

COGNITIVE PROCESSING CHARACTERISTICS IN  
OBSESSIVE-COMPULSIVE DISORDER  
SUBTYPES

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## Contents

	<b>Page</b>
<b>List of Tables.....</b>	<b>viii</b>
<b>List of Figures.....</b>	<b>ix</b>
<b>Acknowledgments.....</b>	<b>x</b>
<b>Abstract.....</b>	<b>xi</b>
<b>1. CLINICAL PRESENTATION OF OCD.....</b>	<b>1</b>
1.1 Phenomenology.....	4
1.1.1 Onset .....	6
1.1.2 Course .....	7
1.1.3 Prevalence .....	8
1.1.4 Gender.....	9
1.1.5 Differential Diagnosis.....	10
1.1.6 OCD In Childhood.....	12
1.2 Comorbidity .....	16
1.2.1 Anxiety Disorders .....	16
1.2.2 Negative Affect.....	18
1.2.3 Personality Disorders .....	20
1.2.4 Tourette’s Disorder .....	20
1.2.5 Schizotypy.....	21
1.2.6 Obsessive Compulsive Spectrum Disorders (OCSD).....	23
1.2.7 Impulse Control Disorders (ICD) .....	25
1.3 Assessment.....	26
1.3.1 Structured And Semi-Structured Assessments .....	26
1.3.2 Psychometric Scales.....	28
1.4 Chapter Summary .....	30

2.	ETIOLOGICAL MODELS OF OBSESSIVE COMPULSIVE DISORDER .....	33
2.1	Biological Models.....	33
2.1.1	Genetic Variables.....	33
2.1.2	Autoimmune .....	34
2.1.3	Neuroanatomical Perspectives .....	35
2.1.4	Neurochemical Approach .....	37
2.1.5	Neuropsychological Approach.....	38
2.2	Psychological Models .....	39
2.2.1	Psychodynamic Models .....	40
2.2.2	Behavioural Models .....	40
2.3	Cognitive Models.....	43
2.3.1	Cognitive Deficit Theories.....	43
2.3.2	Cognitive-Appraisal Model .....	46
2.3.3	Carr (1974) and Mcfall And Wollersheim (1979) .....	47
2.3.4	Salkovskis' Cognitive Model Of OCD .....	48
2.3.5	Rachman (1993, 1997, 1998) Misinterpretation of Significance Theory .....	64
2.4	Chapter Summary .....	77
3.	OBSESSIVE COMPULSIVE DISORDER SUBTYPES.....	79
3.1	Current Status of Obsessive Compulsive Disorder Subtypes .....	80
3.2	Subtyping by Compulsive Behaviour .....	81
3.2.1	Subtyping by Principal Compulsive Behaviour.....	81
3.2.2	Identification Of OCD Schemas Using Psychometric Instruments.....	82
3.3	Subtyping by Clinical Descriptors .....	83
3.3.1	Subtyping by age of onset: Early (EOCD) Vs Late Onset OCD (LOCD).....	83
3.3.2	Subtyping according to gender .....	84

3.3.3 Subtyping by means of comorbidity .....	84
3.4 Subtyping using Multivariate Statistical Methods .....	89
3.4.1 Factor Analysis to Delineate Subtype Schemas.....	89
3.4.2 Subgroups Derived Using Cluster Analysis .....	92
3.5 The Obsessive Compulsive Cognitions Working Group (OCCWG) .....	97
3.5.1 Over-Importance of Thoughts.....	98
3.5.2 Importance of Controlling one’s Thoughts.....	100
3.5.3 Perfectionism .....	103
3.5.4 Overestimation Of Threat .....	108
3.5.5 Intolerance for Uncertainty .....	111
3.5.6 Obsessive Beliefs Questionnaire (OBQ-87) and Interpretations of Intrusions Inventory (III-31; OCCWG, 2001; 2003, 2005).....	117
3.6 OCCWG Beliefs and Symptom Specificity.....	119
3.6.1 Contamination Obsessions and Washing/Checking Compulsions .....	119
3.6.2 Harming Obsessions and Checking Compulsions .....	122
3.6.3 Symmetry Obsessions and Ordering Compulsions.....	122
3.6.4 Hoarding Obsessions And Compulsions .....	124
3.6.5 Miscellaneous Obsessions and Compulsions.....	127
3.7 Chapter Summary .....	128
4. THOUGHT-ACTION FUSION & RESPONSIBILITY BELIEFS IN ADULTS WITH OCD.....	133
4.1 Introduction.....	133
4.1.1 New Zealand Context .....	134
4.2 Study I.....	137
4.2.1 Method .....	137
4.2.2 Materials .....	138

4.2.3 Results.....	145
4.2.4 Discussion.....	157
5. COGNITIVE PROCESSING CHARACTERISTICS IN OBSESSIVE- COMPULSIVE DISORDER (OCD):.....	163
Exploring the relationship between specific cognitive beliefs and OCD subtypes .....	163
5.1 Introduction.....	163
5.1.1 OCD Subtypes .....	163
5.1.2 Obsessive Compulsive Cognitions Working Group (OCCWG; 1997, 2001, 2003, 2005).....	164
5.2 Study II.....	166
5.2.1 Method.....	167
5.2.2 Results.....	174
5.2.3 Discussion.....	186
6. EXPERIMENTAL PARADIGMS: COGNITIVE PROFILES OF OCD SUBGROUPS.....	193
6.1 Introduction.....	193
6.2 Study III.....	195
6.2.1 Method.....	196
6.2.2 Statistical analysis.....	209
6.2.3 Results.....	210
6.2.4 Thought-Action Fusion (Sentence Paradigm; SP).....	215
6.2.5 Perfectionism (Letter Sequencing Task; LST) .....	218
6.2.6 Discussion.....	227
7. GENERAL DISCUSSION .....	241

7.1 Introduction.....	241
7.2 Limitations .....	252
7.3 Implications of the research.....	253
7.4 Directions for future research .....	254
8. REFERENCES .....	256
9. APPENDICES .....	324
9.1 Appendix A: Study I Volunteer Information Sheet .....	324
9.2 Appendix B: Study I consent form .....	327
9.3 Appendix C: Study I exclusion/inclusion sheet .....	329
9.4 Appendix D: Study II: Initial sheet.....	331
9.5 Appendix E: Study II: written description .....	332
9.6 Appendix F: Study II consent form .....	335
9.7 Appendix G: Study II sample characteristics (n = 67).....	338
9.8 Appendix I: Study III Consent form .....	340
9.9 Appendix J: Study III Information sheet .....	342
9.10 Appendix K: Study III Visual Analogue Scale (VAS).....	347
9.11 Appendix L: Study III Agreement Scale .....	348
9.12 Appendix M: Study III Post-task questions: Uncertainty.....	349
9.13 Appendix N: Study III Post-task questions: TAF (3 sections) .....	350

9.14 Appendix O: Study III Post-task questions: Perfectionism .....	352
9.15 Appendix P: Study III Post-task questions: Responsibility .....	353
9.16 Appendix Q: Study III Post-task questions: Control .....	356
9.17 Appendix R: Study III Letter Sequencing Task (5-pages).....	360
9.18 Appendix S: Study III Anxiety ratings at baseline, during and post-task (%)....	365

## List of Tables

Table 1: OCD subgroups identified using clustering methodologies .....	97
Table 2: Hypothesized relationships between OCD subgroups & cognitive domain....	129
Table 3 Study I: Sample characteristics: means and standard deviation .....	146
Table 4 Study I: Percentage comorbidity of anxiety disorders across groups .....	147
Table 5 Study I: Means (standard deviation), F and P-values across groups .....	148
Table 6 Study I: Means (standard deviation), F and P-values for the RIQ Subscales..	151
Table 7 Study I: Means (standard deviation), F and P-values for TAF Subscales .....	152
Table 8 Study I: Pearson correlations between subscales of the RIQ, RAS and TAF .	154
Table 9 Study I: Regression Analysis for variables predicting OC symptoms.....	156
Table 10 Study II: Symptom severity .....	174
Table 11 Study II: YBOCS symptom rating for subgroups (N=5).....	178
Table 12 Study II: Demographic & clinical characteristics (%) of OCD subgroups....	179
Table 13 Study II: Subgroups differences on Depression, Anxiety, Obsessionality ....	180
Table 14 Study II: Between subgroup differences on measures of cognition .....	183
Table 15 Study II: Correlation matrix: obsessive severity & OBQ-87.....	184
Table 16 Study III: Demographic and clinical characteristics OCD subgroups .....	212
Table 17 Study III: Subgroup scores on baseline measures of cognition .....	213
Table 18 Study III: Intolerance of Uncertainty Task .....	215
Table 19 Study III: Thought-Action Fusion Task.....	217
Table 20 Study III: Perfectionism Task .....	219
Table 21 Study III: Inflated Responsibility Task.....	220
Table 22 Study III: Overestimation of Threat Task (BAT) .....	223
Table 23 Study III: Controllability of Thought Task (SUD Ratings).....	225



**List of Figures**

Figure 1: Cognitive analysis of OCD.....	51
Figure 2: Pearson Correlations between Lifetime Scores on the YBOCS.....	91
Figure 3: Logistic regressions predicting miscellaneous symptoms ( $n = 381$ ).....	92
Figure 4: Dendrogram representing cluster analysis Of OCD symptom categories.....	.176
Figure 5: Mean scores for the five subgroup taxonomy on the OBQ-87.....	182
Figure 6: Cognitive profiles of the five subgroups on the OBQ-44 .....	185
Figure 7: Manipulation check: anxiety ratings at baseline .....	214
Figure 8: Subgroups time across trials.....	218
Figure 9: Anxiety ratings during The HR and LR conditions. ....	221
Figure 10a: Subgroups anxiety levels during the distractibility task.....	226
Figure 10b: Sugroups percentage of control post provocation .....	226

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**ABSTRACT**

Obsessive Compulsive Disorder (OCD) is classified as an anxiety disorder characterized by distressing persistent unwanted ideas or impulses (obsessions) and urges and/or compulsion to do something to relieve the associated anxiety caused by the obsession. The thematic content of the obsessions are highly variable, ranging from symmetry, contamination to aggressive concerns. Compulsions tend to be linked to the obsessions, but can also be idiosyncratic to the intrusive thought. According to the cognitive model, Obsessive-compulsive disorder (OCD) is maintained by various belief factors such as an inflated sense of responsibility, overestimation of threat and the over-control of thoughts. Despite much support for this hypothesis, there is a lack of specificity. This series of studies sought to determine the relationship between a number of cognitive beliefs and appraisal processes and obsessive-compulsive symptoms.

This thesis presents the results of three studies. The first study was designed to investigate the hypothesis that certain beliefs are more prevalent in OCD, compared with other anxiety disorders. The second study expands on earlier findings by examining whether the six metacognitive beliefs proposed by the Obsessive Compulsive Cognitions Working Group, (OCCWG; 1997, 2001, & 2003) correlate with specific symptom-based OCD subtypes. The final study addresses some of the methodological weaknesses inherent in retrospective self-report measures by replicating the study using experimental techniques. Most importantly, this research was conducted from within the theoretical framework of Rachman (1993) and Salkovskis (1989) models which emphasise the misinterpretation of significance of the intrusive thoughts.

The first study explored the relationship between thought-action fusion (TAF) and inflated responsibility beliefs across individuals diagnosed with obsessive compulsive disorder (OCD), an anxiety disorder other than OCD (anxious controls; AC), and a non-

anxious control group (NAC). It was hypothesized that the OCD group would evidence significantly higher inflated responsibility and TAF scores, compared to the AC and NAC groups. In this study, non-clinical and clinical participants were recruited for research. The non-clinical group was comprised of undergraduate students ( $n = 22$ : mean age = 26.8; SD = 9.2). The clinical groups included 20 participants with OCD as their primary diagnosis (mean age = 32.1; SD = 11.9) and 21 individuals diagnosed with another anxiety disorder (mean age = 32.2; SD = 10.9).

To measure inflated responsibility beliefs and thought action fusion, self-report questionnaires were administered to the participants. The results of this study demonstrated that inflated responsibility beliefs, while present in other anxiety disorders, were significantly higher in participants with OCD, even after controlling for depressed mood and TAF levels. No group differences emerged between the OCD and anxious groups on measures of TAF. Thus, it can be tentatively concluded that inflated responsibility beliefs may have a more robust relationship with OCD than TAF beliefs, which appear to act as a general vulnerability factor occurring along a continuum of anxiety disorders.

The second study examined the associations between the six OCD-related beliefs: control of thoughts, importance of thoughts, responsibility, intolerance of uncertainty, overestimation of threat and perfectionism and five empirically derived OCD subgroups. Clinical participants with a primary diagnosis with OCD ( $n = 67$ : mean age = 38.0; SD = 11.7) were recruited over a period of two years from the Anxiety Disorders Unit. Participant responses were cluster analysed to form five stable groups: aggressive obsessions–checking compulsions ( $n = 22$ : mean age = 26.8; SD = 9.2); contamination obsessions–cleaning compulsions ( $n = 22$ : mean age = 26.8; SD = 9.2); symmetry concerns–ordering/arranging compulsions ( $n = 22$ : mean age = 26.8; SD = 9.2); hoarding obsessions–hoarding compulsions

( $n = 22$ : mean age = 26.8; SD = 9.2); and miscellaneous obsessions –miscellaneous compulsions ( $n = 22$ : mean age = 26.8; SD = 9.2).

The second found that intolerance of uncertainty was significantly related to the contamination subgroup. While responsibility and threat estimation beliefs were higher in the aggressive-checking subgroup, these differences did not reach statistical significance. No other significant results were found, however, there was a non-significant trend for perfectionism beliefs to be higher in symmetry-ordering and hoarding subgroup. Following the results of this study, questions remained about whether the lack of significant findings reflected the generality of these beliefs or were due to methodological differences. This led to the development of the final study presented in this thesis.

The purpose of the final study was to investigate whether the second study was limited by the method of assessment (e.g. self-report questionnaires). This study was unique, as it was the first of its kind to experimentally manipulate all six beliefs in empirically derived OCD subtypes. Twenty participants (mean age = 45.0; SD = 11.0) were chosen from the second study to form the following priori groups: contamination ( $n = 4$ : mean age = 44.5; SD = 9.5); aggressive ( $n = 6$ : mean age = 46.5; SD = 7.2); hoarding ( $n = 4$ : mean age = 47.2; SD = 6.9); and symmetry ( $n = 6$ : mean age = 41.8; SD = 17.4). Six behavioural experiments designed to reflect one of the six OCCWG beliefs were specifically developed and administered to the groups. Baseline scores were obtained using self-report questionnaires.

The study found strong support for the use of experimental paradigms over self-report measures, as several significant interactions between cognitive beliefs and OCD symptom-based subtypes were found. Specifically, the hoarding subgroup evidenced significantly higher overall thought action fusion scores compared to those in the contamination group. The symmetry subgroup exhibited significantly higher anxiety than the aggressive group during the perfectionism task and demonstrated significantly higher scores on several items

measuring perfectionism compared to the contamination group. Finally, over-estimation of threat beliefs was significantly higher in the contamination thoughts. No statistically significant group differences were found for controllability of thoughts, responsibility and intolerance of uncertainty.

In conclusion, these studies collectively showed that in some cases of OCD certain beliefs appear highly applicable, whereas in others they are not. This finding may explain why some OCD patients have poor treatment outcomes as the beliefs and appraisals were highly variable across groups. These findings are of both theoretical and clinical significance because they add to the growing understanding that OCD may consist of distinct clusters of symptoms with different underlying motivations and beliefs. This finding is of clinical significance because treatment guidelines for OCD can become more specific, factoring into the therapy situation these underlying beliefs and appraisal processes.

Lastly, the findings regarding inflated responsibility deserve special mention, given the significance of this construct in contemporary cognitive models. The results of the present studies were mixed with regard to responsibility as only the first study found a significant result. It appears that, like the other belief domains proposed by the OCCWG, responsibility may not be specific to all types of OCD and current cognitive models may benefit was shifting the emphasis to other belief domains.

## CHAPTER ONE

### 1. CLINICAL PRESENTATION OF OCD

Once considered one of the more rare anxiety disorders, Obsessive Compulsive Disorder now has a lifetime prevalence rate of approximately 2.3 percent (Taylor, 2002). OCD is characterised by clinically significant repetitive intrusive thoughts and compulsive behaviour. Common obsessions include contamination fears, thoughts of harming others, and/or a preoccupation with symmetry and order. Compulsions can include repetitive checking of certain objects, incessant cleaning, and/or mental counting. Compulsions can be either observable behaviours or may include covert acts like repeating certain words. Compulsive behaviour is typically performed to reduce the anxiety caused by the occurrence of the obsessive thought.

