentiles) increased the likelihood that the

samples were analogous to populations with and without social phobia, respectively. Therefore, replication of these studies in clinical samples should result in findings of analogous effects. Nevertheless, direct generalisation of the present findings to clinical populations cannot be inferred.

Another limitation was that the demographic variables explored were gender and age. Socio-economic status, level of education, and ethnicity were not assessed. Nevertheless, given that the samples were recruited within the University, these variables were considered stable across the studies. The majority of the sample was expected to have a similar educational level (being undergraduate students) and socio-economic status. However, assessing these variables would have allowed examination of their potential contribution to the results.

Moreover, all the studies recruited via the University's online research volunteering service. This may have influenced the questionnaires' psychometric properties compared with their respective hard copy forms. However, one study compared online and hard copy forms of commonly used measures of social phobia (Hedman et al., 2010) and found equivalent psychometric properties across the different formats. That study did not employ the scales used in the present PhD. Nevertheless, the likelihood that the form of administration might have influenced the reliability of the questionnaires in this PhD is considered low. Moreover, the reliability of most scales was examined in each study.

It can be argued that the measures of anticipatory processing (ASBQ; Hinrichsen & Clark, 2003), the observer perspective (Wells et al., 1998), and the post-mortem (PEPQ; Rachman et al., 2000) might not have been as reliable as established measures of worry (e.g., the Penn State Worry Questionnaire; Meyer et al., 1990), rumination (e.g., the Response Styles Questionnaire; Nolen-Hoeksema, 1991), and self-focused attention (e.g., the Focus of Attention Questionnaire; Woody et al., 1997). The measures chosen were preferred because of their direct relevance to the Clark and Wells (1995) model of social phobia; that is they targeted specific processes in social phobia: anticipatory processing, the observer perspective, and the post-mortem. The psychometric properties of the ASBQ and PEPQ were explored in study 1 (principle components analyses and reliability tests) and in subsequent studies (reliability tests) showing good structure and internal consistency. Nevertheless, the use of these measures might have influenced the statistical power of the studies.

Furthermore, Studies 3 and 4 employed multiple testing that is susceptible to familywise error. In some cases, this was addressed by employing statistical methods that require one test instead of several. For example, when appropriate, multiple mediation analysis was employed (Preacher & Hayes, 2008) instead of the three regression analyses

suggested by Baron and Kenny (1986). Tabachnick and Fidell (2007) suggest that this is a useful way of reducing familywise error. Nevertheless, it would have been useful to use more stringent α levels for each test. Moreover, larger sample sizes might have improved the statistical power of the studies that were verging on being underpowered.

8.6. Future directions

8.6.1. On the generalisation of the results in clinical samples

As discussed above, to examine the generalisability of the present results in people with social anxiety disorder, future research should focus on replicating the current studies in clinical populations. It is expected that the findings would yield analogous results, with exaggerated patterns and relationships between meta-cognitive beliefs and the CAS in people with social phobia compared with non-anxious controls.

8.6.2. On the causal and maintaining factors of social anxiety disorder

As discussed in the introduction, several personality traits, such as introversion and neuroticism, as well as parental characteristics (e.g., psychopathology), and environmental factors (e.g., familial emotional warmth) have been implicated in the aetiology of social phobia. The S-REF is a dynamic model that accounts for the maintenance of social anxiety once it is established. However, an interesting area of research would be to explore whether individual meta-cognitive beliefs have an impact on personality traits. Furthermore, it could be interesting to investigate whether parental meta-cognitive knowledge might influence children's meta-cognitive beliefs and the development of behavioural inhibition and neuroticism in high socially anxious children.

Moreover, traditional cognitive models of anxiety disorders (e.g., Beck et al., 1985) propose that psychopathological symptoms are maintained by the activation of maladaptive schemas that are stored in long term memory. The final study of the present PhD indirectly suggested that meta-cognitive knowledge regulates and maintains the disorder, whereas schemas could be the consequences of prolonged engagement in the CAS (Figure 7.1). This would be in line with the "hard" meta-cognitive approach discussed by Wells (2009) as follows: "Perhaps the thing that truly makes thoughts tangible and realistic is their intrusive quality and the mode in which they are experienced rather than any "belief" in them. Changing the intrusiveness of thoughts and the mode in which they are experienced (object vs. metacognitive) may well modify their realism" (Wells, 2009, pp. 257). Therefore, it could be important to establish the direction of the relationships between meta-cognitive knowledge, core-beliefs, the CAS, and social anxiety.

8.6.3. On the role of other elements of meta-cognition in social anxiety

So far, great emphasis has been given on the study of meta-cognitive beliefs. Study 5 suggests that positive meta-cognitive beliefs could be related to a meta-cognitive experience that dictates the need to use anticipatory processing when one is distracted. It may be possible to detect persistence in processing using neuropsychological methods as well as new self-report instruments that target such experiences.

Neuropsychological methods could also enable the investigation of whether detached mindfulness could activate different brain areas (e.g., the pre-frontal cortex and limbic system domains) from those activated in thought challenging. Such research could help clarify the pathways that each technique follows in cognitive and emotional change, and could perhaps broaden our understanding of the brain structures implicated in meta-cognitive activity.

8.6.4. On the application of meta-cognitive therapy in social anxiety disorder

The present PhD suggests that detached mindfulness could be an effective technique in the treatment of social anxiety. Further research could investigate the efficiency of this technique in a sample of people with social anxiety disorder with and without depression. Furthermore, a longitudinal design could explore potential long-term effects and the amount of time and practice required for obtaining effects.

8.7. Conclusion

In conclusion, the present PhD explored the role of meta-cognitive beliefs in social anxiety. Analogue populations were used with the aim to provide preliminary data that could be further replicated and generalised in clinical populations. The findings offered support for the application of the S-REF model in social anxiety. Several meta-cognitive beliefs had predictive value in social anxiety measured with various questionnaires. Furthermore, meta-cognitive beliefs influenced state anxiety in high socially anxious individuals that engaged in anticipatory processing or distraction before the delivery of a speech. Meta-cognitive beliefs predicted attentional bias and interacted with social anxiety in influencing attentional bias for emotionally valenced words. Finally, a meta-cognitive intervention, namely detached mindfulness, was compared with a broadly used thought challenging technique and was more effective in reducing worry, negative beliefs, and the observer perspective, in high socially anxious individuals. This body of evidence supports the notion that meta-cognitions play an important role in the maintenance of social anxiety, and should therefore be considered in the assessment and treatment of social anxiety disorder.

Appendix 1.1
Approvals obtained by the School of Psychological Sciences Research Ethics
Committee

| | Studies 1 and 2 | Study 3 |
|---------------------|--|--|
| Date: | 19-11-2007 | 29-09-2008 |
| Code: | 36/07P | 214/07P |
| Title: | Investigation of the presence and nature of metacognitive beliefs in social anxiety: a preliminary study | Psychometric Properties and Correlates of Two New Measures of Metacognitions in Social Anxiety |
| Methodology: | Questionnaire and interviews | Questionnaires |
| Comments: | 1. No changes necessary | 1. Amendments received and noted |
| Decision: | Approved | Approved |
| | Study 4 | Study 5 |
| Date: | 02-03-2009 | 19-01-2009 |
| Code: | 375/07P | 340/07P |
| Title: | An investigation of the relationship between meta-cognitive beliefs and attentional bias in social anxiety | The maintaining role of meta-cognitive beliefs on anxiety, on anticipatory processing and on focusing on a self-image in high socially anxious individuals |
| Methodology: | Questionnaires and testing | Questionnaires and testing |
| Comments: | 1. Amendments received and noted | 1. Amendments received and noted |
| Decision: | Approved. | Approved |
| | Study 6 | |
| Date: | 18-08-2009 | |
| Code: | 447/07P | |
| Title: | Effects of detached mindfulness on social anxiety, worry, and self-focused attention | |
| Methodology: | Questionnaires and testing | |
| Comments: | 1. Amendments received and noted | |
| Decision | Approved | |