The typical age of onset of OCD has consistently been reported to be approximately 19 to 25 years (Steketee, 1993). However, for males the modal age of onset tends to be between six and fifteen years, with females developing the disorder later between twenty to twenty-nine years (*Diagnostic and Statistical Manual of Mental Disorders, DSM-IV-TR*, (APA, 2000)). It is estimated that fewer than 15% of individuals with OCD develop the disorder after the age of 35 years (Rasmussen & Tsuang, 1984). OCD commonly occurs alongside other psychological disorders, including other anxiety disorders, mood disorders, eating disorders, substance use/abuse and some personality disorders (e.g., avoidant personality disorder, obsessive compulsive personality disorder). OCD tends to be a chronic condition, with the majority of individuals experiencing a waxing and waning of symptoms over time. These fluctuations are typically precipitated by significant stressful life events (Taylor, 2002).

The perplexing nature of clinical obsessions is matched by a plethora of research regarding the etiological components involved in this illness. Whilst all theoretical models

contribute to the overall understanding of the disorder, one of the most promising theoretical models is the cognitive model of OCD (Rachman, 1993; Salkovskis, 1985). Under the umbrella of ‘cognitive models’, two distinct models are proposed. The first, ‘cognitive-dysfunction model’ asserts that OCD arises because of a general dysfunction in cognitive processing. The second, termed ‘cognitive-appraisal model’ emphasizes the role of dysfunctional beliefs and assumptions.

Cognitive–appraisal models of OCD (Salkovskis, 1985, 1989) suggest that, as a result of prior experience, the individual develops particular assumptions (Salkovskis, Shafran, Rachman, & Freeston, 1999). The occurrence of a particular event or situation activates previously dormant beliefs. These belief systems affect the way in which the thoughts or intrusions are interpreted (Salkovskis et al., 1999). Obsessive compulsive symptoms arise because underlying beliefs fuel the misinterpretation and significance of the intrusive thoughts. In other words, these cognitive intrusions are interpreted as threatening and causing distress. This then manifests in compulsive behaviour, which is performed to decrease or remove the associated anxiety. Obsessive–compulsive symptoms continue because (a) compulsive behaviour is strengthened via the temporary reduction in distress; and (b) the individual fails to distinguish between the occurrence of the intrusive thought and the actuality of the obsessive thought occurring (e.g., thoughts of contaminating a loved one will not lead to acts of contamination). The cognitive-appraisal model will serve as the theoretical foundation for the studies contained in this thesis.

The drive for more accurate assessment of OCD precipitated the formation of the Obsessive Compulsive Cognitions Working Group (OCCWG, 1997, 2001, 2003, 2005). The OCCWG consists of a large group of international researchers dedicated to the study of the cognitive aspects of OCD. The efforts of the OCCWG have resulted in; (a) psychometric scales designed to assess certain beliefs and appraisal processes thought to be important in OCD; (b) new knowledge regarding the cognitive aspects involved in OCD; (c) the



development of operational definitions of what is believed to be the six most important beliefs and appraisal processes in OCD: *inflated personal responsibility, tendency to overestimate threat, perfectionism, intolerance of uncertainty, and over-importance and over-control of thoughts* (OCCWG., 2001) and (d) clear directions for future research.

The advent of the OCCWG has led to an array of research opportunities. For example, although conceptual, the aforementioned beliefs are described as distinct. The typology is primarily maintained for research purposes, as considerable overlap exists. Because many of the beliefs are aimed at the prevention of harm or threat, there is some debate as to whether these beliefs are specific to OCD. For instance, the “do no harm” appraisal occurs in a range of psychological disorders (e.g., dependent personality). The over-importance of thoughts and beliefs about controlling one’s thoughts have been conceptualised as more general vulnerability factors for OCD, whilst the perception of responsibility is seen to contribute to the development of obsessive compulsive symptoms in more specific ways (Salkovskis, 1985).

Other areas for investigation include whether changes in dysfunctional beliefs and appraisals correspond to significant treatment outcome (Clark, 2002b), or further whether some beliefs act as precursors for others (Rassin, Muris, Schmidt, & Merckelbach, 2000). Another fruitful area for research involves the subtyping of OCD. Preliminary research suggests that a number of cognitive domains may be more applicable to certain types of OCD. For example, Rachman and Shafran (1998) have argued that checking compulsions are more closely associated with inflated responsibility beliefs than cleaning compulsions. Conversely, the tendency to inflate intrusive thoughts is regarded by some researchers to be more salient in aggressive obsessions (Thordarson & Shafran, 2002). To the author’s knowledge no study has attempted to evaluate whether the six metacognitive beliefs proposed by the (OCCWG, 1997, 2001, 2003, 2005) specifically correspond to symptom-based

subtypes of OCD. The purpose of the present body of research is to examine this issue further.

The following chapter presents the clinical presentation of OCD, including a review of the phenomenology, comorbidity, OCD in childhood as well as methods of assessment. Chapter 2 describes the most common etiological models of OCD, briefly discussing the psychodynamic, conditioning, cognitive and biological approaches to OCD. Chapter 2 continues with a more detailed discussion of two specific cognitive-appraisal models: (a) Salkovskis (1985) model of OCD stressing the role of inflated responsibility beliefs; and (b) Rachman's (1993) model emphasising the role of Thought-Action Fusion (TAF). Chapter 3 reviews the current state of research into the subtyping of OCD and research conducted by the OCCWG. Chapters 4, 5 and 6 present the three empirical studies that form the basis of the current research and finally, chapter 7 discusses the theoretical and research implications of these studies.

### 1.1 Phenomenology

Obsessive Compulsive Disorder (OCD) is a psychological disorder characterised by repetitive cognitive intrusions, which cause such intense anxiety that the sufferer feels compelled to perform certain mental or behavioural actions/compulsions in order to reduce the associated distress. The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR, APA, 2000) defines obsessions as “persistent ideas, thoughts, impulses, or images that are experienced as intrusive and inappropriate and that cause marked anxiety or distress” (American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision. Washington, DC, American Psychiatric Association, 2000, p.457). Obsessions can involve repetitive thoughts concerning contamination, intense need for orderliness, aggressive or sexual intrusions, and religious preoccupations. Often the obsessions occur concurrently, with clients reporting a broad range of thoughts

simultaneously. Obsessions and/or compulsions shift over time, often in response to developmental changes (Evans, Leckman, Carter, Reznick, & et al., 1997).

Compulsions are defined as “repetitive behaviours (e.g., hand washing, ordering, checking) or mental acts (e.g., praying, counting, repeating words silently) the goal of which is to prevent or reduce anxiety or distress, not to provide pleasure or gratification” (DSM-IV-TR, 2000 p.457). In contrast to earlier additions, the DSM-IV-TR modified the diagnostic criteria to include covert compulsions (mental counting), in response to growing research demonstrating the high use of mental acts to decrease anxiety in OCD (see DSM-IV field trials). Typical compulsions include cleaning (hand-washing), checking (doors), arranging, mental counting and reassurance seeking behaviours. Generally, the compulsive activity is not rationally connected to the obsession itself (Taylor, 2002); more the behaviour tends to be excessive and serves as an anxiety reducing mechanism.

Although most individuals with OCD report both obsessions and compulsions (Noshirvani, Kasvikis, Marks, Tsakiris, & Monteiro, 1991), the presence of both is not required for the diagnosis of OCD. The previously prevailing view that all persons with OCD recognize the nonsensical nature of their obsessions and compulsions was also discounted with the advent of the DSM-IV. Growing research supporting the hypothesis that the degree of insight in OCD is better represented on a continuum (Abramowitz, 1999; Bellino, Patria, Ziero, & Bogetto, 2005; Eisen et al., 2001; Matsunaga et al., 2002; Ravi Kishore, Samar, Janardhan Reddy, Chandrasekhar, & Thennarasu, 2004), has led to the diagnostic specifier of OCD “*with poor insight*”.

It is estimated that intrusions of the types experienced by obsessional patients, also occur in 80-90 percent of the general population (Rachman & de Silva, 1978; Salkovskis & Harrison, 1984). Studies evaluating normal intrusions and clinical obsessions have found that both types of intrusions are remarkably similar in terms of content e.g., (Rachman & de Silva, 1978; Salkovskis & Harrison, 1984). However, it is reported that abnormal obsessions occur

more frequently, are more intense, and are of longer duration (Muris, Merckelbach, & Clavan, 1997; Rassin, Merckelbach, & Muris, 2000). Taken together, these results suggest that although obsessional patients may experience cognitive intrusions more frequently and intensely, they are apparently indistinguishable in terms of content from the intrusions experienced by the general population (Wroe, Salkovskis, & Richards, 2000).

### *1.1.1 Onset*

Typically, OCD begins in early adolescence or young adulthood (American Psychiatric Association (APA, 2000). The modal age of onset for males varies between 6 and 15 years and for females between 20 to 29 years (APA, 2000). Overall, two-thirds of individuals with OCD experience onset of symptoms prior to 25 years (Kaplan, Sadock, & Grebb, 1994; Rasmussen & Eisen, 1990), with fewer than 15% of individuals with OCD developing symptoms for the first time after 35 years of age (Kaplan et al., 1994; Rasmussen & Eisen, 1991). However, several findings suggest that 'later-life' OCD increases 3 to 5 times when individuals are living in institutional as opposed to independent settings (Bland, Newman, & Orn, 1988; Calamari, Janeck, & Deer, 2002; Juninger, Phelan, Cherry, & Levy, 1993). Whilst the disorder has been reported to occur less often in later in life, several researchers have questioned the accuracy of these estimates of OCD, because many of the measures used have not been validated in this age group (Calamari et al., 2002; Fuentes & Cox, 1997; Jones & Menzies, 1998; Juninger et al., 1993).

Different symptom and neurological profiles have been identified by the onset of disorder, specifically concerning early-onset (EOD) versus late-onset OCD (Busatto et al., 2001; Fontenelle, Mendlowicz, Marques, & Versiani, 2003; Fontenelle, Mendlowicz, Marques, & Versiani, 2003; Rosario-Campos et al., 2001). Prepubertal onset of OCD is characterised by (a) male preponderance (Zohar, Pauls, Ratzoni, Apter, & et al., 1997); (b) higher rate of comorbid tic disorders (Hemmings et al., 2004; Swedo, Rapoport, Leonard, Lenane, & et al., 1989); (c) higher frequency of compulsions not preceded by obsessions

(Geller, Biederman, Jones, Park et al., 1998); (d) greater familial loading for OCD (Lenane, Swedo, Leonard, Pauls, & et al., 1990); (e) more aggressive clinical course (Sobin, Blundell, & Karayiorgou, 2000; Sobin, Blundell, Weiller et al., 2000). These onset-specific features have precipitated research examining whether these characteristics represent subtypes of OCD. This issue will be discussed in more detail in Chapter 3.

### *1.1.2 Course*

OCD typically develops gradually, however acute onset has been observed in some cases. The disorder tends to be chronic, with the majority of individuals experiencing a waxing and waning of symptoms (Rasmussen & Eisen, 1992). The presence of depression, severity of illness, childhood-onset OCD and poor initial treatment response are associated with a poorer course (Steketee, Eisen, Dyck, Warshaw, & Rasmussen, 1999) and are seen as important predictors of later functioning (Stewart et al., 2004). Episodic and deteriorating courses have been observed in about 10 per cent of cases (Rasmussen & Eisen, 1989).

Despite the majority of cases developing gradually, acute onset OCD has been observed in response to specific life stressors. During the last ten years, particular significance has been placed on the role of trauma (de Silva & Marks, 2001; Dinn, Harris, & Raynard, 1999; Ginsberg, 2004; Sasson et al., 2005; Scarciglia, 2003; Stavrakaki & Antochi, 2004) and pregnancy in OCD (Abramowitz, Schwartz, & Moore, 2003a; Altemus, 2001; Lochner et al., 2004; Williams & Koran, 1997). Recently, de Silva and Marks (2001) presented a series of cases linking the expression and/or content of obsessions to the nature of trauma. In all cases, onset was aggressive and proceeded by trauma. For example, one of the cases involved sexual assault, which was followed by feelings of 'being unclean' and lead to thoughts about dirt and contamination. This was then followed by corresponding urges to neutralise these feelings.

Obsessive-compulsive symptomatology has been reported to be sensitive to hormonal changes (Altemus, 2001; Altemus, Swedo, Leonard, Richter, & et al., 1994; Pigott, 1998;

Weiss, Baerg, Wisebord, & Temple, 1995; Williams & Koran, 1997). Consistent with previous research, changes in obsessive compulsive symptoms have been observed during the premenstrual phase, (Williams & Koran, 1997), and menarche (Labad et al., 2005; Lochner et al., 2004), with an increased vulnerability towards OCD during pregnancy (Altemus, 2001; Diaz, Grush, Sichel, & Cohen, 1997) and menopause (Labad et al., 2005). It is thought the fluctuations in oestrogen and progesterone levels during pregnancy alter the serotonergic transmission, uptake, and binding. This in turn then precipitates or worsens obsessive the compulsive symptomatology (Stockert, 1985).

Individuals who develop OCD as a result of hormonal changes or a traumatic event tend to differ from other individuals in the swiftness of symptom onset, the course, and content of obsession e.g., preoccupation of harming the infant (Buttolph & Holland, 1990). Taken together, these findings may provide an explanation regarding the acute-onset and non-typical episodic course observed in a subset of individuals with OCD.

### *1.1.3 Prevalence*

Historically, OCD was considered a rare disorder affecting only .00005 percent of individuals (Rudin, 1953). Since the 1980s, the prevalence rate of OCD has seemingly soared with current estimates at 2-3 percent (Kolada, Bland, & Newman, 1994; Samuels & Nestadt, 1997; Sasson et al., 1997). However, the discrepancy between figures is more likely the result of the enigmatic and embarrassing nature of OCD coupled with certain sampling practises, see (Nelson & Rice, 1997) rather than a substantial increase in the number of individuals with OCD. Some studies have reported a slight variation in lifelong prevalence rates of OCD between males, .5-2.5% and females, .9- 3.5% (Weissman, Bland, Canino, Greenwald et al., 1994). While there is emerging support for this premise (Ginsberg, 2004), the majority of epidemiological studies in Europe, Asia and Africa support the contention that there are no sex differences in terms of prevalence of OCD (Cilli et al., 2004; Juang & Liu, 2001; Kaplan et al., 1994).

#### *1.1.4 Gender*

In contrast with adult OCD, where no gender differences have been reported, most studies note a 3:2 male-female ratio during childhood (Geller, Biederman, Jones, Park et al., 1998). Gender-related differences have been found in the course, development, presentation and prognosis of OCD (Bogetto, Venturello, Albert, Maina, & Ravizza, 1999; Fontenelle, Marques, & Versiani, 2002; Rosario-Campos et al., 2001; Zohar, 1999). The male profile with OCD tends to include: (a) earlier age of onset (Bogetto et al., 1999; Tükel, Polat, Genç, Bozkurt, & Atli, 2004); (b) associated tics (Chabane et al., 2005; Hemmings et al., 2004; Lochner et al., 2004); (c) more frequent history of predominant sexual, exactness and symmetry obsessions (Lensi, Cassano, Correddu, Ravagli, & Kunovac, 1996; Tükel et al., 2005), checking, symmetry and bizarre compulsions (Lensi et al., 1996) differing Axis I comorbidity and worse prognosis (Lochner et al., 2004). Females with OCD experience: (a) more washing and contamination fears (Castle, Deale, & Marks, 1995; Minichiello, Baer, Jenike, & Holland, 1990); (b) are more likely to be married (Castle et al., 1995; Lensi et al., 1996); (c) have increased comorbidity of depression (Lochner et al., 2004; Noshirvani et al., 1991) and eating disorders (Bogetto et al., 1999; Lochner et al., 2004).

This diversity in findings has provoked research into the role of gender in genetic studies of OCD (Bogetto et al., 1999; Fontenelle et al., 2002; Geller, Biederman, Jones, Shapiro et al., 1998; Lochner et al., 2004; Tükel et al., 2004). Initial studies of genes involved in the monoaminergic neurotransmitter systems have suggested a sexually dimorphic association between OCD and polymorphisms of the catechol-*O*-methyltransferase gene (COMT) and the monoamine oxidase *A* gene (MAO-A; (Hemmings et al., 2004). Specifically, males with OCD have been shown to have (a) low activity of the COMT gene (Karayiorgou et al., 1999); and (b) high activity variants of the MAO-A gene (Camarena et al., 2001). Unfortunately, studies investigating reports of gender-specific associations

between OCD and COMT polymorphisms have not been consistent (Alsobrook, 2002; Karayiorgou et al., 1999).

Whilst there is some research to suggest different OCD profiles based on gender, e.g., contamination fears are more likely to be associated with females than males (Castle, 1995; Castle et al., 1995; Kyrios, Sanavio, Bhar, & Liguori, 2001; Minichiello et al., 1990) there is also evidence to the contrary, e.g., contamination fears were higher among male subjects than females (Fischer, 1997). Clearly, further clinical and genetic research is required to fully elucidate the gender-related differences in OCD.