Appendix 2.1

Self-Image Perspective Scale

This questionnaire asks you about the impression that you had in the social situation you have just experienced; Please, read the three items below and circle the number that best indicates the type of impression you had;

1. I've had an impression of how I was presenting myself

| | | | | |
|-------|--------|-----------|-------|--------|
| 1 | 2 | 3 | 4 | 5 |
| Never | Rarely | Sometimes | Often | Always |

2. To what extent was your impression one of looking out and observing what is going on around you, or to what extent was your impression one of observing yourself; that is looking at yourself as if from someone else's point of view? Circle a number below to indicate your perspective.

| | | | | | | |
|--|----|----|------------------|------------------------------|----|----|
| | | | | | | |
| -3 | -2 | -1 | 0 | +1 | +2 | +3 |
| Entirely looking out at the situation | | | Equal amounts | Entirely observing myself | | |

3. To what extent was your impression an "inner-image" (i.e. internal picture) of yourself?

| | | | |
|------------|----------|---------------|--------------|
| 1 | 2 | 3 | 4 |
| Not at all | Somewhat | Moderately so | Very much so |

Interview questions based on metacognitive profiling (Wells, 2002; Wells & Matthews, 1994)

FNE:

- When you are aware that you will need to enter a social situation what usually goes through your mind?
- Do you ever worry about entering social situations beforehand? If yes, how often (say out of 10 social situations)?
- How long does your worry last?
- Can you think of any advantages of worrying before entering a social situation?
- Can you think of any disadvantages?
- Can anything bad happen as a result of thinking this way?
- When you are thinking this way, what are you paying most attention to (e.g. thoughts, memories, bodily sensations, feelings)?
- How controllable do you think your anticipatory worry is?
0 _____ 10
Completely uncontrollable completely controllable
- How do you think you can control it?
- What percentage of time do you usually spend trying to control it?
- Do you have any particular goal when you are doing this?
- How do you know when to stop engaging in this?

Focusing on the inner image:

- When you are aware that you are in a social situation, do you tend to focus more on an inner image of yourself, others or the situation?
- Do you ever tend to focus on a self-image as if you were seeing yourself from the eyes of another person? Could you describe it?
- If yes, how often (say out of 10 social situations)?
- How long does it usually last?
- Can you think of any advantages of focusing on your self-image while in a social situation?
- Can you think of any disadvantages?
- Can anything bad happen as a result of thinking this way?
- When you are focusing on your inner image while in a social situation, what are you paying most attention to (e.g. thoughts, memories, bodily sensations, feelings)?
- How controllable do you think your tendency to focus on your inner image is?

0 _____ 10
Completely uncontrollable completely controllable

- How do you think you can control it?
- What percentage of time do you usually spend trying to control it?
- Do you have any particular goal when you are doing this?
- How do you know when to stop engaging in this?

Post-Mortem:

- After the social situation has finished, do you tend to think about it?
- Is that in the form of replaying the situation in your mind? What usually goes through your mind?
- If yes, how often (out of 10 social situations):
- Can you think of any advantages of replaying the social situation in your mind after it has finished?
- Can you think of any disadvantages?
- Can anything bad happen as a result of thinking this way?
- When you are thinking this way, what are you paying most attention to (e.g. thoughts, memories, bodily sensations, feelings)?
- How controllable do you think this type of thinking is?

0 _____ 10

Completely uncontrollable completely controllable

- How do you think you can control it?
- What percentage of time do you usually spend trying to control it?
- Do you have any particular goal when you are doing this?
- How do you know when to stop engaging in this?

Appendix 3.2
The rating sheets
Anticipatory Processing

| | |
|---|--|
| How often do you engage in AP (out of 10 social situations, e.g., 2/10) | |
| How long does it last (in minutes) | |
| Uncontrollability (0=completely uncontrollable, 10=completely controllable) | |
| Uncontrollability categorical (0= completely uncontrollable, 1= quite uncontrollable, 2= a bit uncontrollable, 3=a bit controllable, 4= quite controllable, 5= completely controllable) | |
| Percentage of time spent to control it | |

0= absence, 1= presence

| | |
|---|--|
| Positive belief: it helps prepare for the task (task-focused) | |
| Positive belief: it helps give a desired impression (others-focused) | |
| Positive belief: it helps to become self-aware (self-focused) | |
| Negative belief: it results in negative physical symptoms (stress, headaches, insomnia) | |
| Negative belief: it causes negative feelings (depression, anxiety) | |
| Negative belief: it influences performance in a negative way | |
| Negative belief: It distracts from more important things | |
| Negative belief: it contaminates the situation | |
| Negative belief: it makes you want to avoid the situation | |
| It can be controlled by rationalization | |
| It can be controlled by speaking to somebody | |
| It can be controlled by keeping busy | |
| It can be controlled by thinking something else | |
| It can be controlled by postponing worry for later | |
| It can be controlled by relaxing | |
| It can be controlled by avoiding the situation or preparing escape routes | |
| It can be controlled by finding the solution | |
| It can be controlled by acknowledging it | |
| Stop signal: when it lasts long | |
| Stop signal: when it makes me feel bad | |
| Stop signal: when the worries are disconfirmed | |
| Stop signal: when it makes me want to avoid | |
| Stop signal: when it distracts me from other things | |
| Stop signal: when others notice there's something wrong with me | |
| Stop signal: when a solution is found | |

Focusing on an inner image from an observer perspective (OP)

| | |
|---|--|
| How often do you engage in OP (out of 10 social situations, e.g., 2/10) | |
| How long does it last (in minutes) | |
| Uncontrollability (0=completely uncontrollable, 10=completely controllable) | |
| Uncontrollability categorical (0= completely uncontrollable, 1= quite uncontrollable, 2= a bit uncontrollable, 3=a bit controllable, 4= quite controllable, 5= completely controllable) | |
| Percentage of time spent to control it | |
| 0= absence, 1= presence | |
| Positive belief: it helps control behaviour | |
| Positive belief: it helps control the impression someone gives | |
| Negative belief: it makes me behave in a different way than I normally would, therefore contaminating the situation | |
| Negative belief: it makes me feel bad about myself, self-doubt and have low self-esteem, it makes me think of myself from a negative light (negative self-bias) | |
| Negative belief: it causes negative feelings (e.g. anxiety) and negative physical sensations | |
| Negative belief: It makes me want to escape or avoid | |
| It can be controlled by rationalization | |
| It can be controlled by focusing on the here and now (the moment, the situation) | |
| It can be controlled by avoiding thinking about it | |
| It can be controlled by acknowledging it | |
| It can be controlled by trusting others' opinions | |
| It can be controlled because I am confident | |
| Stop signal: when it lasts too long | |
| Stop signal: when it's disconfirmed | |
| Stop signal: when distracted | |
| Stop signal: when I've rationalized my image | |
| Stop signal: when preoccupied | |
| Stop signal: when having negative physical symptoms and feelings | |
| Stop signal: when others notice there's something wrong | |
| Stop signal: when acknowledging it happens | |

Post-Mortem Processing (PM)

| | |
|---|--|
| How often do you engage in PM (out of 10 social situations, e.g., 2/10) | |
| How long does it last (in minutes) | |
| Uncontrollability (0=completely uncontrollable, 10=completely controllable) | |
| Uncontrollability categorical (0= completely uncontrollable, 1= quite uncontrollable, 2= a bit uncontrollable, 3=a bit controllable, 4= quite controllable, 5= completely controllable) | |
| Percentage of time spent to control it | |
| 0= absence, 1= presence | |
| Positive belief: to learn and improve | |
| Positive belief: replaying positive experiences helps me cheer up | |
| Positive belief: to reflect on past experiences | |
| Negative belief: it makes me want to avoid future situations | |
| Negative belief: it causes negative physical symptoms (e.g. stress, headaches, insomnia) | |
| Negative belief: it causes negative feelings (e.g. sadness, anxiety) | |
| Negative belief: it distracts from other things one should be doing/thinking | |
| Negative belief: it is unnecessary, waste of time and energy | |
| Negative belief: it predisposes negatively towards future situations | |
| It can be controlled by speaking to somebody about it | |
| It can be controlled by rationalising | |
| It can be controlled by distraction (thinking or doing something else) | |
| It can be controlled by avoidance | |
| It can be controlled by self-suggestion (e.g. telling myself to STOP) | |
| Stop signal: when it distracts from other things | |
| Stop signal: when I have negative physical symptoms and feelings | |
| Stop signal: when a solution is found | |
| Stop signal: when others remind me to stop | |
| Stop signal: when I acknowledge it | |

Appendix 3.3

Instructions to the rater

Definitions:

- The 'cognitive processes' here are: anticipatory processing, focusing on an inner image from an observer perspective, and post-mortem processing
- Anticipatory Processing: Worrying about a forthcoming social situation
- Focusing on an inner image from an observer perspective: having a self-image or a self-impression when in a social situation (focusing on the self and more specifically, focusing on a self-image that can be clear or vague and that gives you the impression that it reflects how other people see you)
- Post-mortem Processing: Dwelling on a past social situation
- Positive beliefs about the above cognitive processes: These beliefs are further divided into subcategories, such as positive beliefs about being self-aware, positive beliefs about controlling your impression etc.
- Negative beliefs about the above cognitive processes: These beliefs are also divided into further subcategories, and include beliefs about the dangerousness and uncontrollability of anticipatory processing, focusing on the inner image, and the post-mortem. For example, 'It drives me crazy'; 'I cannot control it'. Other categories include negative feelings and physical sensations, etc. Here, you will need to distinguish between controllability beliefs and other negative beliefs. There are the controllability beliefs ('how controllable do you think it is'), and the 'control it by' beliefs (how do you think you can control it'). These form distinctive categories.

About the categories

- You will read some beliefs about the above cognitive processes. For each belief you recognize, tick the box with the category you believe it belongs to.
- The category 'contamination of the social situation' includes statements that refer to the impact of the cognitive mechanisms on the situation itself, either directly (e.g., 'it will make the situation harder'), or indirectly (e.g., 'it will make you act strange and others will think you are awkward, so you will not enjoy yourself')
- You can put the same belief in both performance and contamination of the situation if you think it's necessary
- When you read 'control it by', go to controllability/ coping strategies beliefs.
- When you read 'stop signals' go to stop signals beliefs
- When you read 'the goal for controlling ... is' and 'the goal for engaging in ... is', you can put these statements in the positive and negative categories of beliefs if you wish to do so, nevertheless, the statements under 'control it by' and 'stop signals' can only go to the respective categories and not to the categories of

positive and negative beliefs. Sometimes though they mention stop signals at the controllability beliefs and vice versa; feel free to put them to the categories you think suit them better but not at the categories of positive and negative beliefs.

- More than one belief can be expressed in one sentence (because I tried to transcribe what the participants said verbatim)
- Controllability was initially an open question and later on became closed (0 to 10 scale); use the appropriate scale accordingly or leave blank
- Self-focus: when self-aware, self-conscious, when preoccupied by what I say
- Other-focused: when focusing on others, when others are mentioned (e.g., 'it will help me make a good impression to others', 'it will help me not offend others')
- Task-focused: when mentioning specific tasks, or implying specific tasks, e.g., 'it will help me do well at my interview, presentation, etc'
- The categories of emotions/ feelings and physical sensations. When you see two categories, one for each, then put stress as physical and anxiety as a feeling. At other times, emotions and physical sensations are in one category.
- Physical sensations include shakiness, heart rate changes, insomnia, being sick, headaches etc.
- Whenever you have two numbers (e.g., '10 to 15 minutes'), please calculate the mean,
- Whenever they say 'throughout the whole situation' or 'from the time I am aware of it until the situation has finished' or anything that means from the beginning to the end (throughout), code it as 666.
- The category 'rationalisation' included statements that actually mention 'rationalising' (e.g., 'I reason with myself') but also descriptions of rationalising (e.g., 'I try to explain to myself that it doesn't matter what other people say', 'I remind to myself that it's just thoughts and not an actual fact' etc). However, distinguish from reassurance when necessary.

Appendix 3.4

Percentage of agreement and Cohen's kappa statistics for each category of meta-cognitive beliefs

AP = anticipatory processing,

OP = observer perspective self image,

PM = post-mortem processing,

*** Significant difference between high and low FNE groups**

| Category | Percent agreement | Cohen's kappa |
|---|-------------------|-----------------------|
| AP positive beliefs about improving task performance | 76.2% | 0.47 (moderate) |
| AP positive beliefs about improving the given impression | 85.7% | 0.61 (substantial) |
| * AP positive beliefs about being self-aware | 78.6% | 0.40 (moderate) |
| AP negative beliefs about physical symptoms | 85.7% | 0.69 (substantial) |
| AP negative beliefs about feelings | 73.8% | 0.48 (moderate) |
| AP negative beliefs about performance | 64.3% | 0.19 (slight) |
| AP negative beliefs about being distracted | 90.5% | 0.61 (substantial) |
| AP negative beliefs about contamination of the social situation | 57.1% | 0.23 (fair) |
| AP negative beliefs about avoidance | 90.5% | 0.69 (substantial) |
| AP can be controlled by rationalisation | 83.3% | 0.64 (substantial) |
| AP can be controlled by speaking to someone | 90.5% | 0.76 (substantial) |
| AP can be controlled by keeping busy | 88.1% | 0.74 (substantial) |
| * AP can be controlled by distraction | 81% | 0.58 (moderate) |
| AP can be controlled by postponing worry for later | 100% | 1 (perfect) |
| AP can be controlled by relaxation | 97.6% | 0.84 (almost perfect) |
| AP can be controlled by avoiding | 100% | 1 (perfect) |
| AP can be controlled by acknowledging it | 78.6% | 0.09 (slight) |
| AP stop signal: Its duration | 90.5% | 0.69 (moderate) |
| AP stop signal: physical sensations | 90.5% | 0.81 (almost perfect) |
| * AP stop signal: when fears are disconfirmed | 83.3% | 0.44 (moderate) |
| AP stop signal: when wanting to avoid | 95.2% | 0.48 (moderate) |
| AP stop signal: when distracted | 88.1% | 0.60 (moderate) |
| AP stop signal: when others notice | 90.5% | 0.56 (moderate) |
| AP stop signal: when a solution is found | 95.2% | 0.64 (substantial) |