#### *1.1.5 Differential Diagnosis*

OCD is not diagnosed if the content of the thoughts or the activities is exclusively related to another mental disorder e.g., Social or specific phobia (preoccupation with feared object or situation), Trichotillomania (hair pulling). OCD can be distinguished from Body Dysmorphic disorder (BDD; preoccupation with appearance) by examining for content specificity as individuals with BDD are singly obsessed, whereas most individuals with OCD have multiple sentience (APA, 2000). Generalized Anxiety Disorder (GAD) is distinguished from obsessions by the fact that the person experiences them as excessive concerns about real-life circumstances (APA, 2000). For example, an excessive concern that one may lose their job would constitute as worry, not an obsession. In contrast, the content of obsessions does not typically involve real-life problems, and the individual experiences the obsessions as inappropriate. Hypochondriasis should be diagnosed instead of OCD if the rituals such as excessive washing or checking are related to concerns about illness or about spreading it to other people (APA, 2000).

Delusional or Psychotic disorder: the ability of individuals to recognize that the obsessions are unreasonable occurs on a continuum. In some individuals with OCD, reality testing may be gone, and the obsession may reach delusional proportions (the belief that one has caused the death of another by having willed it). In such cases, the presence of psychotic



features may be indicated by an additional diagnosis of delusional disorder or psychotic disorder NOS (APA, 2000). Schizophrenia: The ruminative delusional thoughts and bizarre stereotyped behaviours that occur in schizophrenia are distinguished from obsessions and compulsions by the fact that they are not ego-dystonic (separate) and not subject to reality testing. However, an individual can have both diagnoses (APA, 2000).

There is considerable overlap in symptomatology between Tourette's syndrome (TS) and obsessive-compulsive disorder (Anholt et al., *in press*; Coffey et al., 2000; Grados, 2001; Leonard, Lenane, Swedo, Rettew, & et al., 1992, 1993). Increased rates of tics are found in OCD and up to 60% of people with TS have obsessive-compulsive symptoms (Anholt et al., *in press*). Thirty to 50% of TS patients meet the diagnostic criteria for concurrent OCD (Pauls, Raymond, & Robertson, 1991). Furthermore, elevated rates of tics (10–30%), have been found in patients with OCD (Holzer, Goodman, McDougle, Baer, & et al., 1994; Zohar et al., 1997; Zohar, Ratzoni, Pauls, Apter, & et al., 1992). A wide range of OC symptoms may be seen in TS e.g. violent, sexual, & religious obsessions, checking behaviours, and hoarding behaviours, with obsessions of contamination less common. Compulsive behaviour in OCD differs from complex motor tics, in that compulsions tend to be more purposeful, more elaborate, & often occur in response to some obsession. Complex tics may be difficult to distinguish from compulsions, as in the compulsive need to touch a particular object again & again (Holzer et al., 1994).

Two studies (Miguel, Baer, Coffey, Rauch, & et al., 1997; Miguel, Coffey, Baer, Savage, & et al., 1995) have investigated the intentional repetitive behaviours between TS and OCD patients. The results found that the repetitive behaviours in TS patients were (a) often precipitated by sensory phenomena (Miguel et al., 2000); (b) less accompanied by cognitions (Anholt et al., *in press*), and (c) less anxiety-driven than in OCD with tics (Anholt et al., *in press*). Furthermore, the results showed participants with OCD and tics performed more impulse like, non anxiety-related behaviours, compared to the OCD without tic group

(Anholt et al., *in press* ; Miguel et al., 1997; Zohar et al., 1997). These findings have led some researchers to postulate that OCD with comorbid tics constitutes a variant of TS, rather than a subtype of OCD (Cath, Spinhoven, Hoogduin et al., 2001; Cath, Spinhoven, Van Woerkom et al., 2001). Anholt et al. (*in press*) investigated this issue by comparing the differences in dysfunctional cognitions across groups: OCD group without tics, OCD with tics and TS (without OCD) to those of normal controls. The results showed that the OCD without tics exhibited higher dysfunctional beliefs than TS patients. However, no differences emerged between OCD with or without tics. These findings support the argument for OCD and TS as diagnostically distinct disorders.

#### *1.1.6 OCD In Childhood*

OCD is reported to occur in 3% of children and adolescents (Zohar, 1999). The diagnostic criteria for OCD in children is identical to that of adults, with the exception that children do not have to recognise the senselessness of their obsessions or compulsions (Criterion B). The rationale for this exception is that children may lack sufficient cognitive awareness to make this judgement (DSM-IV-TR, p.457). Children with OCD tend to be described as ego-syntonic, as they are unable to make the distinction between the obsessive symptoms and the 'self'. This finding is in contrast to adults, who perceive their symptoms as ego-dystonic, or separate from themselves (unless the adult receives the diagnostic specifier "*with poor insight*"). Whether the limited insight in some children who have OCD reflects immature cognitive development or diagnostic specific differences remains unknown.

There appears to be bimodal distribution in terms of age of onset of OCD. The literature suggests that childhood-onset tends to develop between 8 and 11 years (Geller, Biederman, Jones, Park et al., 1998; Geller, Biederman, Jones, Shapiro et al., 1998; Rosario-Campos et al., 2001), whereas adult-onset develops between 19 to 25 years (Steketee, 1993). Given the evidence that males tend to develop the disorder earlier (6 -15 years) as opposed to than females (20-27 years; Sochting & March, 2002) it is not surprising that most cases of

childhood-onset OCD are characterised by a male predominance, 3:2 male-female ratio (Flament, Whitaker, Rapoport, Davies, & et al., 1988; Geller, Biederman, Jones, Park et al., 1998). As discussed, earlier onset cases are more likely to have stronger familial aggregation of OCD, and differ in symptom profile and comorbidity (Farrell, 2004). In terms of continuity, it is estimated that 50-70% of children with OCD continue to experience the disorder in adulthood (Bolton, Luckie, & Steinberg, 1995).

Childhood Obsessive–Compulsive Disorder (OCD), once considered as a rare disorder, has an estimated lifetime prevalence rate of 2–3% (Zohar, 1999). In community samples, prevalence rates range from 1.9% in the US (Flament et al., 1988) to 4.1-10% in a Danish sample (Thomsen, 1993). In clinical samples, estimates range from .2-1.2% in US samples (Hollingsworth, 1980; Tolin, Abramowitz, Kozak, & Foa, 2001) to 1.3 in a Dutch sample (Thomsen, 1991) and 5% in a Japanese sample (Honjo, Nishide, & Toki, 1998). The course of OCD varies greatly, and often has an episodic course. A recent study (Leonard, Swedo, Lenane, Rettew, & et al., 1993) showed that 43% - 68% of children diagnosed with OCD continue to meet diagnostic criteria 2 -14 years after initial presentation.

Like adults, the presentation of OCD in children is highly heterogeneous. The majority of children with OCD (90%) manifest both obsessions and compulsions, with the content of the child's obsessive and/or compulsive behaviour varying over time (Farrell, 2004; Foa & Kozak, 1995). The most prevalent obsession and/or compulsion in childhood OCD includes contamination – hand washing; and aggressive - avoidance obsessions and/or compulsions (Eichstedt & Arnold, 2001; Farrell, 2004; Riddle, 1990). However, for a large majority of children with OCD, the compulsive behaviour includes the repetition of certain actions or behaviours until the child feels “just right” (Swedo et al., 1989). This phenomenon termed “not just right experiences (NJRE)” (Coles, Heimberg, Frost, & Steketee, 2005) is often associated with perfectionism, and will be discussed in greater detail Chapter 2.

Some predisposing factors have been identified in childhood anxiety disorders and can include: (a) history of cautious, inhibited behaviour in early childhood (Biederman, 1990); (b) parental anxiety disorder (Rosenbaum, 1991; Turner, Beidel, & Costello, 1987); (c) family dysfunction (Alonso et al., 2004; Messer, 1994); (d) high rates of neurological soft signs (Bolton, Raven, Madronal-Luque, & Marks, 2000); (e) increased school difficulties (Last & Strauss, 1990; Sukhodolsky et al., 2005); (f) poor social skills (Last & Strauss, 1989); and (g) dependent or inflexible temperamental traits (Messer, 1994). However, it is important to note that these variables are correlates, not causal factors in OCD. It may be the case that a child with OCD develops poor social skills in response to obsessive behaviour, and not the other way.

The diagnosis of OCD in the absence of other psychological disorders is relatively rare (Swedo, Leonard, & Rapoport, 1992) with estimates ranging from 50-80% for comorbid clinical disorders in childhood (Zohar, 1999). Twenty-five to fifty per cent of children with OCD experience a current or past history of another anxiety disorder (Geller, Biederman, Griffin, & Jones, 1996; Swedo et al., 1989). Twenty to seventy-three per cent of children with OCD receive an additional diagnosis of depression (Flament et al., 1990; Geller et al., 1996). Other conditions of note include learning disorders, disruptive behavioural disorders (Geller, Biederman, Faraone, Agranat et al., 2001; Geller, Biederman, Faraone, Bellordre et al., 2001; Geller et al., 1996), and Tourette's disorder (Geller, Biederman, Faraone, Bellordre et al., 2001). The risk of developing other psychological disorders (e.g., anxiety, mood and/or personality disorders) is reportedly increased if the diagnosis of OCD is given in childhood (Thomsen, 1993).

Small subsets of children with OCD are classed as having a Paediatric Autoimmune Disease Associated with Streptococcal Infection or PANDAS (Swedo et al., 1998). This type of OCD is thought to be etiologically distinct, developing in response to Group A  $\beta$ -haemolytic streptococcal infection (GABHS). It is thought that GABHS triggers the abrupt

onset or exacerbation of tics/obsessive-compulsive behaviours (Singer & Loiselle, 2003). Pathophysiologically, it is proposed that antibodies produced against GABHS cross-react with neuronal cells, in a process involving molecular mimicry (Singer & Loiselle, 2003). Generally, this form of OCD is characterised by: (i) pre-pubertal onset; (ii) associated neurological abnormalities (motoric hyperactivity); and (iii) abrupt onset of symptoms or an episodic course in which exacerbations are temporally related to streptococcal infections.

For the most part, childhood OCD has been conceptualised within the adult cognitive models of OCD. Sochting and March's (2002) single-case studies demonstrated consistencies between child-and-adult appraisal processes in OCD. For example, one case described a 13-year old boy with repeated images of a dead animal his family had encountered once when driving in their car. Attempts to neutralise this image involved 'mentally rewinding the image'. During the course of standard behavioural treatment, concerns regarding excessive responsibility emerged. The child reported feeling almost 50% responsible for the animal's death, as he had failed to warn the driver of the car. This case supports the prevailing view that children with OCD, like adults engage in dysfunctional appraisals, which may not be readily apparent in the context of a particular obsession.

The trend to transpose adult models of OCD onto children with the disorder has recently been examined. There is currently some debate as to whether the appraisal processes underlying adult forms of OCD are the same in childhood. One hypothesis is that these cognitive biases operate within a developmental sequelae (Farrell, 2004). In a recent study, Lara Farrell (2004) investigated the developmental differences in cognitive processing of threat in a sample of individuals with OCD<sup>1</sup>. Using self-report questionnaires and an idiographic assessment approach, Farrell evaluated whether a sample of children ( $n = 34$ ), adolescents ( $n = 39$ ) and adults ( $n = 38$ ) with OCD would respond to stimuli sourcing the

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<sup>1</sup> As per the requirements of a dissertation.

cognitive appraisals of responsibility, probability, severity, thought-action fusion (TAF), thought-suppression, self-doubt and cognitive control.

Farrell (2004) hypothesized that age-related differences would be apparent in reported responsibility for harm, probability of harm, severity of harm, thought suppression, TAF, self-doubt and cognitive control. Compared to adolescents and adults with OCD, Farrell (2004) demonstrated that children: (i) experience fewer intrusive thoughts; (ii) experience less distress and uncontrollability; (iii) were *less likely to endorse responsibility attitudes*, probability biases and thought suppression strategies; (iv) were comparable to adults and adolescents in cognitive processes of TAF, perceived severity of harm, self-doubt and cognitive control.

The finding that children with OCD were less likely to endorse statements reflecting inflated responsibility beliefs was extremely surprising given the central role of this belief in contemporary cognitive models. Whilst there appears to be some consistency within the literature regarding the role of dysfunctional beliefs in OCD, there are discrepancies between the developmental stage and the cognitive processing of certain beliefs (e.g., inflated responsibility beliefs). Although beyond the scope of this dissertation, this issue warrants further investigation given the implications for current cognitive models of OCD e.g (Salkovskis, 1985, 1989)

## 1.2 Comorbidity

### *1.2.1 Anxiety Disorders*

The comorbidity of OCD with other anxiety disorders has been widely investigated (Abramowitz & Foa, 1998; Black & Noyes, 1997; Crino & Andrews, 1996; Foa & Kozak, 1995), with the majority of studies revealing the frequent co-occurrence of anxiety disorders. OCD is reported to be highly associated with phobic disorders (Rasmussen & Eisen, 1989), particularly social phobia (Angst et al., 2005). However, while OCD subjects tend to have

relatively high rates of co-occurring lifetime anxiety disorders, this association appears to be one-sided, with other anxiety disorders, most notably panic disorder with agoraphobia, experiencing low rates of OCD (Crino & Andrews, 1996).

Recently, the comorbidity of OCD and generalised anxiety disorder (GAD) has become of interest due to the resemblance between obsessional phenomena and worries. Abramowitz and Foa (1998) investigated this issue by dividing participants with OCD ( $n = 381$ ) into two groups based on the presence or absence of GAD. In line with other estimates, 20% of the sample experienced both OCD and GAD (Brown, Moras, Zinbarg, & Barlow, 1993). The results demonstrated (i) a higher preponderance of females than males in the comorbid group; (ii) the presence of GAD did not elevate the severity of OCD symptoms; and (iii) patients with comorbid GAD reported more worries about 'every-day' issues, compared to those without GAD. Thus, despite the similarities between disorders, the general consensus is that obsessions tend to be specific; whilst GAD involves the excessive worry about real, everyday life problems (Turner, Beidel, & Stanley, 1992)

The high comorbidity of OCD and other anxiety disorders is thought to arise as many of the anxiety disorders share similar underlying themes e.g., desire to escape (Marks, 1987), persistent misinterpretations of particular stimuli as threatening (Lazarus & Folkman, 1984) and the underestimation of one's ability to cope effectively with the perceived threat (Beck, Emery, & Greenberg, 1985). For example, in Post Traumatic Stress Disorder (PTSD), the person appraises intrusive recollections as indications of their mental instability, which causes a number of dysfunctional assumptions about their safety, which manifests in pathological anxiety (Ehlers & Clark, 2000). Whilst the DSM-IV-TR anxiety disorders are diverse in presentation and precipitants, the underlying processes maintaining the anxiety (e.g., threat aversion) are quite similar. This may be one explanation as to the high rate of co-occurring anxiety disorders.

### *1.2.2 Negative Affect*

In the 1950s, psychiatric literature conceptualised depression and OCD as part of the spectrum of neurotic disorders (Clark, 2002a). These psychoneurotic disorders, as they were classed in the first editions of the DSM, reflected the predominant ethos that both disorders originated from dysfunctional anxiety states. It was not until the late 1980s and the DSM-III that depression and OCD were recognised as being diagnostically distinct mood and anxiety disorders. Whilst later DSM editions provided diagnostic clarification regarding OCD and depression, clinically the association between mood and OCD can be arbitrary, with evidence showing depression to be the most frequent complication of OCD (Black & Noyes, 1990). This finding may suggest a correlational relationship between OCD and mood disturbance, with either state serving as the precipitant.

Major Depressive Disorder (MDD) is a most common comorbid axis I disorder for individuals with OCD. Across studies, MDD tends to be the most common additional diagnosis with prevalence rates ranging from 20.7% to 22% and from 54% to 66% for additional current and lifetime diagnoses, respectively. Current estimates range from 32% to 71% (Brown, Campbell, Lehman, Grisham, & Mancill, 2001), with 52% of children experiencing major depressive disorder (Swedo et al., 1989) The presence of depression is reported to be equivocal across all anxiety disorder groups (Crino & Andrews, 1996)

Research by Denys and colleagues (Denys, de Geus, van Megen, & Westenberg, 2004) has shown that onset of OCD tends to precede rather than follow depression. These findings have led some researchers to suggest that OCD may be an affective variant (Zohar & Insel, 1987). The majority of support for this viewpoint is derived from two main sources, including (i) favourable response to treatment of antidepressant medication (Hudson & Pope, 1990); (ii) epidemiological data confirming the frequent co-occurrence of OCD and depression (Karno, Golding, Sorenson, & Burnam, 1988).