| | | |
|--|-------|-----------------------|
| OP positive beliefs about controlling behaviour | 69% | 0.40 (moderate) |
| OP positive beliefs about controlling impression | 81% | 0.58 (moderate) |
| OP negative beliefs about contaminating the social situation | 76.2% | 0.48 (moderate) |
| OP negative beliefs about increasing self-bias | 71.4% | 0.43 (moderate) |
| OP negative beliefs about physical sensations and feelings | 73.8% | 0.46 (moderate) |
| OP negative beliefs about avoidance | 97.6% | 0.79 (substantial) |
| OP can be controlled by rationalisation | 64.3% | 0.21 (slight) |
| OP can be controlled by focusing on the situation | 78.6% | 0.58 (moderate) |
| OP can be controlled by distraction | 92.9% | 0.78 (substantial) |
| OP can be controlled by acknowledging it | 81% | 0.11 (slight) |
| OP can be controlled by others | 97.6% | 0.88 (almost perfect) |
| OP can be controlled by being confident | 97.6% | 0.66 (substantial) |
| * OP stop signal: when the image is disconfirmed | 90.5% | 0.75 (substantial) |
| OP stop signal: when distracted | 88.1% | 0.64 (substantial) |
| OP stop signal: when the image is rationalised | 90.5% | 0.29 (fair) |
| OP stop signal: when too preoccupied | 81% | 0.38 (fair) |
| OP stop signal: physical sensations | 90.5% | 0.75 (substantial) |
| OP stop signal: when others notice there's something wrong | 95.2% | 0.88 (almost perfect) |
| OP stop signal: when acknowledged | 92.9% | 0.73 (substantial) |
| PM positive beliefs about learning from past mistakes and improving for the future | 97.6% | 0.93 (almost perfect) |
| PM positive beliefs about recalling positive memories that cheer you up | 81% | 0.51 (moderate) |
| PM positive beliefs about reflecting back on one's experiences | 76.2% | 0.42 (moderate) |
| * PM negative beliefs about avoidance | 95.2% | 0.85 (almost perfect) |
| PM negative beliefs about physical sensations | 88.1% | 0.66 (substantial) |
| PM negative beliefs about feelings | 81% | 0.6 (moderate) |
| * PM negative beliefs about being distracted | 92.9% | 0.8 (substantial) |
| PM negative beliefs about it being unnecessary | 78.6% | 0.52 (moderate) |
| PM negative beliefs about it influencing future situations | 78.6% | 0.39 (fair) |
| * PM can be controlled by speaking to someone | 100% | 1 (perfect) |
| PM can be controlled by rationalisation | 76.2% | 0.54 (moderate) |

| | | |
|--|-------|-----------------------|
| PM can be controlled by distraction | 78.6% | 0.57 (moderate) |
| PM can be controlled by avoiding social situations | 90.5% | 0.05 (slight) |
| PM can be controlled by self-suggestion | 95.2% | 0.84 (almost perfect) |
| PM stop signal: its duration | 90.5% | 0.78 (substantial) |
| PM stop signal: distraction | 92.9% | 0.84 (almost perfect) |
| PM stop signal: physical sensations | 83.3% | 0.64 (substantial) |
| PM stop signal: when a solution is found | 81% | 0.32 (fair) |
| PM stop signal: when others notice | 90.5% | 0.46 (moderate) |
| PM stop signal: when acknowledged | 92.9% | 0.54 (moderate) |

Appendix 3.5

Categories of meta-cognitive beliefs and examples of the respective beliefs

| Category | Example |
|--|--|
| Anticipatory processing | |
| Positive beliefs: Preparation | "It is important in the sense that you are better prepared", "it helps you plan" |
| Positive beliefs: It helps give a desired impression | "It can make me ... make an impression on others as considerate", "it helps to be more careful of how you may come across and be friendly" |
| Positive beliefs: It helps to become self-aware | "It helps me be more self-aware", "It may make me slightly more self-aware... so that perhaps I am more aware of what I am doing..." |
| Negative beliefs: Negative physical symptoms (stress, headaches, insomnia) | "You feel tensed", "I suppose it could be bad for your health in a biological sense, it could be... or high cholesterol" |
| Negative beliefs: Negative feelings (depression, anxiety) | "It makes me anxious..." "Very depressed, it eats you up" |
| Negative beliefs: Distraction | "It's a distraction", "It distracts me from other things... not concentrate on other things" |
| Negative beliefs: Contamination of the situation | "... because of the worry I come across badly, as not very nice or not interesting", "...you are not friendly because you are so anxious... other people won't want to meet you" |
| Negative beliefs: Urge to avoid | "You might convince yourself not to go to the social situation...", "...not going out. It stops you from doing things" |
| It can be controlled by rationalization | "By questioning what your concerns are or worries and reason with them", "By rational thinking..." |
| It can be controlled by speaking to somebody | "Speak to my mother if it gets really bad", "Ask for help from friends, parents, and useful consultant" |
| It can be controlled by keeping busy | By being busy so that there is no time to worry", "Do something, like phone somebody" |

| | |
|---|--|
| It can be controlled by thinking something else | "I just think of something else", "Think about something else" |
| It can be controlled by postponing worry for later | "Maybe postpone it for later", "By putting it aside and think of it later..." |
| It can be controlled by relaxing | "By herbal relaxants...", "Relaxation techniques" |
| It can be controlled by avoiding the situation or preparing escape routes | "By avoiding situations that make you worry" |
| It can be controlled by acknowledging it | "By acknowledging it", "The moment I acknowledge it... it kind of becomes feeble" |
| Stop signal: Its duration | "When too much time is spent", "When you have realised that you have spent more time on it than you need to" |
| Stop signal: Negative feelings | "When you start feeling a bit anxious", "When I feel horrible about it" |
| Stop signal: Disconfirmation of worries | "When adjusted, accepted, reassured, allowed to be there", |
| Stop signal: Urge to avoid | "When I start to consider not to participate in a situation", "If I was that worried that I wouldn't go into that situation" |
| Stop signal: Distraction | "When distracted", "If I am not doing the things I have to do" |
| Stop signal: When other notice there's something wrong | "When others start looking strange at me", "When others mention I look preoccupied" |
| Stop signal: When a solution is found | "When I know, when I feel confident that I can achieve that", "When I have found the solution" |

| The observer perspective self-image | |
|--|---|
| Positive beliefs: Controlling behaviours | "It helps me control what I am doing", "It could help you control your behaviour" |
| Positive beliefs: Impression management | "It helps me control other people's opinions of me", "...and the good thing is like you create a good impression in people..." |
| Negative beliefs: Contamination of the situations | "You might get distracted from the conversation", "I may appear thick, not natural" |
| Negative beliefs: Negative self-bias | "It makes me feel very ugly, like an abnormality", "You are always doubting yourself" |
| Negative beliefs: Negative feelings (e.g. anxiety) | "It makes me feel anxious for something unimportant", "I get more anxious..." |
| Negative beliefs: Urge to escape or avoid | "It can make you want to get out of the situation", "It can make you avoid being in a particular situation" |
| It can be controlled by focusing on the here and now (the moment, the situation) | "By focusing on the conversation and the reality..." by re-concentrating on what I am doing, on the actual situation" |
| It can be controlled by avoiding thinking about it | "By thinking about other things", "By changing the subject in my mind" |
| Stop signal: Disconfirmation of the image | "When other people are OK towards me, because that's the only reason I do it", "When the situation develops to appoint that I realise that my concerns are unnecessary" |
| Stop signal: Distraction | "When you are distracted from the conversation", "...lose track, forget what they are saying or what's going on" |
| Stop signal: Negative physical symptoms and feelings | "When you feel worked up", "When I feel bad" |
| Stop signal: When others notice there's something wrong | "If other people become aware of it, if they are asking you if you are alright", "Feedback from others" |
| Stop signal: Acknowledgment | "As soon as it starts, I try to stop it", "The beginning is the main signal" |

| The post-mortem | |
|---|--|
| Positive beliefs: Positive mood | "Maybe I replay in my mind parts of the conversation or the social event or part of it where everybody was having fun or they did something that was funny so I cheer up a bit", "It helps you feel better, and be happy if you think of positive experiences" |
| Positive beliefs: Reflection | "to reflect on things you shouldn't have done and how you can change in the future and what you would like to keep doing or how you would like to be perceived" |
| Negative beliefs: Urge to avoid future situations | "It makes you avoid future situations...", "And you might not want to go out again..." |
| Negative beliefs: Negative physical symptoms (e.g. stress, headaches, insomnia) | "...you will have a headache; you might end up catching a cold because you cry too much...", "It could have an effect on your physical health as well...have a headache or feel sick" |
| Negative beliefs: Negative feelings (e.g. sadness, anxiety) | "It makes me have low mood", "You get down, or depressed, or angry at yourself" |
| Negative beliefs: Distraction | "It's distracting and it makes you lose concentration...", "It distracts me from what I should do" |
| Negative beliefs: It is unnecessary | "...so sometimes there is no use about thinking of it any more", "It's a waste of time" |
| Negative beliefs: It predisposes one negatively towards future situations | "...I fight with other people in future situations", "perhaps you get nervous next time" |
| It can be controlled by speaking to somebody about it | "Try to talk with other people", "Talk about it to close friends..." |
| It can be controlled by rationalising | "It all lies in your ability to reason..." |
| It can be controlled by distraction | "The solution is going on, do something else...", "Directing thoughts to something else" |
| It can be controlled by self-suggestion | "I say 'OK, stop it', I should not think about these things", "I tell myself to stop" |
| Stop signal: Duration | "If it takes too much time...", "The amount of time" |

| | |
|--|--|
| Stop signal: Distraction | "When it stops me from something", "If I am talking to my kinds or something and they are telling me something and I've missed what they're saying then I know, I say to myself to stop focusing on memories..." |
| Stop signal: Negative physical symptoms and feelings | "If I started feeling unwell thinking about it", "If it's affecting my mood... depressed, distracted, self-loathing...", "The headaches, anxiety, and agitation" |
| Stop signal: When a solution is found | "When things are sorted in my mind and I know what to do next", "When I've found the solution about the situation and I know what I should do" |
| Stop signal: Other people's interference | "If my parents indicate to me that I didn't appear to the internet chat for a week...", |
| Stop signal: Acknowledgment | "When I know I'm doing it" |

Appendix 3.6

Metacognitions of Anticipatory Processing Scale: Items and subscales

| Subscales | Items |
|---------------------------------------|--|
| Self-focus meta-cognitive beliefs | <p>Makes me aware of how I come across</p> <p>Helps me visualize how to present myself</p> <p>Is useful in working out how other people see me</p> <p>Helps me be more aware of myself</p> <p>Helps me be more aware of my actions</p> <p>Makes me more aware of what I might say</p> |
| Other-focus meta-cognitive beliefs | <p>Makes me sensitive to other people's needs</p> <p>Makes me sensitive to other people's feelings</p> <p>Helps me ensure I do not upset other people</p> <p>Helps me understand other people's expectations</p> <p>Enables me to know what other people want of me</p> <p>Prepares me to behave in a friendly manner so that people will like me</p> |
| Task-focus meta-cognitive beliefs | <p>Makes sure that I can behave appropriately</p> <p>Helps me plan what I can talk about</p> <p>Helps me consider the situation carefully so that I can create a good impression</p> <p>Keeps me more alert and focused on the tasks I need to do</p> <p>Helps me understand what is expected of me</p> <p>Sharpens my mind so that I can perform better</p> |
| Beliefs about avoidance | <p>Stops me from saying or doing something stupid</p> <p>Helps me plan the situation so that I don't get nervous</p> <p>Makes me sensitive to other people's feelings</p> <p>Helps me avoid embarrassment</p> <p>Helps me avoid making any mistakes</p> <p>Allows me to avoid situations I find difficult</p> |
| Negative beliefs | <p>Prevents me from enjoying social situations</p> <p>Stops me from seeing situations clearly</p> <p>Could be harmful for my wellbeing</p> <p>Is something I have no control over</p> <p>Makes me forget important things</p> <p>Is uncontrollable until I discover the situation goes well</p> <p>Does not respond to anything I can do to stop it</p> |

Appendix 3.7

Metacognitions of Focusing on a Self-Image Scale: items and subscales

| Subscales | Items |
|---------------------------------|--|
| Positive meta-cognitive beliefs | <p>Is a way of ensuring that people have a certain impression of me</p> <p>Helps me stay in control of what people think of me</p> <p>Makes me more aware of how other people view me</p> <p>Helps me present the person I want to be</p> <p>Helps me form an impression of other people's opinions of me</p> <p>Helps me see how other people see me</p> <p>Helps me understand the impression that other people have of me</p> <p>Helps me communicate my strengths</p> <p>Helps me be more acceptable to the people around me</p> <p>Prepares me for the social situation</p> <p>Helps me think about how I need to change my behaviour</p> <p>Helps me prevent making a negative impression on others</p> <p>Stops me from saying or doing something I'll regret</p> |
| Negative meta-cognitive beliefs | <p>Makes me see myself in a bad way</p> <p>Can lead people to think I'm acting strangely</p> <p>Can make me give an impression of being unfriendly</p> <p>Stops me from being myself</p> <p>Stops me from paying attention to other people</p> <p>Makes me want to leave the situation</p> <p>Can cause me to lose track of the conversation</p> <p>Stops me from acting naturally</p> |
| Uncontrollability beliefs | <p>Cannot be controlled</p> <p>Can be controlled when I'm aware of it</p> <p>Just happens spontaneously</p> <p>Enters my mind against my will</p> <p>Comes to my mind even though</p> <p>I try not to have it</p> |

Appendix 4.1
MFIS scale: structure matrix

| | Component | | |
|--|------------------|------------------|-------------------|
| | Positive beliefs | Negative beliefs | Uncontrollability |
| Makes me see myself in a bad way | .04 | .41 | -.67 |
| Is a way of ensuring that people have a certain impression of me | .66 | .22 | -.32 |
| Cannot be controlled | .23 | .36 | -.66 |
| Can be controlled when I am aware of it | .43 | .17 | .21 |
| Can make me give an impression of being unfriendly | .20 | .57 | -.25 |
| Just happens spontaneously | .35 | -.15 | -.67 |
| Stops me from being myself | .11 | .81 | -.35 |
| Stops me from paying attention to other people | .001 | .76 | -.12 |
| Enters my mind against my will | .27 | .54 | -.76 |
| Helps me stay in control of what people think of me | .69 | .16 | -.17 |
| Makes me more aware of how other people view me | .65 | .34 | -.12 |
| Helps me present the person I want to be | .70 | -.10 | -.20 |
| Helps me form an impression of other people's opinions of me | .64 | .14 | -.05 |
| Makes me want to leave the situation | .01 | .63 | -.52 |
| Helps me see how other people see me | .76 | .21 | .002 |
| Can cause me to lose track of the conversation | .23 | .77 | -.24 |
| Helps me understand the impression that other people have of me | .79 | .18 | -.05 |
| Stops me from acting naturally | .11 | .77 | -.36 |
| Helps me communicate my strengths | .64 | -.16 | -.03 |
| Comes to my mind even though I try not to have it | .22 | .50 | -.75 |
| Helps me be more acceptable to the people around me | .75 | .13 | .18 |
| Prepares me for the social situation | .73 | .14 | .25 |
| Helps me think about how I need to change my behaviour | .67 | .11 | -.41 |
| Helps me prevent making a negative impression on others | .77 | .02 | -.15 |
| Stops me from saying or doing something I'll regret | .70 | .11 | -.24 |

Appendix 4.2

The Metacognitions about Focusing on an Image of the Self scale

Think about social situations; that is to say any situation that involves you socialising or interacting with one or more other people. Below is a list of beliefs people have about focusing on their self-image while in a social situation. This self-image is a mental picture of the public self as if viewed from other people's point of view, in which you see yourself like someone else would see you. Please read each item carefully and indicate how much you generally agree with it by circling the appropriate number. Please respond to all items. There are no right or wrong answers.