Concurrent mood disturbance in OCD has been reported to impact treatment efficacy. Severe depression has been reported to impede the efficacy of behavioural treatment of OCD (Abramowitz & Foa, 2000; Abramowitz, Franklin, Street, Kozak, & Foa, 2000; Braun, 2005; Foa, 1979; Foa et al., 1983) affecting the frequency, controllability and severity of intrusive cognitions. Negative mood states are reported to increase the vulnerability for obsessions (Rachman, 1971; Rachman, 1981; Reynolds & Salkovskis, 1991; Ricciardi & McNally, 1995) and prolong the duration of the intrusive thought, image or impulse (Rachman, 1981; Rachman & Hodgson, 1980). Consequently, most psychological interventions focus on both depressive and obsessive symptomatology concurrently (Ricciardi & McNally, 1995).

The considerable degree of comorbidity across the various anxiety and mood disorders has led some researchers to focus on the shared characteristics between these disorders rather than the difference (Barlow, Allen, Choate, 2004). This has led to the development of unified models of emotional disorders (e.g. see Clark and Watson, 1991 tripartite model of emotional disorders and Barlow, 1991, 2000, 2002 "triple vulnerabilities" model). These models conceptualise the heterogeneity in the expression of emotional disorder symptoms (e.g., individual differences in the prominence of social anxiety, panic attacks, anhedonia, etc.) as varied manifestations of a broader syndrome (Barlow, Allen & Choate, 2004). This type of approach suggests that anxiety and mood disorders emerge from shared psychosocial and biological/genetic diatheses in which with "negative affect syndrome" (NAS) plays a functional role. The evidence for this viewpoint is derived from studies demonstrating that psychological treatments for a given anxiety disorder produce significant improvement in additional comorbid anxiety or mood disorders that are not specifically addressed in treatment (Borkovec, Abel, & Newman, 1995; Brown, Antony, & Barlow, 1995). These findings have led some researchers to question the clinical utility of making these conceptual distinctions between the anxiety and mood disorders.

### *1.2.3 Personality Disorders*

The nature and relationship of OCD to Obsessive Compulsive Personality Disorder (OCPD) has been the subject of considerable debate (Gibbs & Oltmans, 1995). However, the similarity between both disorders is in name only, as the clinical presentation is quite different. Whereas OCD is characterised by obsessions and compulsions, OCPD involves a persistent pattern of preoccupation with orderliness, perfectionism, and control (APA, 2000). Several studies have supported this distinction by demonstrating that OCD patients (i) are not more likely to have OCPD than normal controls; and that (ii) OCPD is not the most frequent type of personality disorder found in these patients (Mancebo, Eisen, Grant, & Rasmussen, 2005).

The effect of personality pathology on treatment outcome of OCD has been met with mixed results. Some research suggests that the presence of any personality disorder, irrespective of type, is unrelated to treatment outcome (Baer, Jenike, Black, Treece, & et al., 1992). Conversely, others have reported markedly lower rates of response to behavioural treatment for OCD patients with paranoid, schizoid and schizotypal personality disorders (de Haan et al., 1997; Minichiello, Baer, & Jenike, 1987). Therefore, the true effect of comorbid personality disorders and OCD requires further analysis.

### *1.2.4 Tourette's Disorder*

There is also evidence of a strong link between OCD and Tourette's Disorder in children and adults. Estimates of the comorbidity of Tourette's and OCD range from 36% to 52% (Leckman & Chittenden, 1990; Pauls, Towbin, Leckman, Zahner, & et al., 1986). A further 20 to 30 percent of individuals with OCD have reported current or past tics (American Psychiatric Association, APA, 2000), with 5 to 7 percent of people with OCD experiencing Tourette's Disorder (Rasmussen & Eisen, 1989). Childhood OCD has also been linked with learning disorders and disruptive behavioural disorders. To that end, some researchers have

speculated that specific types of OCD exist according to comorbidity, specifically tic disorders. This issue will be addressed later in Chapter Three.

### *1.2.5 Schizotypy*

It has been suggested that the magical or superstitious qualities observed in some individuals with OCD (e.g., touching the door handle five times to avoid something bad from occurring) reflects schizotypal traits (Lee, Cogle, & Telch, 2005) or a schizotypy subtype of OCD (Sobin, Blundell, Weiller et al., 2000). Schizotypy is conceptualised as a multi-factorial personality liability for schizophrenia (Korfine & Lenzenweger, 1995; Lenzenweger, 1999; Lenzenweger & Korfine, 1992). Schizotypal traits include (i) magical thinking or rituals (e.g., an airplane arriving early at its destination is the direct result of you thinking an hour earlier that it should); (ii) paranoid ideation (e.g., believing that your neighbours are trying to kill your dog); and (iii) unusual perceptual experiences (e.g., hearing voices, or seeing an imagery person).

Magical Ideation (MI) in OCD refers to the belief that certain thoughts or behaviours exert a causal influence over outcomes (Evans, Milanak, Medeiros, & Ross, 2002). MI is reported to be an indicator of schizotypy (Eckblad & Chapman, 1983). Research by Einstein and Menzies (2004) examined the presence of MI in 60 individuals with OCD. The results suggested that MI was strongly related to OCD severity and content of intrusive thoughts. Individuals with predominantly aggressive and atypical symptoms were shown to be particularly prone to MI, whilst those with compulsive washing compulsions and contamination obsessions were not.

Several lines of research support the above proposal<sup>2</sup>. A recent study (Moritz et al., 2004) investigated whether positive schizotypal symptoms predicted treatment outcome in

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<sup>2</sup> The majority of support for this association lies in a shared cognitive bias termed Thought-Action Fusion (TAF). This bias will be discussed in greater detail towards the end of the Chapter.

OCD. Fifty-three patients participated in cognitive behavioural therapy with and without medication. The results supported the contention that positive schizotypal symptoms were antecedents for treatment failure in OCD. Further support for the link between schizotypal characteristics and OCD has been found by Lee et al. (2005) who demonstrated that in a sample of undergraduate students ( $n = 969$ ), schizotypal traits emerged as a more potent predictor of OCD symptoms relative to depression or general anxiety. Another study (Sobin, Blundell, Weiller et al., 2000) used the Structured Interview of Schizotypy to assess schizotypal traits in 119 adults with OCD. Fifty per cent of the sample reported mild to severe positive schizotypal traits. The patients with OCD and schizotypy traits were distinguishable by: age of onset, greater number of comorbid diagnoses, increased rates of learning disability, aggressive and somatic obsession, and counting and arranging compulsions.

As with other anxiety disorders and OCD, recent cognitive approaches investigating the similarities between schizophrenia and OCD place the emphasis on the misinterpretation of benign stimuli (Morrison, 1998). Morrison argues that auditory hallucinations can be understood as normal phenomena which are interpreted as threatening. According to this model, the associated distress produces safety seeking behaviours which serve to maintain the importance of the hallucinations. A common theme underlying most cognitive conceptualisations of psychosis is that the auditory hallucinations associated with the psychosis are an activating event, and the meaning attributed to these voices governs subsequent affective behaviour (Birchwood & Chadwick, 1997).

Whilst there is increasing interest in the similarities between OCD and schizophrenia (Poyurovsky & Koran, 2005), these findings should be interpreted within the context of the following limitations. Firstly, schizophrenia is known to be subject to considerable genetic (Bassett, Chow, Waterworth, & Brzustowicz, 2001; Moldin & Gottesman, 1997), neurological (Malla, Norman, Aguilar, & Cortese, 1997; Wong, Voruganti, Heslegrave, &

Awad, 1997), and neurobiological (Egan & Weinberger, 1997; Voruganti, Heslegrave, & Awad, 1997) influences. Secondly, it is possible that the misinterpretation model applies to only positive (e.g., delusions, hallucinations), and not negative (affective flattening, alogia) symptoms, as there is substantial evidence supporting a positive–negative symptom distinction (Lenzenweger, 1999). Thirdly, it is possible that the observed rates of schizotypy in OCD are the result of criterion contamination (Salkovskis, 1996), rather than a ‘schizotypy subtype of OCD’. Clearly, further research is required to fully elucidate the relationship between OCD and schizotypy traits.

#### *1.2.6 Obsessive Compulsive Spectrum Disorders (OCS)*

The heterogeneous nature of OCD has prompted some debate regarding what is termed Obsessive-Compulsive Spectrum Disorders (OCS; Hollander, 1993; Hollander & Evers, 2004; Hollander & Rosen, 2000; Hollander & Wong, 1995; Lochner et al., 2005; Lochner & Stein, *in press*). One of the most influential proponents of the OCS is Eric Hollander. Hollander and colleagues have described three broad categories of OCS; (i) disorders involving preoccupation with bodily appearance and sensations (e.g., Body Dysmorphic Disorder (BDD), eating disorders, hypochondriasis); (ii) impulse control disorders (pathological gambling, trichotillomania, sexual compulsions, kleptomania, compulsive shopping and self-injurious behaviours); and (iii) neurological disorders with compulsive features (e.g., Autism, Tourette’s disorder, and Sydenham’s chorea (see PANDAS)). These disorders are reported to lie along a continuum of compulsivity vs. impulsivity (Oldham, Hollander, & Skodol, 1996; Dan J. Stein, Harvey, Seedat, & Hollander, 2006).

Hollander and colleagues’ suggest that disorders at the compulsive end, like OCD are characterised by an over-exaggerated estimation of harm, lead to avoidance, and anxiety reduction (Hollander, 1998; Hollander & Rosen, 2000). Conversely, disorders at the impulsive end, like pathological gambling are characterised by the underestimation of harm

desire to obtain pleasure, arousal and gratification (Anholt et al., 2004). Serotonin appears to be the neurotransmitter system primarily implicated across the spectrum, with increased serotonergic sensitivity and frontal lobe activity in compulsive disorders and decreased serotonergic sensitivity and frontal lobe activity in impulsive disorders (Hollander & Evers, 2004).

Currently research suggests that inclusion as a OSCD should be based on five primary dimensions (Hollander & Rosen, 2000): (i) clinical symptoms (intrusive thoughts, repetitive behaviours); (ii) associated features (age of onset, demographic, family history, course comorbidity); (iii) neurobiology; (iv) response to treatment for OCD; and (v) etiology (genetics, environmental factors). The OCSD theory raises some interesting theoretical questions. Firstly, as this model is predominantly biological, very few studies have tested the psychological similarities within OCSD, like symptom structure and underlying dysfunctional cognitions (Anholt et al., 2004). Secondly, it is unclear whether some dimensions are more important than others, i.e., clinical features versus etiology, see (Antony, 2002) for review. Thirdly, it is unknown whether OCSD's are uniquely related to OCD, or whether they are related to other forms of pathology. For example, Hollander (1998) has argued that disorders of bodily preoccupation like Body Dysmorphic Disorder (BDD) should be considered part of the OCSD. However, whilst BDD and OCD share similar clinical features (e.g., repetitive thoughts, rumination), BDD is more commonly seen in social phobia (12%) than OCD (7.7%) (Wilhelm & Neziroglu, 2002; Wilhelm, Otto, Zucker, & Pollack, 1997).

In short, firmer guidelines are required when discussing which disorders should be considered OSCD. Whilst some disorders currently considered OCSD share remarkably similar symptom profiles, they often have etiologically distinct pathways (e.g., substance abuse and OCD). A promising line of investigation involves examining whether the disorders considered OCSD are characterised by elevated levels of perfectionism or other belief

constructs. For example, Shafran (2002) has questioned whether the high levels of perfectionism observed in some individuals with OCD precipitate the development of other perfectionism-related disorders, like anorexia. Although in infancy, this proposition has support when the rates of comorbidity between OCD and other perfectionism-related disorders (e.g., social phobia, depression) are considered (Antony, Downie, & Swinson, 1998).

### *1.2.7 Impulse Control Disorders (ICD)*

Some researchers have suggested that Impulse Control Disorders (ICDs) are part of the obsessive-compulsive spectrum (Grant, Mancebo, Pinto, Eisen, & Rasmussen, *in press*). Like OCD, the ICDs are characterised by repetitive, compulsive and uncontrollable behaviours (Fontenelle, Mendlowicz, & Versiani, 2005) which reflect deficits in either reward-seeking and/or impulse regulation (Grant et al., *in press*) There is no consistency as to which disorders should be grouped as an ICD. However, some of the most common ICDs include pathological gambling, pyromania, kleptomania, and binge eating, trichotillomania, skin picking, and nail biting (Grant et al., *in press* ; Hollander & Stein, 2006)

The prevalence of ICDs among individuals with OCD is unclear. However, a recent study by Grant et al. (*in press*) demonstrated a lifetime ICD prevalence of 16.4% and a current ICD prevalence of 11.6% in a sample of 48 individuals with OCD. In this sample, the most common ICDs were skin picking (lifetime, 10.4%; current, 7.8%) and nail biting (lifetime 4.8% and current 2.4%) were the most common ICDs. Interestingly, the results showed those individuals with predominantly hoarding and symmetry obsessions were more likely to have an ICD. Additionally, individuals with both OCD and ICDs reported significantly worse OCD symptoms and poorer functioning and quality of life (Grant et al., *in press*). Overall, the findings suggested a low prevalence of ICDs among individuals with OCD, although certain ICDs (e.g., skin picking) may be more common.

However, the similarities between disorders are in appearance only, as stark differences emerge when evaluating the underlying motivation for the behaviour. Individuals with ICDs exhibit elevated scores on measures of risk-taking and sensation seeking (Moreyra, Ibanez, Saiz-Ruiz, & Blanco, 2004). In contrast, individuals with OCD are generally harm avoidant with a compulsive risk-averse endpoint to their behaviours (Hollander, 1993 cited in Grant et al., *in press*).

### 1.3 Assessment

The focus of assessment is often influenced by the discipline of the clinician. From a clinical psychological perspective, the assessment process should involve: a detailed clinical interview and psychological tests (e.g., self-report questionnaires), collateral information obtained via family and support people, as well as the referral to medical specialists if appropriate (e.g., if the symptoms are reflective of organic origins). The following sections will review the empirical approaches towards the assessment of OCD in adults.

#### *1.3.1 Structured And Semi-Structured Assessments*

Diagnostic assessments can consist of a structured or semi-structured interview. Structured and semi-structured interviews were developed to increase the reliability of a diagnosis. In this type of assessment, confounding factors which may impede on reliable diagnosis are minimised, as the content, format and questions to be asked are standardised (Summerfeldt & Antony, 2002). The two most common validated interviews for diagnosing OCD in adults are the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-Clinician Version (CV); (First, Spitzer, Gibbon, & Williams, 1997) and the Anxiety Disorders Interview Schedule for DSM-IV; ADIS-IV (Di Nardo, Brown, & Barlow, 1994).

The SCID is a semi-structured interview administered by the clinician to assist in the diagnosis of Axis I and II DSM-IV disorders. There are several versions: the SCID-clinician version (SCID-CV) and the SCID-research version (SCID-RV). Research has shown good



reliability (.61) in patient samples using the SCID (Williams, Gibbon, First, & Spitzer, 1992), as well as a high concordance rate with the SCID and other standardised measures (First & Gibbon, 2004). The ADIS is also a semi-structured clinician administered interview focused specifically on the reliable diagnosis of the DSM-IV anxiety disorders. The ADIS-IV has two separate versions, one determining current diagnoses, and another assessing lifetime problems (includes current and past issues). Like the SCID, research has shown the ADIS to demonstrate good reliability (Brown, Di Nardo, Lehman, & Campbell, 2001) and construct validity (Summerfeldt & Antony, 2002).

As there are a range of physical and psychological disorders which can mimic OCD, standardised measures like the ADIS and SCID become extremely helpful in facilitating a clear diagnostic picture. For example, individuals with physical disorders like temporal lobe epilepsy, traumatic head injuries, postencephalitic complications, and drug-induced conditions can often display obsessive-compulsive behaviour. Likewise, the diagnosis of OCD can often be difficult given the similarities with other psychological disorders, e.g., Body Dysmorphic Disorder (BDD; preoccupation with minor or imagined physical defects), Trichotillomania (compulsive hair pulling) and hypochondriasis (unfounded fear of serious illness). Consequently, instruments like the ADIS and SCID are widely used because they decrease inconsistencies and assist in the reliability and accuracy of diagnosis.

After DSM-IV-TR diagnosis of OCD has been established, it is important to schedule another session with the client prior to therapy to explore other variables. These include (a) identifying specific threat cues that cause the client distress; (b) identify what the client believes will be the consequence of engaging in their rituals; (c) determine the strength of belief in the obsessional ideation (i.e. degree of insight); (d) gather information regarding particular avoidance behaviours and rituals; (e) collect as much information regarding onset, course of disorder, and outcome of previous treatments; (f) determine the extent of disruption in social functioning; (g) identify maintenance variables (e.g., safety-seeking behaviours);

and (h) assess mood state and risk. Following a diagnostic and clinical interview, it is important to quantify the severity of OCD symptoms using several psychometric measures.