Do not Agree Agree Agree
agree slightly moderately very much

Focusing on my self-image as if viewed from other people's perspective:

| | | | | |
|---|---|---|---|---|
| 1. Makes me see myself in a bad way | 1 | 2 | 3 | 4 |
| 2. Is a way of ensuring that people have a certain impression of me | 1 | 2 | 3 | 4 |
| 3. Cannot be controlled | 1 | 2 | 3 | 4 |
| 4. Can be controlled when I'm aware of it | 1 | 2 | 3 | 4 |
| 5. Can make me give an impression of being unfriendly | 1 | 2 | 3 | 4 |
| 6. Just happens spontaneously | 1 | 2 | 3 | 4 |
| 7. Stops me from being myself | 1 | 2 | 3 | 4 |
| 8. Stops me from paying attention to other people | 1 | 2 | 3 | 4 |
| 9. Enters my mind against my will | 1 | 2 | 3 | 4 |
| 10. Helps me stay in control of what people think of me | 1 | 2 | 3 | 4 |
| 11. Makes me more aware of how other people view me | 1 | 2 | 3 | 4 |
| 12. Helps me present the person I want to be | 1 | 2 | 3 | 4 |
| 14. Makes me want to leave the situation | 1 | 2 | 3 | 4 |
| 15. Helps me see how other people see me | 1 | 2 | 3 | 4 |
| 16. Can cause me to lose track of the conversation | 1 | 2 | 3 | 4 |

| Focusing on my self-image as if viewed from other people's perspective: | Do not agree | Agree slightly | Agree moderately | Agree very much |
|--|--------------|----------------|------------------|-----------------|
| 18. Stops me from acting naturally | 1 | 2 | 3 | 4 |
| 19. Helps me communicate my strengths | 1 | 2 | 3 | 4 |
| 20. Comes to my mind even though I try not to have it | 1 | 2 | 3 | 4 |
| 21. Helps me be more acceptable to the people around me | 1 | 2 | 3 | 4 |
| 22. Prepares me for the social situation | 1 | 2 | 3 | 4 |
| 23. Helps me think about how I need to change my behaviour | 1 | 2 | 3 | 4 |
| 24. Helps me prevent making a negative impression on others | 1 | 2 | 3 | 4 |
| 25. Stops me from saying or doing something I'll regret | 1 | 2 | 3 | 4 |

Appendix 4.3
MAPS structure matrix

| Items | Component | | |
|--|-----------|----------|-------------|
| | Positive | Negative | Sociability |
| Makes me aware of how I come across | .66 | .21 | -.28 |
| Prevents me from enjoying social situations | .30 | .60 | .15 |
| Helps me visualise how to present myself | .68 | .20 | .15 |
| Allows me to plan an escape route if things get difficult | .62 | .26 | -.32 |
| Makes me sensitive to other people's needs | .45 | .17 | -.69 |
| Stops me from seeing situations clearly | .22 | .73 | .09 |
| Could be harmful for my wellbeing | .20 | .74 | -.03 |
| Makes me more aware of what I might say | .75 | .11 | -.49 |
| Helps me plan what I can talk about | .72 | .11 | -.48 |
| Helps me plan the situation so that I don't get nervous | .69 | .12 | -.40 |
| Helps me consider the situation carefully so that I can create a good impression | .50 | .06 | -.18 |
| Makes me sensitive to other people's feelings | .42 | .19 | -.77 |
| Is something I have no control over | .16 | .71 | -.22 |
| Helps me be more aware of my actions | .73 | .22 | -.59 |
| Makes me forget important things | -.08 | .58 | -.18 |
| Helps me ensure I do not upset other people | .46 | .13 | -.70 |
| Helps me avoid embarrassment | .77 | .25 | -.44 |
| Prepares me to behave in a friendly manner so that people will like me | .69 | .19 | -.46 |
| Enables me to know what other people want of me | .49 | .22 | -.71 |
| Helps me understand other people's expectations | .53 | .21 | -.74 |
| Is uncontrollable until I discover the situation goes well | .30 | .74 | .14 |
| Allows me to avoid situation I find difficult | .60 | .38 | -.32 |
| Keeps me more alert and focused on tasks I need to do | .45 | .07 | -.65 |
| Does not respond to anything I can do to stop it | .19 | .69 | -.32 |
| Helps me understand what is expected of me | .55 | .20 | -.72 |

Appendix 4.4

The Metacognitions about Anticipatory Processing Scale

Think about social situations; that is to say any situation that involves you socialising or interacting with one or more other people. Listed below are a number of beliefs people have about anticipating or dwelling on a social situation before it starts. Please read each item carefully and indicate how much you generally agree with it by circling the appropriate number.

Please respond to all items. There are no right or wrong answers.

Do not Agree Agree Agree
agree slightly moderately very much

Anticipating and thinking through a social situation before it starts:

| | | | | |
|--|---|---|---|---|
| 1. Makes me aware of how I come across | 1 | 2 | 3 | 4 |
| 2. Prevents me from enjoying social situations | 1 | 2 | 3 | 4 |
| 3. Helps me visualize how to present myself | 1 | 2 | 3 | 4 |
| 4. Allows me to plan an escape route if things get difficult | 1 | 2 | 3 | 4 |
| 5. Makes me sensitive to other people's needs | 1 | 2 | 3 | 4 |
| 6. Stops me from seeing situations clearly | 1 | 2 | 3 | 4 |
| 7. Could be harmful for my wellbeing | 1 | 2 | 3 | 4 |
| 8. Makes me more aware of what I might say | 1 | 2 | 3 | 4 |
| 9. Helps me plan what I can talk about | 1 | 2 | 3 | 4 |
| 10. Helps me plan the situation so that I don't get nervous | 1 | 2 | 3 | 4 |
| 11. Helps me consider the situation carefully so that I can create a good impression | 1 | 2 | 3 | 4 |
| 12. Makes me sensitive to other people's feelings | 1 | 2 | 3 | 4 |

| Anticipating and thinking through a social situation before it starts: | Do not agree much | Agree slightly | Agree moderately | Agree very |
|---|-------------------------|-------------------|---------------------|---------------|
| 14. Helps me be more aware of my actions | 1 | 2 | 3 | 4 |
| 15. Makes me forget important things | 1 | 2 | 3 | 4 |
| 13. Is something I have no control over | 1 | 2 | 3 | 4 |
| 16. Helps me ensure I do not upset other people | 1 | 2 | 3 | 4 |
| 17. Helps me avoid embarrassment | 1 | 2 | 3 | 4 |
| 18. Prepares me to behave in a friendly manner so that people will like me | 1 | 2 | 3 | 4 |
| 19. Enables me to know what other people want of me | 1 | 2 | 3 | 4 |
| 20. Helps me understand other people's expectations | 1 | 2 | 3 | 4 |
| 21. Is uncontrollable until I discover the situation goes well | 1 | 2 | 3 | 4 |
| 22. Allows me to avoid situations I find difficult | 1 | 2 | 3 | 4 |
| 23. Keeps me more alert and focused on the tasks I need to do | 1 | 2 | 3 | 4 |
| 24. Does not respond to anything I can do to stop it | 1 | 2 | 3 | 4 |
| 25. Helps me understand what is expected of me | 1 | 2 | 3 | 4 |

Appendix 4.5

Inter-correlations between meta-cognitive beliefs and social anxiety (FNE and SIAS), self-consciousness (private and public), anticipatory processing, and the observer perspective self-image, ** $p < 0.01$, * $p < 0.05$

| | FNE | SIAS | ASBQ | OP | Private self-consciousness | Public self-consciousness |
|----------------------------------|-------|-------|-------|-------|----------------------------|---------------------------|
| SIAS | .69** | - | | | | |
| Anticipatory processing (ASBQ) | .54** | .58** | - | | | |
| The observer perspective (OP) | .35** | .31** | .35** | - | | |
| Private self-consciousness | .21** | .16* | .49** | .24** | - | |
| Public self-consciousness | .54** | .47** | .62** | .40** | .55** | - |
| MCQ positive | .17* | .24** | .42** | .14 | .24** | .28** |
| MCQ uncontrollability/danger | .44** | .44** | .59** | .28** | .41* | .48** |
| MCQ cognitive confidence | .11 | .33** | .33** | .11 | .19* | .13 |
| MCQ cognitive self-consciousness | .14 | .07 | .43** | .12 | .66** | .31** |
| MCQ need for control | .22** | .23** | .45** | .17* | .30** | .29** |
| MFIS positive | .16* | .28** | .59** | .33** | .37** | .41** |
| MFIS contamination | .35** | .54** | .47** | .28** | .31** | .37** |
| MFIS uncontrollability/self-bias | .45** | .56** | .58** | .45** | .39** | .46** |
| MAPS positive | .26** | .38** | .69** | .23** | .35** | .41** |
| MAPS uncontrollability/ harm | .39** | .52** | .52** | .24** | .30** | .37** |
| MAPS sociability | .07 | .18* | .53** | .15 | .32** | .22** |

Appendix 5.1

Word pairs and frequency of use as used in the dot-probe task

| Emotional Words | Neutral | Frequency of use |
|----------------------------------|-----------------|------------------|
| Negative evaluative words | | |
| Stupid | Module | 3206/3209 |
| mocked | Slashed | 180/180 |
| foolish | Discharge | 1030/1033 |
| failure | Latter | 7762/7762 |
| pathetic | Butterfly | 635/630 |
| inferior | Severity | 726/726 |
| ridiculous | Allocation | 1832/1831 |
| criticised | Arrivals | 370/370 |
| inadequate | Underlying | 2319/2326 |
| humiliated | standardisation | 108/105 |
| clumsy | Meter | 482/482 |
| weird | Duck | 1085/1085 |
| shy | Tap | 1072/1076 |
| worthless | Snooker | 356/356 |
| incompetent | Unoccupied | 208/208 |
| coward | Unsold | 161/161 |
| boring | Cable | 1395/1398 |
| ugly | Merger | 1365/1367 |
| weak | Drive | 3571/3579 |
| awkward | Portrait | 1431/1433 |
| Positive evaluative words | | |
| admired | Luggage | 569/569 |
| respected | Ongoing | 282/283 |
| accepted | Initial | 4361/4371 |
| capable | United | 4943/4942 |
| friendly | Plastic | 4058/4052 |
| graceful | Softer | 444/444 |
| cordial | Latency | 107/107 |
| praised | Juke | 25/23 |
| skilful | Utmost | 450/450 |
| dignified | Lottery | 358/360 |
| intelligent | Capitalism | 1895/1893 |

| | | |
|------------------------------------|--------------|-----------|
| attractive | Limited | 5152/5146 |
| elegant | Locally | 1809/1805 |
| beautiful | Officers | 8670/8655 |
| dynamic | Processor | 1501/1495 |
| brave | Grip | 1570/1571 |
| talented | Secretion | 850/850 |
| clever | Versions | 2357/2357 |
| likeable | Absentee | 144/144 |
| flawless | Zenith | 93/93 |
| Negative somatic sensations | | |
| sweating | digits | 311/311 |
| tensed | Teen | 122/122 |
| nervous | Entrance | 3079/3072 |
| shaky | Rental | 468/468 |
| breathless | Alley | 475/476 |
| nauseous | Chandelier | 80/80 |
| blushing | Tabloid | 138/138 |
| collapse | Baseline | 421/425 |
| faint | Dawn | 1409/1402 |
| palpitations | Unsurprising | 40/40 |
| vomit | Signpost | 108/108 |
| dizzy | Grassy | 324/324 |
| gasping | Adhere | 243/240 |
| blank | Seed | 1323/1320 |
| suffocating | Moisturiser | 77/77 |
| numbness | Boathouse | 97/92 |
| gagging | Shaver | 28/28 |
| trembling | Campus | 626/626 |
| tired | Link | 3496/3494 |
| agitated | Fluidity | 99/100 |
| Positive somatic sensations | | |
| relaxed | Repay | 545/542 |
| comfortable | Identity | 3957/3950 |
| calm | Cook | 731/734 |
| peaceful | Prefer | 1640/1643 |
| serene | Ginger | 222/222 |
| focused | Rebound | 109/109 |
| sharp | Block | 3553/3540 |

| | | |
|-----------------------|-------------|-------------|
| strong | Soon | 15898/15903 |
| harmonic | Instructive | 301/301 |
| paced | Scrap | 164/163 |
| steady | Postcard | 547/547 |
| stable | Neighbour | 1777/1774 |
| vocal | Postage | 313/313 |
| concentrated | Periphery | 308/311 |
| cool | Lad | 1832/1823 |
| animated | Monasteries | 305/305 |
| energetic | Participant | 632/632 |
| lively | Secret | 1472/1473 |
| composed | Resume | 617/617 |
| upbeat | Judo | 97/97 |
| Practice words | | |
| bicycle | Monitor | |
| grouse | Mouse | |
| paper | Bottle | |
| door | Watch | |
| aboard | Enough | |
| above | Structure | |
| book | Sun | |
| leisure | Pencil | |
| picture | Figure | |
| glass | Space | |

Appendix 5.2
Reliability estimates (Cronbach's alpha) for the dot-probe task

| | High social anxiety group | | Low social anxiety group | |
|----------------------------|----------------------------------|----------------|---------------------------------|----------------|
| | 200msec | 500msec | 200msec | 500msec |
| Congruent stimuli | | | | |
| Negative evaluative | .94 | .82 | .90 | .87 |
| Positive evaluative | .93 | .89 | .89 | .88 |
| Negative somatic | .93 | .81 | .89 | .86 |
| Positive somatic | .91 | .89 | .85 | .92 |
| Incongruent stimuli | | | | |
| Negative evaluative | .94 | .86 | .88 | .88 |
| Positive evaluative | .88 | .83 | .85 | .89 |
| Negative somatic | .93 | .87 | .90 | .90 |
| Positive somatic | .94 | .83 | .88 | .90 |

Appendix 5.3

MFIS scale's Items

MFIS-positive (positive beliefs about focusing on the self-image):

- Is a way of ensuring that people have a certain impression of me
- Helps me stay in control of what people think of me
- Makes me more aware of how other people view me
- Helps me present the person I want to be
- Helps me form an impression of other people's opinions of me
- Helps me see how other people see me
- Helps me understand the impression that other people have of me
- Helps me communicate my strengths
- Helps me be more acceptable to people around me
- Prepares me for the social situation
- Helps me think about how I need to change my behaviour
- Helps me prevent making a negative impression to others
- Stops me from saying or doing something I'll regret

MFIS-negative (negative beliefs about focusing on the self-image):

- Makes me see myself in a bad way
- Cannot be controlled
- Can make me give an impression of being unfriendly
- Stops me from being myself
- Stops me from paying attention to other people
- Enters my mind against my will
- Makes me want to leave the situation
- Can cause me to lose track of the conversation
- Stops me from acting naturally
- Comes to mind even though I try not to have it