### *1.3.2 Psychometric Scales*

Several self-report measures have been developed to assess the content and severity of obsessive-compulsive symptomatology. These scales differ with respect to their psychometric properties and focus. The measures described below tend to assess symptom severity and/or content of obsessions and compulsions. These tests were developed to aid in the assessment of OCD, not to replace a clinical interview. The most widely used self-report measures for OCD include: the Maudsley Obsessive Compulsive inventory; MOCI (Hodgson & Rachman, 1977), the revised Padua Inventory; PI-R (Burns, Keortge, Formea, & Sternberger, 1996) the Leyton Obsessional Inventory; LOI (Cooper, 1970); The Compulsive Activity Checklist; CAC (Freund, Steketee, & Foa, 1987); and The Yale Brown-Obsessive Compulsive Scale; YBOCS (Goodman, Price, Rasmussen, Mazure, & et al., 1989).

The MOCI is designed to assess specific symptoms of OCD. The 30-items in this scale are spread across four subscales: (a) washing; (b) checking; (c) obsessional slowness/repetition; and (d) excessive doubting. Each item is rated true or false and yields a total score of 30. Scores above 30 are indicative of OCD. The MOCI has been reported to have acceptable internal consistency for the subscales (Richter, Cox, & Direnfeld, 1994) test-retest reliability (Hodgson & Rachman, 1977) and good convergent validity with a number of other OCD measures (Taylor, 1998). The PI-R consists of 39 items, with five subscales assessing: (a) obsessional thoughts about harm to oneself or others; (b) obsessional impulses to harm to oneself or others; (c) contamination obsessions and washing compulsions; (d) checking compulsion; and (e) dressing and grooming compulsions. The PI-R has good internal consistency (.77 to .88) and test-retest reliability (.61 to .84) over 6-7 months (Burns et al., 1996).

The LOI consist of 69 yes/no items, two subscales assessing: symptoms (46-items; (b) traits (23-items). The primary aim of the LOI is to differentiate between normal perfectionist obsessive-compulsive symptoms. There are inconsistent findings regarding the reliability and validity of the LOI. However, the scale has shown good internal consistency (alphas = 0.75 to 0.90) in some studies (Richter et al., 1994), acceptable test-retest reliability ( $r_s = .73$  to  $.84$ ; (Kim, Dysken, & Kuskowski, 1990) and good convergent validity with other measures of OCD ( $r_s = .38$  to  $.77$ ; see (Taylor, 1995). Whilst the LOI is a good screening tool for OCD symptoms, it inadequately measures overall symptom severity and tends to be biased towards cleaning and contamination symptoms (Kim et al., 1990).

The CAC has several versions: clinician administered and self-report. The self-report version consists of 38-items and assesses OCD-related interference associated with a range of daily routines and activities. The self-report version of the CAC has demonstrated good internal consistency (alphas =  $.86$  to  $.95$ ) and test-retest reliability ( $r = .74$ ; (Sternberger & Burns, 1990). The CAC is reported to be less acceptable with regard to discriminant validity, with large correlations between the CAC and other non-OCD measures (Taylor, 1995). Consequently, the CAC should be used in conjunction with other scales like the PI-R.

The YBOCS is generally considered to be the gold standard for measuring and assessing OCD symptoms (Taylor, 1998). There are several versions: clinician-administered interview, computer-assisted version (Baer, Brown-Beasley, Sorce, & Henriques, 1993) and a computerized version (Rosenfeld, Dar, Anderson, Kobak, & Greist, 1992). Research has shown both versions to demonstrate good psychometric properties (Steketee, Frost, & Bogart, 1996). As Study I used the YBOCS self-report version, and Study II used the YBOCS clinician-administered interview, the administration and psychometric properties for both versions will be discussed in the methodology sections of the individual studies.

Other less commonly used scales include the Meta-Cognitive Beliefs Questionnaire, MCBQ (Clark, Purdon, & Wang, 2003); Obsessive Compulsive Beliefs Questionnaire,

OCBQ (Steketee, Frost, & Cohen, 1998); Responsibility Appraisal Scale, RAS (Salkovskis et al., 2000); Responsibility Interpretations Questionnaire, RIQ (Salkovskis et al., 2000); and Thought-Action Fusion Questionnaire, TAF (Shafran, Thordarson, & Rachman, 1996). These measures were designed to assess general and specific domains of beliefs considered important in OCD (Taylor, Kyrios, Thordarson, Steketee, & Frost, 2002).

More than 15 scales have been developed to assess the role of cognition in OCD (Taylor et al., 2002). The plethora of instruments designed to measure essentially the same aspects of cognition led to a confusing picture as to the role of cognition was in OCD. In an attempt to provide some consistency within research and clinical spheres, the Obsessive Compulsive Cognitions Working Group (OCCWG, 1997, 2001, 2003, 2005) developed two comprehensive scales: Obsessive Beliefs Questionnaire (OBQ) and the Interpretation of Intrusions Questionnaire (III). Recent and research by the OCCWG (1997, 2001, 2003, 2005) in the cognitive assessment of OCD will be discussed in Chapter 3.

#### 1.4 Chapter Summary

OCD is characterised by clinically significant repetitive intrusive thoughts and compulsive behaviour. OCD has a lifetime prevalence rate of approximately 2.3 percent, and typically occurs between the ages of 19 to 25 with an earlier onset reported in males. Presentation is diverse, but often includes: (a) contamination fears and washing/cleaning compulsions; (b) thoughts of harming others and checking compulsions; (c) preoccupation with symmetry and arranging/ordering compulsions. Compulsive behaviour is conceptualised as a response to the anxiety elicited by the obsessive thought. It is estimated that intrusions of the types experienced by obsessional patients, also occur in 80-90 percent of the general population.

Childhood OCD occurs in 3% of children and adolescents and is characterised by a 3:2 male-female predominance. The diagnostic criteria for childhood OCD is identical to that

of adults, except that children are not required to have insight into their symptoms. Children with OCD tend to have both obsessions and compulsions, with the content and course of the disorder intrinsically linked. A large majority of children (50-70%) continue to have OCD in adulthood. The risk of developing other psychological disorders later in life is also increased with childhood-onset-OCD. Etiologically, childhood OCD is generally conceptualised within adult models. Recently however, research (Farrell, 2004) has highlighted distinct differences in cognitive processing of certain beliefs between adults and children with OCD suggesting that the developmental sequelae may be an important variable in OCD.

OCD commonly occurs alongside other psychological disorders, particularly other anxiety disorders. In childhood, research suggests: (a) 50-80% of children with OCD have comorbid disorders; (b) 25-50% of children with OCD experience a current or past history of another anxiety disorder; (c) 20-73% of children with OCD receiving an additional diagnosis of depression. In adults, OCD commonly co-occurs with Social Phobia (26%), Panic Disorder with Agoraphobia (15%), depression (current diagnosis 32%, lifetime diagnosis 71%), some personality disorders and Tourette's Disorder, particularly in children (36% to 52%). The vast array of comorbid disorders led some researchers to suggest Obsessive-Compulsive Spectrum Disorders (OCSD). Whilst in infancy, the recent evidence supports the proposal of OCSD.

The assessment of OCD is multifaceted, usually involving structured and/or semi-structured interview and psychometric testing (e.g., self-report measures or clinician-administered). Two empirically supported diagnostic interview schedules include: the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-CV; First et al., 1997) and the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-CV; Di Nardo et al., 1994). Assessment of OCD is often complicated by the presence of one or more co-occurring disorders (e.g., anxiety, mood).

There are many etiological models of OCD. One of the most popular approaches involves cognitive–appraisal models of OCD (see Salkovskis, 1985, 1989, 1996; Rachman, 1993). These models suggest that, as a result of prior experience, the individual develops particular assumptions (Salkovskis et al., 1999). The occurrence of a particular event or situation activates previously dormant beliefs (Salkovskis et al., 1999). These belief systems affect the way in which the thoughts or intrusions are interpreted. Obsessive compulsive symptoms arise because underlying beliefs fuel the misinterpretation of significance of the intrusive thoughts. The symptoms continue because the compulsive behaviour is strengthened by the temporary relief in anxiety, which prevents the individual from testing the accuracy of the obsessive thought.

While much is known regarding the descriptive features of OCD, there are still many inconsistencies within the literature regarding the etiological pathways of this disorder. Chapter two provides a review of current literature pertaining to the different causal models of OCD.

## CHAPTER 2

### 2. ETIOLOGICAL MODELS OF OBSESSIVE COMPULSIVE DISORDER

The perplexing nature of clinical obsessions is matched by a paucity of research regarding the etiological components involved in this disorder. Etiological models of OCD differ in methodology, theoretical framework and formulation. Prior to discussing current psychological approaches to OCD, it is necessary to explore past models which evoked such perspectives. The following sections will outline the most empirically supported etiological theories of OCD, under the umbrella terms biological, neuropsychological and psychological models. Biological models include: (a) *Genetic*; (b) *Autoimmune*; (c) *Neuroanatomical*; (d) *Neurochemical* and *Neuropsychological models*. Psychological approaches include: (a) *Psychodynamic*; (b) *Behavioural*; (c) *Cognitive-Behavioural*; and (d) *Cognitive* approaches. The final section reviews two specific cognitive theories: (a) *Salkovskis (1985, 1989, 1996) Cognitive Model of OCD*; and (b) *Rachman's (1993, 1997, 1998) Misinterpretation of Significance Theory*.

#### 2.1 Biological Models

Accumulated data from clinical, electrophysiological, psychosurgical, pharmacological, and neuroimaging have led many researchers to conceptualise OCD as a neuropsychiatric disorder with an organic basis (Braun, 2005). The following sections detail the various models assumed under this category.

##### 2.1.1 Genetic Variables

The available evidence for a strong genetic component in OCD is sparse, and essentially results from family and twin studies (Billiett, Richter, & Kennedy, 1998; Hetteema, Neale, & Kendler, 2001; Pauls, Alsobrook, Goodman, Rasmussen, & et al., 1995). The concordance rate for monozygotic (MZ) is consistently reported to be higher than dizygotic (DZ) twins, at 67.5% and 31% respectively (Billiett et al., 1998). Some studies

suggest that the familial risk for OCD may be higher in early-onset cases of OCD compared to later-onset cases (Bellodi, Sciuto, Diaferia, Ronchi, & Smeraldi, 1992). This hypothesis is supported by findings that approximately 25-30% of children and adolescents with severe primary OCD have a familial history of OCD (Lenane, Swedo, Rapoport, Leonard, & et al., 1992; Swedo et al., 1989). However, these findings are complicated by the high rate of comorbid Tourette's and/or tics often observed in early onset cases, especially male cases (Swedo et al., 1989).

There are several inconsistencies within the genetic hypothesis of OCD. The evidence for a genetic component in the pathogenesis of OCD is complicated by the near impossible task of quantifying the effects one's culture and behavioural repertoire (e.g., parental modelling) has on the subsequent development of OCD. For example, not all individuals with a genetic predisposition towards OCD develop symptoms, whilst others with no familial history produce symptoms. Perhaps research investigating gene candidates, primarily related to the serotonin (Mundo, Richter, Sam, Macciardi, & Kennedy, 2000) and dopamine systems may further clarify this see (see McDougle et al., 1994 for review).

### *2.1.2 Autoimmune*

Early reports of an association between OCD and Sydenham's chorea (SC) directed research towards the consideration of an autoimmune hypothesis of OCD. According to this hypothesis, some cases of OCD result from a disruption in autoimmune processes, specifically the cortico-striatal-thalamic-cortical circuits (Asbahr et al., 1998; Swedo et al., 1993). Support for this hypothesis arose from studies demonstrating the relatively high incidence of acute-onset OCD following streptococcal infection. This type of OCD has been coined Paediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infection, PANDAS (Swedo et al., 1998).

SC is a variant of rheumatic fever and follows streptococcal infection (Swedo, Leonard, Garvey, & Mittleman, 1996). SC, a movement disorder, arises as a result of an



antineuronal antibody-mediated response to group A  $\beta$ -haemolytic streptococcal (GABHS) infection, affecting portions of the basal ganglia. The GABHS infection is thought to trigger the abrupt onset or exacerbation of tics/obsessive-compulsive behaviours. Approximately 75% of children with SC present with obsessive-compulsive symptoms (Swedo et al., 1993).

Swedo and colleagues criteria for children with PANDAS includes: (a) presence of tics and/or OCD, (b) pre-pubertal onset of symptoms; (c) episodic course of symptom severity; (d) abrupt onset and/or correlations with the exacerbation of symptoms and GABHS infection; (e) neurological abnormalities (e.g., movement disorders); (f) have abnormal striatal volume on brain imaging; and (g) respond to immunomodulatory interventions such as plasma exchange and intravenous immunoglobulin (Stein, 2002). However, as PANDAS is a relatively new hypothesis further research is required.

Several aspects of the autoimmune hypothesis of OCD remain ambiguous. Further study is required to determine the similarities and/or differences between children with OCD without SC or streptococcal infection, versus children with OCD-related PANDAS and other disorders (Singer & Loiselle, 2003). Secondly, a major challenge in this field is the absence of a prospective epidemiologic study confirming that an antecedent GABHS infection is associated with either the onset or exacerbation of tic disorders or OCD (Singer & Loiselle, 2003). It is also important to establish the frequency of relationship of PANDAS to other factors, like genetic variables (Lougee, Perlmutter, Nicolson, Garvey, & Swedo, 2000).

### *2.1.3 Neuroanatomical Perspectives*

Early neuroanatomical models of OCD conceptualised obsessive compulsive symptoms as arising from abnormalities in the caudate nucleus (see Schwartz, 1999 for review). Evidence in support of this hypothesis can be seen in PET studies demonstrating a correlation between metabolic rates in the caudate nucleus and obsessive compulsive symptom severity (Swedo, Leonard, Kruesi, Rettew, & et al., 1992). Later, neuroanatomical models emphasised dysfunction in the basal ganglia and/or striatum (Aigner et al., 2005;

Hollander et al., 2005). However, improved neuroimaging techniques have implicated several other regions and sites of the brain (Sherlin & Congedo, 2005; Valente et al., 2005). Currently the majority of research is focused on the orbitofrontal-subcortical circuits (OFC; Saxena et al., 2001).

The orbitofrontal-subcortical circuits (OFC) are thought to connect regions of the brain that process information involved in the initiation of behavioural responses that are implemented with little conscious awareness (Saxena et al., 2001). This circuitry consists of a direct and an indirect pathway. The direct pathway projects from the cerebral cortex to the striatum to the internal segment of the globus pallidus/substantial nigra, pars reticulata complex, then to the thalamus and back to the cortex (Whiteside, Port, & Abramowitz, 2004). The indirect pathway is similar but projects from the striatum to the external segment of the globus pallidus to the subthalamic nucleus before returning to the common pathway (Whiteside et al., 2004). Obsessions and compulsions are reported to arise because of an overactivity of the direct circuit.

Research to support this hypothesis is derived from several sources, but mostly neuroimaging studies. As a full discussion of this hypothesis is beyond the scope of this thesis, the most important findings are reviewed. Firstly, PET studies have demonstrated increased glucose metabolism in the OFC, caudate, thalamus, prefrontal cortex among patients with OCD as compared to controls (Saxena et al., 2001). Secondly, disruption to the cortico-striatal-thalamic-cortical circuits via surgery has been shown to correspond with a reduction in obsessive compulsive symptoms (Savage, Deckersbach, Heckers et al., 2000) and decrease striatal volume (Rauch et al., 1998). Thirdly, functional abnormalities in the orbitofrontal cortex are positively correlated with the severity of symptoms (Lacerda, Dalgalarondo, Caetano, Camargo et al., 2003; Lacerda, Dalgalarondo, Caetano, Haas et al., 2003; Rubin, Ananth, Villanueva-Meyer, Trajmar, & Mena, 1994) and are worsened by exposure to a “contaminating” object (Monaco et al., 2005).

However, the existence of a neurobiological model of OCD should be interpreted in light of the following points. Firstly, evidence for most neurobiological models is derived from animal studies, specifically primates. Whilst there are similarities, the human brain is far more complex and has additional cortical areas (Saxena et al., 2001) which means these findings may not be applicable. Secondly, causation cannot be inferred as most of the data is correlational and it is unclear whether the alterations in functioning are caused by OCD, or a consequence of the disorder. Thirdly, it is possible that the differences found in neuroimaging studies represent different activation levels of normal, intact healthy neural systems (see Whiteside et al., 2004).

#### *2.1.4 Neurochemical Approach*

The neurochemical model of OCD suggests that OCD is caused by an imbalance in certain neurotransmitters. Support for this theory is derived from clinical studies demonstrating that certain neurotransmitters correlate with a decrease in OCD symptomology. The neurotransmitters implicated include: (a) serotonin (5-hydroxytryptamine) or 5-HT, which controls sleep, mood, some types of sensory perception, body temperature regulation, and appetite; (b) dopamine (DA) which helps control body movements, thought patterns and regulates hormone release; (c) norepinephrine, used by the CNS and the peripheral sympathetic nervous system to govern “fight or flight” responses. Whilst several neurotransmitters have been implicated in the development of OCD, the strongest findings have been found with serotonin, stimulating what is termed the “serotonergic hypothesis” (S-H) of OCD (Gross, Sasson, Chopra, & Zohar, 1998)

The strongest support for the S-H comes from the data about the selective serotonin reuptake inhibitors (SSRIs). SSRI's were developed for inhibition of the neuronal uptake pump for serotonin (5HT). The therapeutic mechanism of action of the SSRIs involves alteration in the 5-HT system. There are five clinically useful SSRI's: Paroxetine, Sertraline, Fluoxetine, Citalopram and Fluvoxamine. The earliest evidence for the involvement of the

serotonin system was the finding that clomipramine, a tricyclic antidepressant affecting 5-HT system was effective in the treatment of OCD (Abramowitz, 1997). A body of literature supports the efficacy of antidepressant agents SSRIs for treating OCD (Flament, Bisslerbe, Boyer, & Lecrubier, 1996) however there is contradictory evidence.

As discussed, the S-H has support from a number of sources (Gross et al., 1998; Zohar, Kennedy, Hollander, & Koran, 2004). However, certain limitations should be discussed. Firstly, as serotonin affects the production of other neurotransmitters like dopamine and norpinephrine, it is likely that the pathophysiology of OCD is based on a multiple neurotransmitter system (Stein, 2002). For example, a meta-analysis for four studies of potent serotonergic agents in OCD patients revealed that improvement in OCD symptoms was associated with *less* serotonergic selectivity (Kaplan & Sadock, 1998). Secondly, whilst it is likely that disrupted serotonergic function plays some role in the expression of OCD, the S-H hypothesis fails to explain why 40-60% of patients with OCD fail to respond adequately, with minimal to no change during treatment with SSRI's alone (Goodman, McDougle, & Price, 1992). Thirdly, the serotonin and dopamine systems have been shown to play a role in a range of psychiatric disorders other than OCD (Lochner & Stein, *in press*). Lastly, a range of other neurochemical systems (including the opioids, steroids, oxytocin and vasopressin) have also been implicated in the mediation of OCD (Lochner & Stein, *in press*).

### *2.1.5 Neuropsychological Approach*

Neuropsychological models focus on impairments in general cognitive processing. The most consistent finding is that OCD may be characterised by a decline in executive functioning (i.e. poor organizational skills), and poor immediate recall of non-verbal material (cited in Clark, 2004). However, these results should be interpreted within the context of the following limitations: (a) small sample sizes; (b) absence of studies replicating significant test performance (Amir & Kozak, 2002); (c) poor performance on neuropsychological tests is not specific to OCD (Tallis, 1995); and (e) it is unclear what effect the clinical characteristics of

OCD (e.g., indecision) have on test performance (Greisberg & McKay, 2003). These issues will be discussed further in section 2.3.1 (cognitive deficit theories).

In summary, the conceptualisation of OCD as a neuropsychiatric disorder was conceived from evidence demonstrating neurochemical dysfunction, neuroanatomical abnormalities, autoimmune dysfunction, genetic transmission and/or deficits in cognitive processing. However, these models tend to be speculative, and lack consistent empirical support. For example, these models do not account for the finding that (a) many patients improve without pharmacological treatment; (b) why combining behavioural and pharmacological treatments is no more efficient than behaviour therapy alone (O'Connor, Todorov, Robillard, Borgeat, & Brault, 1999); and (c) why 80% of the general population experience the same type of thoughts experienced by individuals with OCD (Rachman, 1993). These anomalies have led to an increased focus of the role of psychological factors in the development and maintenance of OCD.

## 2.2 Psychological Models

Over the past 20 years, several psychological models have directed and enhanced our knowledge of the etiological processes involved in OCD. It is also important to acknowledge that most contemporary perspectives are based on a collection of these early models. For example, Salkovskis' (1985, 1989, and 1996) cognitive theory of OCD was based on Beck's (1976) cognitive model of emotion and Rachman and colleagues' seminal research during the 1970s. The remainder of this chapter reviews the most significant psychological models of OCD, beginning with early behavioural models, then cognitive behavioural approaches, and finally cognitive formulations of OCD. The remaining sections will present Salkovskis (1985, 1989, 1996) cognitive theory of OCD and Rachman's (1997, 1998) Misinterpretation of Significance Theory. The chapter will conclude with a summary of findings and directions for future research.

### 2.2.1 *Psychodynamic Models*

The earliest psychological conceptualisations of OCD were psychoanalytic in nature. Classic psychoanalytic theories considered OCD a neurosis, caused by a regression of the oedipal phase to the anal psychosexual phase of development. The appearance of symptoms in OCD was attributed to a defensive regression of the psychic apparatus to earlier phases (e.g., pre-oedipal), with the consequent emergence of earlier modes of functioning of the ego, superego, and the id. Those factors along with the use of specific ego defences (isolation, undoing, and reaction formation) combine to produce the clinical symptoms of obsessions and compulsions. Thus the key to 'neurotic anxiety' is *repression* of underlying conflicts primarily related to the id impulse (Davison & Neale, 2001).

Contemporary etiological models of OCD tend not to include psychoanalytic approaches because (a) the central tenets of these theories have never been subject to empirical investigation; and (b) individuals with OCD tend to respond poorly to psychodynamic and/or psychoanalytic therapies (Steketee, 1993). Over the past three decades, research has shown behavioural, cognitive and pharmacological treatments to surpass psychoanalytically oriented therapies (Abramowitz, 1997).

### 2.2.2 *Behavioural Models*

A philosophical shift in the late 60s early 70s, led to a refocus of the behavioural aspects of anxiety. Early behavioural theories and interventions focussed on the anxiety reduction of observable behaviours (e.g., overt compulsive behaviour). Obsessions were considered *conditioned noxious stimuli* (Rachman, 1971) that acquire the ability to elicit anxiety or discomfort by an association with a prior traumatic or upsetting experience (Steketee, 1993). These early conditioning models (e.g. Rachman & Hodgson, 1980; Teasdale, 1974) were based on the notion that fears are acquired by classical conditioning and maintained by operant conditioning.

The most comprehensive behavioural formulation of the acquisition of fear is Mowrer's (1960) two-factor model of fear. Mowrer's (1960) theory encompasses two stages: (a) acquisition of anxiety and/or fear; and (b) maintenance of this anxiety and/or fear. In the first stage, Mowrer suggests that anxiety is acquired when a neutral event becomes associated with fear when paired with a stimulus that by its nature provokes distress. Through the conditioning process, objects as well as thoughts acquire the ability to produce discomfort. In the second stage, escape/avoidance behaviours are developed to reduce the anxiety evoked by the various conditioned stimuli and are maintained by their success in doing so (Riggs & Foa, 1993). In contrast to the second stage of this theory (the maintenance of escape and/or avoidance behaviours) which is well supported, evidence for Mowrer's conceptualisation of fear acquisition (stage one) is lacking.

There have been a number of applications of behavioural techniques, including systematic desensitization, modelling, operant reinforcement and aversion relief (Clark, 2004). However the concept which has received the most attention and empirical support is Exposure and Response Prevention (ERP). Victor Meyer published the first case of ERP to treat OCD in 1966. The basic premise of ERP is to persuade the individual to remain in the feared situation, without performing any compulsive behaviour, so they can learn that the feared consequences of not performing the behaviour do not occur (Clark, 2004; Meyer, 1966). The theoretical basis for ERP was provided by Mowrer's two factor theory and experimental research by Rachman and colleagues in the 1970s.

During the 1970s, Rachman and colleagues applied Mowrer's theory to OCD. In a series of hallmark studies, Rachman and Hodgson (1980) predicted that through conditioning, obsessional thoughts become paired with anxiety, and are maintained by escape and avoidance behaviours. Rachman and colleagues (see Rachman & Hodgson, 1980) supported this hypothesis by showing: (a) intrusive cognitions are initially neutral, but through the process of negative reinforcement become conditioned stimuli and elicit anxiety; (b)

compulsive acts reduce anxiety temporarily, however in the long-term increase the likelihood and accessibility of the ritual (Hodgson & Rachman, 1972); and (c) 'spontaneous decay', in which an effect occurs when compulsive behaviours are delayed post-exposure to an anxiety-provoking situation, resulting in a reduction in anxiety (Rachman, De Silva, & Roper, 1976). This experimental work provided the theoretical support for Exposure and Response Prevention (ERP) in OCD.

There is considerable empirical support for certain aspects of the behavioural model. Most obsessional thoughts provoke anxiety or discomfort and compulsions most often cause a temporary reduction in anxiety (Clark, 2004). However, there is little evidence that obsessions are acquired via association with a traumatic experience (Steketee, 1993; Rachman & Hodgson, 1980). Some research has shown compulsive rituals to increase anxiety, rather than decrease (Marks et al., 2000). Another criticism relates to the finding that many people present with multiple obsessions, which appear to fluctuate in content and form over time (Clark, 2004). The two-factor model has also been criticised for its lack of specificity to OCD as it equally applies to other anxiety disorders, like phobias (Salkovskis, 1998)

In terms of behaviour therapy, the efficacy of ERP for OCD is well established (Clark, 2004). The Expert Consensus Guidelines (March, Frances, Carpenter, & Kahn, 1997) recommended Cognitive Behaviour Therapy (CBT), which included a heavy component of ERP, as the first line treatment for mild cases of OCD (Clark, 2004). In clinical outcome studies, rates of improvement at post-treatment ranged from 40 to 97 %, with a weighted average improvement of 83% (Foa & Kozak, 1996). ERP is reported to be at least as effective as pharmacology at post-treatment (Abramowitz, 1997; Foa & Kozak, 1996) and superior in some cases (see Stanley & Turner, 1995 for review)

However, behavioural therapy has serious shortcomings. Approximately 25% of individuals refuse ERP, another 3-12% will not complete therapy (Foa et al., 1983) and 25%



of those who complete a course of ERP fail to improve. Furthermore, research has also shown ERP to be less effective in treating certain subtypes of OCD, like hoarding (Black et al., 1998; Frost & Steketee, 1999) and the cognitive aspects of OCD (Rachman & Hodgson, 1980). These limitations have led many researchers to shift their focus to the cognitive components in OCD.

### 2.3 Cognitive Models

Over the past two decades there has been an increase in the number of cognitive models of OCD (Rachman, 1993; Salkovskis, 1985; Wells & Papageorgiou, 1998). Despite the diversity of these models, most can be classed as either: (i) dysfunctions in general cognitive processing (deficiency in certain information processing functions); and/or (ii) dysfunction in cognitive appraisal and beliefs (specific dysfunctional beliefs). As a full discussion of all models is beyond the scope of this thesis, the following sections will review the most empirically-supported theories assumed under these categories.

#### 2.3.1 *Cognitive Deficit Theories*

Cognitive deficit (information processing) models, assert that obsessional symptoms represent a generalised and involuntary disturbance of information processing, with compulsive behaviour conceptualised as secondary to the primary information processing deficit (Salkovskis, Westbrook, Davis, Jeavons, & et al., 1997). Research has demonstrated that individuals with OCD may display impairments in executive functioning (Reed, 1985; Schmidtke, Schorb, Winkelmann, & Hohagen, 1998), nonverbal memory, impaired reality monitoring and confidence in memory judgements. Evidence for the information processing hypothesis is derived from two different branches of psychology, namely neuropsychology and experimental research.

Executive functioning describes higher-level control processes that modulate basic sensory, motor, cognitive, memory and affective functions (Clark, 2004). A number of

cognitive tasks fall in this category, including the ability to shift mental sets, inhibit responses and engage in trial-and-error learning (Clark, 2004). The most common tests of executive functioning are the Wisconsin Card Sorting Test (WCST) and the Trail Making Tests (TMT). A number of studies have shown patients with OCD to evidence greater difficulty shifting to a new rule on the WCST or switching between categories of the TMT (Greisberg & McKay, 2003; Clark, 2004) as well as reduced response inhibition on semantic negative priming tasks (Enright & Beech, 1990).

However, these findings are not consistent or specific to OCD. Research has found poor performance on tests such as the WCST and/or TMT in Panic Disorder (Lucas, Telch, & Bigler, 1991); Post-Traumatic Stress Disorder (Beckham, Crawford, & Feldman, 1998) and depression (Moritz et al., 2001). Furthermore, executive functioning deficits are not found in all cases of OCD, and even when present they tend to be mild (Taylor, 2002). It is also unknown whether OCD precipitates poor performance on tests like the WCST, or is a consequence of OCD (Taylor, 2002). These findings suggest that it would be premature to conclude the presence of executive functioning difficulties in OCD.

Some researchers have suggested that the presence of pathological doubt, indecision and uncertainty in OCD represents memory deficits in OCD (Amir & Kozak, 2002; Greisberg & McKay, 2003; Reed, 1985; Savage, Deckersbach, Wilhelm et al., 2000; Tallis, 1997). Evidence for this viewpoint arises from findings that some individuals with OCD appear to have non-verbal memory deficits (Savage, 1998; Tallis, 1995), impaired reality monitoring (McNally & Kohlbeck, 1993), and reduced confidence in memory (Radomsky, Rachman, & Hammond, 2001). Similar to the last section, the evidence for a specific memory deficit in OCD is mixed. While some studies show individuals with OCD to have poorer non-verbal memory (Tallis, Pratt, & Jamani, 1999), others have found contrary results (Tolin, Abramowitz, Brigidi et al., 2001).

Reality monitoring is defined as “the process of distinguishing a past perception from a past act of imagination, both of which resulted in memories” (Johnson & Raye, 1981, p.67). This concept is thought to have particular relevance for compulsive checking as the individual is uncertain about whether they have performed the compulsive behaviour (Ecker & Englekamp, 1995; McNally, 2001). Unfortunately, most of the findings regarding impaired reality monitoring in OCD have been weak and inconsistent with the majority of studies finding no significant differences between clinical checkers, clinical non-checkers and non-clinical samples (Constans, Foa, Franklin, & Mathews, 1995; Hermans, Martens, De Cort, Pieters, & Eelen, 2003; McNally & Kohlbeck, 1993). These findings tend to suggest that impaired reality monitoring may be best conceptualised as secondary to other causal mechanisms (e.g., cognitive distortions) in OCD.

Radomsky et al. (2001) proposed that it was a lack of confidence in memory rather than memory dysfunction per se that underlies the clinical picture of OCD. Several studies have found individuals with OCD to report significantly lower confidence in their memory judgements than nonclinical individuals (Ecker & Engelkamp, 1995; McNally & Kohlbeck, 1993; Tolin, Abramowitz, Brigidi et al., 2001). Dar, Rish, Hermesh, Taub and Fux (2000) found that patients with compulsive checking were significantly less confident in their performance on a general knowledge questionnaire compared to non-clinical cohorts, even though there was no difference in their actual performance. These findings suggest that many individuals with OCD may experience a lack of confidence in their memory functions. This in turn begs the question of whether the lack of confidence in memory functions is due to organic deficits or affective changes associated with the illness (e.g., depression).

At this point, the role of general cognitive deficits in the etiology of OCD can only be speculative. The findings regarding executive functioning and reality monitoring are inconsistent, with only strong evidence found for reduced confidence in memory functioning, especially checking compulsions (Clark, 2004). Neuropsychological research is also limited

in that most have used small samples, fail to include a comparison group and use different test instruments or experimental methodologies (Clark, 2004). Furthermore, as many of these studies do not control for (a) symptoms of other disorders (comorbidity); (b) the complexity of neuropsychological tests; (c) response style (e.g., excessive slowness see Greisberg & McKay, 2003 for a review), it is unclear whether these results are specific to OCD. Future research replicating studies showing significant test differences in clinical samples may help clarify this issue.

### 2.3.2 Cognitive-Appraisal Model

The second paradigm, cognitive-appraisal models, is rationalistic in approach and emphasises the role of dysfunctional beliefs or schemata (see Salkovskis, 1985, 1989; Rachman, 1993). Specifically, these approaches focus on specific beliefs and meanings that drive and/or motivate psychological factors in the maintenance of disorders (Salkovskis, 1996 cited in Taylor, 2002). Most appraisal-based models of OCD are heavily influenced by Beck's (1976) cognitive specificity hypothesis. Beck (1976) following Albert Ellis proposed that dysfunctional beliefs cause emotional disturbances because they affect the interpretation or appraisal of an event or situation. In other words, Beck (1976) hypothesized that it is the meaning of the event that triggers emotions rather than the event themselves. Further, the particular appraisal made will depend on the context in which an event occurs, the mood the person is in at the time it occurs, and the person's past experiences. Prior to discussing these models it is necessary to define the concepts that constitute the cognitive basis of OCD. These definitions are provided by the OCCWG (1997):

- (a) *Intrusions*: Unwanted thoughts, images, or impulses that intrude into consciousness and are called obsessions when they attain clinical severity.
- (b) *Appraisals*: Expectations, interpretations, or evaluations of the meaning of particular phenomena such as unwanted intrusive thoughts.

- (c) *Assumptions (beliefs)*: Relatively enduring ideas that are pan-situational and that may be specific to OCD or may be general assumptions about one's self, that are relevant to other clinical disorders.