Appendix 5.4

Correlations between attentional bias, social anxiety, depression, state anxiety, and meta-cognitive beliefs, NE = negative evaluative, PE = positive evaluative, NS = negative somatic, PS = positive somatic

| Social anxiety FNE | | NE 200 ms | PE 200 ms | NS 200 Ms | PS 200 ms | NE 500 ms | PE 500 ms | NS 500 ms | PS 500 ms |
|--------------------|-------------------------------|--------------|-----------|-----------|--------------|-----------|-----------|---------------|--------------|
| Low FNE | Anxiety | -.31* | .01 | -.21 | -.04 | .03 | .01 | .11 | -.25 |
| | Depression | -.14 | .15 | .06 | .15 | -.15 | .10 | -.03 | -.17 |
| | FNE | .04 | .11 | -.12 | -.16 | .07 | -.17 | .07 | -.01 |
| | MCQ positive | -.10 | .09 | -.30 | .18 | .01 | -.06 | .15 | -.04 |
| | MCQ negative | -.17 | -.002 | .20 | -.01 | -.06 | -.24 | .09 | -.11 |
| | MCQ cognitive confidence | .07 | .15 | -.14 | -.16 | -.01 | -.07 | -.09 | -.21 |
| | MCQ need for control | .13 | -.03 | -.03 | .02 | .01 | -.13 | -.14 | .04 |
| | MCQ cognitive self consc/ness | -.06 | -.01 | -.03 | .07 | .07 | -.29 | .09 | -.09 |
| | MFIS negative | -.01 | .27 | -.17 | -.10 | -.06 | -.01 | -.35* | -.37* |
| | MFIS positive | .12 | -.11 | -.09 | -.11 | -.16 | .30 | -.03 | -.02 |
| High FNE | Anxiety | -.12 | -.05 | .07 | -.05 | .28* | -.01 | -.30* | .20 |
| | Depression | .07 | -.05 | .10 | .15 | .09 | -.05 | -.05 | -.13 |
| | FNE | .17 | -.13 | -.04 | .31* | .18 | -.18 | .01 | .03 |
| | MCQ positive | .13 | -.09 | -.20 | -.15 | .05 | .18 | -.21 | .05 |
| | MCQ negative | -.13 | .02 | .18 | .13 | .13 | -.10 | -.04 | .31* |
| | MCQ cognitive confidence | -.03 | -.21 | -.13 | -.14 | .03 | .07 | .06 | .20 |
| | MCQ need for control | .21 | -.27 | -.04 | -.16 | .18 | .14 | -.28* | .08 |
| | MCQ cognitive self consc/ness | .04 | .06 | .07 | -.31* | -.01 | .02 | -.36** | .12 |
| | MFIS negative | .03 | -.06 | -.01 | .12 | .15 | -.24 | -.05 | .20 |
| | MFIS positive | .02 | -.02 | .09 | -.08 | .03 | .01 | -.22 | .03 |

* significant at the 0.05 level (2-tailed), ** significant at the 0.01 level (2-tailed).

Appendix 7.1

Instructions for detached mindfulness and thought challenging

Detached mindfulness:

The rationale for detached mindfulness was explained as follows: “Beliefs, for instance that worry can be both helpful and uncontrollable, are very common and are considered normal. In fact, they stem from our every day experiences and lessons in life. Nevertheless, these beliefs may influence how much and when we worry. Worrying thoughts are usually intrusive and distressing and people find it difficult to deal with them. Together, we will go through some techniques that could teach you how to deal with your worrying thoughts in a new way, how to be able to put a distance between your thoughts and yourself. You will then be asked to practice these techniques for five minutes”. Participants were then invited to ask questions.

The techniques were the following:

a) The suppression–counter suppression experiment (Wells, 2009). This aims to illustrate the difference between controlling or avoiding thoughts and the state of detached mindfulness. Participants were asked to compare trying to avoid thinking of a blue giraffe and trying to remain mindful of thoughts of a blue giraffe. Specifically, the instructions were: “It is important that you learn the difference between detached mindfulness and trying to control or avoid thoughts. Trying to stop thoughts is a form of active engagement with them since you are trying to push them out of your mind. Pushing something is hardly leaving something alone and so this effort backfires and you remain in contact with your thoughts. How can you push against a door and not be in contact with it by some means? Let’s see this effect in action. For the next 3 minutes I don’t want you to think about a blue giraffe. Don’t allow yourself to have any thought connected with it, try to push it away. Off you go.

What did you notice? Did you think of a blue giraffe? Let’s now try detached mindfulness and see what happens. For the next 3 minutes let your mind roam freely and if you have thoughts of blue giraffes I want you to watch them in a passive way as part of an overall landscape of thoughts. Try that now.

What did you notice? How important was the thought of the blue giraffe the second time around?” (Wells, 2009, p. 82).

b) The free-association task (Wells, 2009). During this task, the experimenter read the following words aloud allowing for 30 seconds of silence between the words: apple, birthday, seaside, tree, bicycle, summertime, roses, desk, teach, speech (five minutes in

total). Participants were asked to close their eyes and be mindful about any thoughts or images that occurred. The instructions were: "So that you can become familiar with using detached mindfulness, it is helpful to practice in response to spontaneous events in your mind. By doing this you can learn to relate to these events in a new way. In a moment I will say a series of words to you. I would like you to allow your mind to roam freely in response to each word. Do not control or analyze what you think, merely watch how your mind responds. You may find that nothing much happens, but you may find that pictures come into your mind. It doesn't really matter what happens. Your task is to passively watch what happens without trying to influence anything. Try this with your eyes closed. I'm going to say some words now: apple, birthday, seaside, tree, bicycle, summertime, roses, desk, teach, speech.

What did you notice when you watched your mind? The idea is that you should apply this strategy to your negative thoughts and feelings. Just watch what your mind does without getting caught up in any thinking process." (Wells, 2009, p. 81).

They were then asked to practice this on their own for five minutes with some of their negative thoughts about the forthcoming speech.

Thought challenging:

The rationale for thought challenging was the following: "Experiencing unpleasant and negative thoughts is quite normal for all of us, especially when we are dealing with stressful situations. However normal, such thoughts are likely to make us feel bad and influence what we are doing at the time, or what we are about to do. Together, we will go through some techniques that could teach you to identify such thoughts, and to challenge and answer them in an accurate way. You will then be asked to practice these techniques for 5 minutes. Participants were then invited to ask questions".

The techniques applied were:

a) A thought record (Greenberger & Padesky, 1995, pp. 63-65) of a recent social situation (when, where, with who), relevant emotions, identified negative thoughts, evidence that supports the thought, evidence that does not support the thought, and generating a rational response (one that takes into account the evidence discussed and not just the initial emotional response), and

b) Socratic questions that helped to find evidence against the identified negative automatic thoughts (Greenberger & Padesky, 1995, p. 70). The questions were:

- Have you had any experiences that show that this thought is not completely true all the time?
- If your best friend or someone you loved had this thought, what would you tell them?
- If your best friend or someone who loves you knew you were thinking this thought, what would they say to you? What evidence would they point out to you that would suggest that your thoughts were not 100% true?
- Have you been in this type of situation before? What happened? Is there anything different between this situation and previous ones? What have you learned from prior experiences that could help you now?
- Are there any strengths or positives in you or the situation that you are ignoring?

The experimenter and the participant went through this technique together by using one recent example. Then, the participants were left alone to practice for five minutes. They were asked to use the forthcoming speech as an example.

Appendix 7.2
Identified thoughts and belief levels at baseline

| Case No. | Thought | Rating at baseline (0=did not believe the thought at all, 100=entirely convinced it was true) |
|----------|--|---|
| 1 | They'll think I'm rubbish | 80/100 |
| 2 | My mind will go blank | 60/100 |
| 3 | People are going to see that I'm nervous | 80/100 |
| 4 | I'll say the wrong thing | 70/100 |
| 5 | I'll panic | 50/100 |
| 6 | I'll sound stupid (they'll laugh at me) | 95/100 |
| 7 | I'm going to look nervous | 90/100 |
| 8 | They'll create a bad and untrue impression of me | 80/100 |
| 9 | I won't be able to think of anything to say | 85/100 |
| 10 | I'm going to be embarrassed | 100/100 |
| 11 | People are going to laugh at me | 90/100 |
| 12 | They'll think I haven't made an effort | 100/100 |

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