The central tenet in early cognitive theories was that dysfunctional beliefs are intrinsically linked with the expression of disordered thinking and behaviour. However, early theories like Beck (1976) lacked specificity to OCD as many of these beliefs about danger were common across all anxiety disorders (Salkovskis, 1985). These limitations precipitated a myriad of disorder-specific psychological theories investigating the different types of dysfunctional beliefs underlying affective disorders, like Social Phobia (Clark & Wells, 1995) and OCD (Salkovskis, 1985, 1989; Rachman, 1993). The remaining sections will briefly discuss two early cognitive models of OCD (Carr, 1974; McFall & Wollersheim, 1979) before concentrating on the more contemporary models proposed by Salkovskis (1985, 1989, 1996) and Rachman's (1993, 1997, 1998). The latter models by Salkovskis and Rachman are currently considered the most comprehensive models of OCD and will form the theoretical basis for the subsequent three studies.

### 2.3.3 Carr (1974) and Mcfall And Wollersheim (1979)

Carr (1974) proposed the first cognitive model of OCD. This theory implies that individuals with OCD over-estimate the probability that negative consequences will occur. Carr argued that any situation that potentially involved harm will result in heightened threat anxiety because the individual exaggerates the probability of the threat occurring (Clark, 2004). Compulsive behaviours were conceptualised as 'threat-reducing' mechanisms. Similar to Mower's conceptualisation, the compulsive behaviour becomes habitual because the individual perceives this to be the most effective means of reducing the anxiety associated with the negative consequences. However, this model was limited in that it did not explain why individuals with OCD exaggerate the probability of threat occurring in the first instance.

McFall and Wollersheim (1979) proposed a model based on the work by Lazarus (1966) and Carr (1974). According to this theory, OCD persists and is maintained by beliefs of perfectionism, punishment, uncertainty and control because they give rise to faulty *primary* and *secondary* appraisals of events. Like Carr, McFall and Wollersheim (1979) argued that individuals with OCD over-estimate the degree of threat of an event through primary appraisals. Individuals then overestimate the probability and the cost of the negative occurrence which evokes feelings of uncertainty. The individual then underestimates their ability to cope with the threat through faulty secondary appraisals which leads to anxiety. McFall and Wollersheim proposed that compulsive behaviour was an attempt to reduce feelings of uncertainty and anxiety caused by these primary and secondary appraisals (Clark, 2004). The major criticism of this model is the lack of differentiation between the threat appraisals seen in OCD versus other anxiety disorders (Salkovskis, 1985).

#### 2.3.4 Salkovskis' Cognitive Model Of OCD

Salkovskis (1985, 1989, 1996) theory is based on Beck (1976) cognitive specificity hypothesis and Rachman and colleagues' spontaneous decay experiments. Salkovskis (1985, 1989) inflated responsibility model proposes that obsessions represent the extreme end of a continuum of normal, unwanted intrusive cognitions (Rachman & de Silva, 1978). Salkovskis argues that as the content of normal intrusive thoughts and clinical obsessions is indistinguishable (Salkovskis & Harrison, 1984), the distinctive feature between the two is the *interpretation* of the intrusion (Salkovskis, 1999). Intrusive thoughts develop into clinical obsessions when the individual interprets the intrusions as implying high *personal responsibility* and significance (Clark, 2004). Inflated responsibility beliefs are given a central role in this theory and are defined as:

*“The belief that one has power which is pivotal to bring about or prevent subjectively crucial negative outcomes. These outcomes may be actual, that is having consequences in the real world,*

*and/or at a moral level”* (Salkovskis, 1996, p.110-111).

Responsibility is conceptualised on two levels (Salkovskis 1985, 1989, 1996): responsibility *beliefs* and responsibility *appraisals*. Responsibility beliefs lead to a tendency to misinterpret mental activities as indicators of personal responsibility. These individuals then generate responsibility appraisals of their intrusive thoughts (Clark, 2004). Salkovskis argues that responsibility appraisals distinguish OCD from other affective disorders (e.g., appraisals of loss will be associated with depression; Salkovskis, 1999). Furthermore, these inflated responsibility beliefs are thought to be more related to *prevention* of perceived negative consequences that might occur because of the intrusive thought, rather than responsibility for the *occurrence* of the thought (Clark, 2004).

Salkovskis argues that the assumption of personal responsibility for the prevention of harm to self or others results in anxiety and restlessness. The individual then deploys all attentional resources towards the removal of the cognitive intrusion. This overwhelming need to decrease the sense of responsibility and liability for harm results in the following outcomes: (a) increased discomfort, anxiety, and sometimes depression; (b) intrusive thoughts become highly accessible and significant; (c) attentional narrowing onto the intrusion; and (d) the initiation of compulsive (neutralising) behaviours in an attempt to decrease the perceived sense of responsibility (Salkovskis, 1996).

#### 2.3.4.1 *Neutralising or Compulsive Behaviour*

Salkovskis (1989) describes a neutralising response as the critical element in the development of obsessions and defines neutralising as “*voluntarily initiated activity which is intended to have the effect of reducing perceived responsibility*” (Salkovskis, 1989. p 678). The activity or compulsive behaviours can be either overt (behaviour) or covert (mental) and becomes repetitive because in the short term, these behaviours are very successful in reducing

the anxiety. However, these behaviours are counter-productive as they prevent individuals from processing any evidence that would disconfirm their beliefs regarding personal responsibility. In addition to the neutralizing behaviours, Salkovskis (1998) argues another maintaining factor in OCD is that individuals with OCD “try too hard” to exert control over their intrusive thoughts.

Salkovskis and Forrester (2002) have asserted that increased efforts to control both mental activity and perceived harmful events in the environment paradoxically serve to increase anxiety because (a) it increases preoccupation with the intrusion; (b) it will result in failure and possibly increase the frequency of the intrusions; (c) it increases the salience of these thoughts and beliefs regarding harm; and (d) it prevents discontinuation of the belief that these thoughts are harmful. In sum, this model proposes that OCD is caused by inflated responsibility beliefs, and is maintained by those affected individuals trying too hard to be certain they have not caused harm (Salkovskis, 1999; Salkovskis, Thorpe, Wahl, Wroe, & Forrester, 2003).



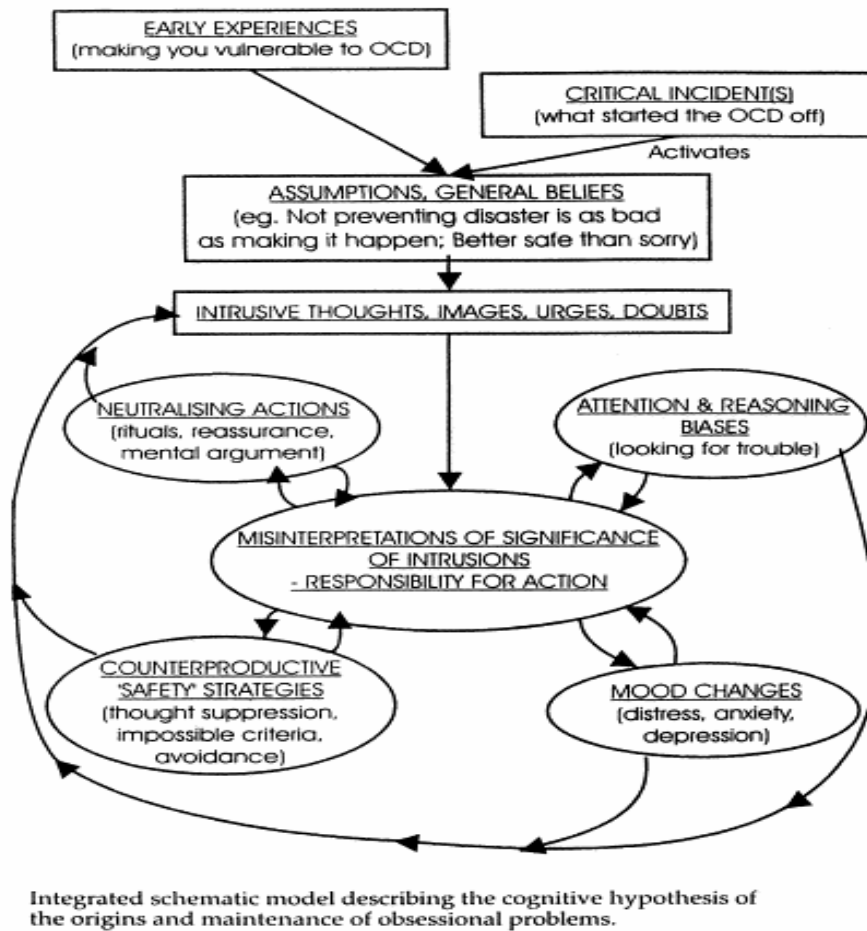


Figure 1: Cognitive Analysis of OCD

Figure.1 presents Salkovskis cognitive analysis of OCD (diagram sourced from Salkovskis, Wroe, Gledhill, Morrison, Forrester, Richards, Reynolds & Thorpe 2000, p 349).

#### 2.3.4.2 Cognitive Bias and Beliefs

Salkovskis (1985, 1989, 1996) proposed that underlying beliefs are triggered by intrusive thoughts which give rise to certain cognitive biases (“thinking errors”) and appraisals of responsibility. These thinking errors refer to particular assumptions made because of pre-existing beliefs (Salkovskis, 1996). The assumptions or beliefs are long-standing ideas which may be idiosyncratic or relate to a specific event (Salkovskis & Freeston, 2001; Salkovskis et al., 2003). The dysfunctional beliefs described by Salkovskis include:

- (a) *Responsibility beliefs*: failure to prevent harm to self or others is just as bad as deliberately causing harm.
- (b) *Thought-action fusion beliefs*: thoughts are equivalent to actions.
- (c) *Thought control beliefs*: one should have complete control over one's thoughts.
- (d) *Neutralisation beliefs*: Neutralisation prevents possible harm from occurring.

These beliefs give way to the following cognitive biases:

- (a) *Responsibility bias*: any personal influence over outcome = responsibility for outcome (Wroe et al., 2000)
- (b) *Absence of omission bias* (Wroe et al., 2000): Most individuals believe their responsibility for negative consequences is diminished when “failing to act” (omission) is involved, as opposed to situations where the commission of a specific act could bring about a negative outcome (Clark, 2004). Salkovskis (2002) found that individuals with OCD are less inclined to show an omission bias, as in just thinking of potentially harmful outcomes evokes the obsessional individual to feel responsible for the outcome unless they attempt to prevent it.
- (c) *Misperceptions of personal agency*: The belief that one can foresee possible harmful outcomes. Not acting when this premonition occurs equates with an inflated sense of responsibility because by not acting, the possibility of harm occurring is increased (Clark, 2004).
- (d) *Thought-Action Fusion*: thoughts are perceived as synonymous with actions.

#### 2.3.4.3 Origins of Inflated Responsibility Beliefs

Salkovskis et al. (1999) hypothesised that the origins of dysfunctional responsibility beliefs are embedded within early life experiences. These researchers' proposed five possible pathways for the development of inflated responsibility beliefs in individuals predisposed to

OCD. These pathways, although not mutually exclusive, are reported to be crucial in the development of exaggerated responsibility beliefs in combination with other variables such as life events, prolonged stress, and depressed mood. These pathways are reviewed below:

(a) *Broad responsibility since childhood*: A child or adolescent is deliberately or implicitly encouraged to assume responsibility for caring and protecting others from harm, by either having to assume actual responsibilities at an unusually early age (e.g., due to incompetent parenting or circumstances), or by negative communication styles between the child and significant other.

*Obsessive theme*: ordering and arranging rituals.

(b) *Rigid and extreme codes of conduct and duty*: Includes the environmental milieu where the primary carer or another authoritative source (e.g., school, or clergy) negatively reinforces strict behavioural codes regarding what is acceptable conduct. Consequently, the child or adolescent develops a set of attitudes concerning the need for personal responsibility.

*Obsessive theme*: rumination, perfectionism and blasphemous obsessions.

(c) *Over-protective and critical parents*: The environment is characterised by excessive parental anxiety, withholding of responsibility and overindulgence. In this type of environment, the child or adolescent is explicitly or implicitly taught that the world outside of the family home is unpredictable and dangerous. The child is sheltered from most *normal* responsibilities, reinforcing the belief that they probably are ill-equipped to deal with the hazards of the outside world. *Obsessive theme*: Need to protect loved ones through specific checking rituals.

(d) *Actual incident affecting the health and wellbeing of others*: After exposure to a traumatic incident, the individual assumes that (i) they played a crucial role in causing the catastrophe; (ii) they should have prevented the incident; and (iii) the “victim” was only saved by ‘good fortune’.

*Obsessive theme:* broad checking procedures to protect others from harm.

(e) *Incident which appears to bring about harm but is actually coincidental.* An incident in which the individual assumes responsibility for the occurrence and/or consequence of the episode. Salkovskis et al. (1999) gives the example of an angry child who wishes that someone was dead, and by coincidence, shortly after that person dies.

*Obsessive theme:* checking behaviours associated with the need to protect others

#### 2.3.4.4 *The Empirical Status of Salkovskis (1985, 1989) Model*

The following sections outline the evidence for Salkovskis formulation that inflated responsibility beliefs drive obsessional thinking. Specifically, these sections are structured to address four key aspects in the Salkovskis (1985, 1989) model. Proposal 1: Inflated responsibility beliefs are a core construct in OCD (Clark, 2004). Proposal 2: Inflated responsibility is specific to obsessive compulsive symptoms (Clark, 2004). Proposal 3: Inflated responsibility beliefs result in increases in anxiety, compulsive behaviour and increased frequency of thoughts (Clark, 2004). Proposal 4: Neutralization or compulsive behaviour increases the frequency and significance of the obsession (Clark, 2004).

##### 2.3.4.4.1 *Inflated responsibility beliefs are a core construct in OCD.*

Several studies have supported the proposal that inflated responsibility beliefs are a central construct in OCD. Studies have found significant correlations between responsibility and obsessive-compulsive behaviours in both clinical (e.g., OCCWG, 2001, 2003; Bouchard, Rheume, & Ladouceur, 1999) and nonclinical participants (Freeston, Ladouceur, Thibodeau, & Gagnon, 1992; Menzies, Harris, Cumming, & Einstein, 2000; Rheume, Ladouceur, Freeston, & Letarte, 1995). However, others have found responsibility to account for only a small amount of variance in specific obsessive compulsive symptoms (Emmelkamp & Aardema, 1999; Wilson & Chambless, 1999).

Several studies using questionnaire-based measures have supported the role of inflated responsibility beliefs in OCD. Freeston et al (1992) administered the cognitive intrusions questionnaire to college students and found responsibility, in conjunction with guilt and disapproval, to be a significant predictor of obsessive compulsive symptoms accounting for 5 percent of the variance in compulsive activity scores. The results suggest that patients with OCD report higher responsibility for outcomes related to their thoughts than matched non-clinical controls.

Rheaume et al. (1995) administered the Responsibility Questionnaire and Padua Inventory to a large sample of healthy adults ( $n = 397$ ). The results indicated that responsibility accounted for up to 80 percent of the variance in obsessive compulsive symptoms. Freeston, Ladouceur, Gagnon and Thibodeau (1993) developed a questionnaire about responsibility beliefs and intrusive thoughts. A significant relationship was found between obsessive compulsive symptoms and beliefs about obsessions were found in 87 non-clinical and 14 individuals with OCD (Salkovskis & Forrester, 2002). Bouchard, Harvard, Ladouceur and Cottraux (1997) also found responsibility beliefs as measured by the French translation of the Responsibility Attitudes Scale (RAS; Salkovskis, Wroe et al., 2000) to be important in the comparison between individuals with and without OCD (Salkovskis & Forrester, 2002).

Salkovskis et al (2000) proposed that two levels of responsibility-related cognitions (responsibility assumptions and responsibility appraisals) interact with other cognitive factors (e.g., threat appraisals) in obsessional problems. In order to test this proposal, the Responsibility Attitude Scale (RAS) and the Responsibility Interpretations Questionnaire (RIQ), were devised. These measures were then administered to a sample of individuals with OCD ( $n = 83$ ), non-clinical ( $n = 218$ ) and anxious controls ( $n = 48$ ). The results showed that obsessional individuals reported significantly higher means scores on the RAS and RIQ (frequency and belief of high responsibility interpretations) compared to the other two

groups. These findings were supported by Mancini, D'Olimpio and D'Ercole (2001) who found a significant relationship between responsibility and obsessive-compulsive behaviour in a non-clinical sample. Regression analysis using the RIQ and RAS as the dependent variables demonstrated that responsibility was a significant predictor of obsessive and compulsive behaviour, as measured by the Padua Inventory-Revised.

Additional support for Salkovskis proposition of responsibility beliefs can be found in the treatment literature (Van Oppen, de Haan, Van Balkom, Spinhoven, & et al., 1995). Ladouceur, Leger, Rheume and Dub (1996) evaluated the efficacy of a cognitive treatment for OCD specifically designed to target responsibility beliefs. Four participants with predominantly checking compulsions received cognitive correction for inflated responsibility without ERP twice weekly for a maximum of 32 sessions. The authors' reported that all participants demonstrated a clinically significant decrease in interference caused by rituals, a 52-100 percent reduction in YBOCS scores, and a decrease in perceived responsibility. These gains were maintained at 6 and 12-month follow-up.

#### *2.3.4.4.2 Inflated responsibility is specific to obsessive compulsive symptoms.*

Several studies have shown a specific relationship between responsibility and obsessive compulsive symptoms (Clark & Purdon, 1993; Freeston & Ladouceur, 1993; Ladouceur, Rheume, & Aublet, 1997; Steketee et al., 1998; Williams, Salkovskis, Forrester, & Allsopp, 2002; Wilson & Chambless, 1999). In a recent study, Mancini et al. (2001) used a non-clinical sample to test whether inflated responsibility was more prevalent in compulsive checking than in cleaning symptoms. Participants were required to complete five psychometric tests pertaining to either responsibility or obsessionality. The results showed a connection between specific factors of responsibility and certain kinds of obsessive-compulsive behaviour, confirming the hypothesis that responsibility is more salient in checking than cleaning behaviours.

This finding was supported by Foa, Amir, Bogert, Molner and Prezworski (2001) who attempted to elucidate the relationship between inflated responsibility and obsessive compulsives with checking concerns (OC checkers), obsessive compulsive non-checkers (OC) and non-anxious controls (NAC). All participants were given written scenarios. The scenarios were divided into three groups representing differing levels of responsibility (e.g., high, low). The results showed the OCD sample to evidence significantly higher responsibility ratings for low risk and OC relevant hypothetical situations compared to the anxious and non-clinical group. However, in their follow-up study, Foa, Sacks, Tolin, Prezworski and Amir (2002) found that the heightened ratings of responsibility were associated with OC-checkers, but were not present in individuals with OCD without predominant checking concerns. These authors concluded that inflated responsibility beliefs may only be salient for compulsive checking.

Bouchard, Rhéaume and Ladouceur (1999) examined the impact of perfectionism and excessive responsibility on checking behaviours and related variables. Fifty-one adults from a university setting were selected and allocated to one of two groups: the highly perfectionist group (HP) and the moderately perfectionist group (MP). These groups then participated in an individual 35 min session. The experimenter briefly explained the procedure which consisted of performing a classification task two times and completing a questionnaire. It was explained that the session would be recorded on video for research purposes. The task consisted of classifying 50 drug capsules (10 kinds, five of each) previously emptied of their active substances and filled with sugar into 12 semitransparent bottles. Participants had to pick one capsule at a time and put each type of capsule in a different bottle aligned in front of them. If they believed that they made a mistake, participants could check and move the capsules during the task. Participants were instructed to proceed as fast as possible while completing the task as best as they could.

In this situation, responsibility was manipulated by varying the instructions. In the low responsibility condition, participants were asked to do the task a first time as a simple practice. The experimenter explained to the participant that his personal results had no importance because it was only a practice trial. After receiving these low responsibility instructions the participant completed the task a first time while the experimenter was out of the room. The experimenter then explained to the participant that “*the research group was specialized in the perception of colours and had been mandated by a pharmaceutical company for a project concerning the exportation of a medication for a virus which was presently very widespread in a Southeast Asian country*” (HR).

Moreover, the participant was told that “*as this region was very poor and its population poorly educated, there was a need for developing a system of colours that would make the distribution of medication safer for the inhabitants*”. The participant was also told that he had great responsibility in the project, because his results in the classification of capsules could directly influence the manufacturing of the medication. Moreover, it was essential that he completed the task as seriously as possible in order to prevent serious harm and completed the task with the high responsibility instructions in mind.

After the task was completed, the experimenter counted the mistakes while the participant completed the retrospective questionnaire on the classification task. Finally, the experimenter debriefed the participant and explained the real goals of the study. The results showed (a) more checking behaviours (hesitations, checking) occurred in the high responsibility condition than in the low responsibility condition for participants of both groups; (b) after executing the task in the high responsibility condition, HP participants reported more influence over and responsibility for negative consequences than MP participants; (c) high perfectionist tendencies could predispose individuals to overestimate their perceived responsibility for negative events; and (d) perfectionism may serve as a catalyst in the perception of responsibility.



Rheaume and colleagues (1994) administered the Responsibility Questionnaire (RQ), a semi-idiographic measure of responsibility to a sample of college students ( $n = 397$ ). The results indicated that responsibility was significantly related to obsessive compulsive symptoms, thought suppression, irrational beliefs and obsessive thoughts. In another non-clinical study, Wilson and Chambless (1999) administered a series of psychometric measures tapping into responsibility beliefs. The results demonstrated that responsibility significantly predicted obsessive compulsive symptoms. These findings were further supported by Lee and Kwon (2003) who found Korean students to rate responsibility appraisals considerably higher for dirt/contamination obsessions than for aggressive intrusive thoughts. However, other studies have not found responsibility to be specific to obsessive compulsive symptoms (OCCWG, 2003; Rachman & Shafran, 1998). At this stage there is only limited support for the premise that inflated responsibility is specific to certain obsessive compulsive symptoms and further research is warranted (Clark, 2004).

#### *2.3.4.4.3 Responsibility beliefs lead to increases in anxiety*

Salkovskis (1985, 1989) model hypothesizes that inflated responsibility beliefs lead to an increased urge to neutralise and increased emotional intensity which increases the frequency and accessibility of the intrusive thought. This proposal is well supported (Clark, 2004), primarily through experimental paradigms where the perceived levels of responsibility have been directly or indirectly manipulated. Typically, direct manipulations involve varying the degree of personal responsibility taken by the participant or experimenter during a personally threatening task (Riskind, Williams, & Kyrios, 2002). Conversely, indirect manipulations of personal responsibility would involve varying the absence or presence of the experimenter during the same personally threatening task.

In an early study, Lopatka and Rachman (1995) directly varied levels of perceived responsibility for 30 obsessive compulsive checkers and ten obsessive compulsive cleaners.

Participants were subject to both a control condition where cleaning or checking urges were provoked, and the experimental manipulation which involved either increasing or decreasing participants' perceived responsibility for an anticipated negative event. In the high responsibility (HR) condition, participants were informed "*you are responsible for anything that happens or anything that is not perfect as a result of not checking*". In the low responsibility (LR) condition, participants were told that the experimenter would take complete responsibility if anything terrible happened.

Following the experimental manipulation, behavioural avoidance tests (BAT) were administered to all individuals. These involved exposing the individual to an object or situation that evoked cleaning or checking behaviours (e.g., "*we would like you to lock the door and then walk away from it without checking it at all*"). The results suggested that participants with OCD experienced a steep decline in compulsive checking urges when they transferred their sense of responsibility for the anticipated consequences of their actions to the experimenter (i.e., low responsibility condition). The results suggested that decreasing the level of perceived responsibility was followed by significant declines in discomfort and in the urge to carry out the compulsive checking.

Ladouceur, Rheaume, Freeston, Aublet, Jean, Lachance, Langlois and De Pokomandy-Morin (1995) conducted a study using non-clinical participants. Their responses on a manual classification task were compared under high and low perceived responsibility conditions. Participants in both responsibility conditions were given differing instructions designed to either increase or decrease the level of perceived responsibility. The results suggested that participants in the high responsibility condition hesitated and checked more, and reported more preoccupation with errors and anxiety during the task than participants from the low responsibility group.

Mancini, D'Olimpio and Cieri (2004) sought to verify whether reduced coping abilities (e.g., an exaggerated expectation of failure) contributed to obsessive-like behaviours.

Forty-seven non-clinical participants completed a visuo-spatial memory task (e.g., eight items were presented on a computer screen). They were assigned to three experimental groups: the personal influence group (PI), the personal influence plus expectation of failure group (PI+EF), and the control group (C). Levels of perceived personal influence and expectation of failure were manipulated by differing the instructions to participants' about their performance.

While control participants were told that this study concerned visuo-spatial memory, participants assigned to the PI group were falsely informed that the examiner was a victim of unjust damage. The laboratory director had forced the examiner to test a lot of participants in a short time, since the laboratory would have an important grant only if the experiment was completed within a week and if the results were the expected ones. Furthermore, the examiner would be dismissed if he was not able to obtain results conforming to the experimental hypothesis within a week. Participants were informed that, if they wanted to help the examiner, they had to perform as best as they could, especially whenever the items to rearrange were the stars. It was explained that everything was up to the participant.

Participants assigned to the PI+EF group received the same instructions as the PI group, but were also falsely informed that they had obtained very low scores both in the training session and in attention tests, because they were inattentive. This kind of information was given to make participants expect they were not able to face the situation and to prevent damage to the examiner. After receiving instructions, participants completed 15 trials of the visuo-spatial memory task, then completed a 16-item self-report questionnaire (seven-point Likert scale), assessing discomfort perceived during the task (seven items), doubts (six items), and perceived performance (three items). The results showed that both PI+EF and PI participants perceived more responsibility, preoccupation with the outcomes of their errors than control participants. These results showed that participants from both PI and PI+EF

groups understood and adhered to instructions, and accordingly perceived more responsibility and preoccupation for error outcomes.

In a novel experiment, Shafran (1997) predicted that inflating the perceived level of responsibility would result in increased distress and urge to perform checking compulsions in a sample of individuals with OCD ( $n = 40$ ). Shafran (1997) indirectly manipulated the level of perceived responsibility by varying the presence (low responsibility) or absence of experimenter (high responsibility) during a Behavioural Avoidance Test (BAT). A BAT involves exposure to a feared situation (e.g., contaminated object) without engaging in compulsions. The procedure of varying the experimenter was based on the clinical observations of Rachman (1976), who noted that obsessional clients were less compelled to check when in the presence of a trusted person (transfer of responsibility). In the high responsibility condition (HR), participants engaged in the BAT alone, while in the low responsibility condition (LR), the BAT was conducted in the presence of the experimenter. The results showed that participants in the HR condition reported greater distress and urges to perform compulsions compared to their counterparts in LR conditions. Contrary to earlier reports, the manipulation of responsibility affected the entire sample and was not confined to those with predominant checking behaviours.

#### *2.3.4.4 Neutralization increases the frequency and significance of obsessions.*

Salkovskis's model predicts that neutralising responses increase the frequency and salience of the obsessive thought. There is partial support for this hypothesis. For example, Lopatka and Rachman (1995) found that both distress and urges to perform compulsions decreased when responsibility was reduced. Ladouceur et al (1996) found similar results when reductions in OCD symptomatology were observed following cognitive therapy targeting inflated responsibility. In a recent study, Salkovskis et al (1997) examined the

effects of deliberately increasing (cognitive) neutralizing on the discomfort associated with naturally occurring and unacceptable intrusive thoughts in non-clinical participants.

Participants were randomly allocated to one of two conditions. Both groups listened to repeated recorded presentations of one of their intrusive thoughts and were then required either to (a) neutralize it (experimental group), or (b) distract themselves for a similar period (control group). The participants' were told that the purpose of the experiment was to investigate intrusive, repetitive, unwanted and upsetting thoughts and images, and that the experiment would be fully explained at the end of the session. The results of this study showed: (a) those that neutralized experienced significantly more discomfort during subsequent presentations of their intrusion, and significantly stronger urges to neutralize and distract; and (b) engaging in neutralizing responses during the first presentation of their intrusions made it difficult to stop neutralizing during the second presentation of the same thoughts.

#### *2.3.4.4.5 Summary: Salkovskis (1985, 1989, 1996) model.*

Salkovskis (1985, 1989, 1996) theory of inflated responsibility has received considerable attention over the past decade. Several aspects of this theory are well supported (e.g., perceived responsibility leads to increases in neutralising), with emerging support for the cognitive specificity hypothesis (e.g., inflated responsibility is specific to certain obsessive compulsive symptoms). The results regarding the central tenet in this theory, that inflated responsibility beliefs are characteristic of individuals with OCD are less clear, with support for (Rachman, 1993; Rachman & Hodgson, 1980) and against this model (Emmelkamp & Aardema 1999).

It is possible that the inconsistent findings relate to definitional issues. Prior to 1992 there was not an operational definition of inflated responsibility. Some studies assessed the social aspects of responsibility (see Frost, Steketee, Cohn, & Griess, 1994) whereas others

focused on Salkovskis (1996a) operational definition<sup>3</sup>. It is important to note that Rheaume et al. (1995) found that when the broader definition was used, ‘pivotal influence’ was the best predictor of responsibility (see Wilson & Chambless, 1999). Consequently, the inconsistent findings regarding inflated responsibility beliefs in OCD may be attributable to differences in the conceptualization of ‘responsibility’, not the relevance of this construct in OCD.

In order to clarify the role of inflated responsibility in OCD, it is necessary to replicate studies using Salkovskis’s measures the RIQ and RAS in clinical samples. Secondly, there is a need for more experimental studies, manipulating inflated responsibility beliefs either directly or indirectly in clinical samples. A final area for investigation is the role of other beliefs in precipitating dysfunctional assumptions that result in obsessional episodes. Salkovskis and Forrester (2002) suggests that within the cognitive analysis of OCD it is likely that beliefs (e.g., need to control ones thoughts’; Purdon & Clark, 2002) play a role in the development of obsessional thinking. One such belief to attract attention is ‘Thought-Action Fusion’ (TAF; Rachman, 1993; 1997; 1998). The following sections will discuss Rachman’s (1993, 1997, 1998) model, the concept of TAF, and the connection between TAF, inflated responsibility and obsessive compulsive symptoms.

### *2.3.5 Rachman (1993, 1997, 1998) Misinterpretation of Significance Theory*

Rachman (1993, 1997, 1998) proposed a cognitive theory of OCD based on Clark’s (1986) cognitive theory of panic disorder and Salkovskis’s (1985) model. Similar to Salkovskis, Rachman’s model asserts that obsessive intrusions have their origins in naturally occurring unwanted thoughts (Rachman & Hodgson, 1980). Rachman proposed that clinical obsessions are caused by “catastrophic misinterpretations of the significance of one’s thoughts, images or impulses” (Rachman, 1997). These obsessions persist as long as these misinterpretations continue, and only diminish when these misinterpretations are weakened

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<sup>3</sup> “The belief that one possesses **pivotal power** to bring about or prevent subjectively crucial negative outcomes.

(Rachman, 1997, 2003). Rachman (1997) reported five dimensions underlying the misinterpretations of significance:

- (a) *Important*: the intrusive thought is perceived as meaningful, important and revealing.
- (b) *Ego-alien (dystonic)*: This thought is alien to me, it is unlike me.
- (c) *Personalized*: The intrusive thought is my own and especially important to me.
- (d) *Potential consequences*: This thought has potential consequences.
- (d) *Serious consequences*: The possible consequences of the intrusion are likely to be serious, threatening and intolerable.

The misinterpretation of significance is an important construct in this theory as the individual is presumed to make the assumption that their intrusive thoughts reveal something important about their moral character (Clark, 2002a). Rachman (1997) provides the following case example to elucidate this point. A 25-year old computer analyst was experiencing aggressive thoughts towards very young children. This person interpreted these thoughts as meaning he was a potential murderer, evil and a worthless human being. This in turn evoked the belief that the intrusive thought was important, highly significant and potentially threatening (Rachman, 1997).

Rachman further postulates that neutral stimuli (intrusive thoughts) are only converted into threatening stimuli if the content of the intrusive thought has particular meaning to the person (e.g., moral values). For example, if a person has strong religious values, then the emergence of intrusive thoughts of blasphemy or acts against a religious icon would be particularly distressing. This distress would convert previously neutral religious cues (e.g., churches) to threat stimuli. Conversely, if the person did not hold these beliefs, then the intrusive thought, churches and religious icons would remain neutral (Rachman, 1998).

This model also suggests that the catastrophic misinterpretation of intrusive thoughts increases the frequency of obsessive thoughts as a wide range of neutral stimuli are converted into threatening stimuli (Clark, 2004). Previously indifferent stimuli become highly significant (Rachman, 1998). This conversion of neutral cues into potentially threatening ones increases the range of threats, and therefore increases the opportunities for the provocation of the obsession (Rachman, 1998). Rachman (1998) also argued that in addition to external cues (e.g., churches), there are internal provocations (e.g., bodily sensations) for obsessional thoughts (Clark, 1986; cited in Rachman, 1998).

Internal provocations, like trembling, sweating and shallow breathing often occur in association with intrusive thoughts (Rachman, 1998). Rachman argued that these sensations are often misinterpreted as signs of danger which increase the personal significance of the unwanted thoughts. It is further proposed that the mere occurrence of an abhorrent thought may serve as an internal source of provocation e.g., “the fact I am having these thoughts must mean I am evil” (Salkovskis & Kirk, 1997; Shafran, 1997).

Lastly, this model asserts that clinical obsessions will persist until the thoughts or images are interpreted as not holding any personal significance (Rachman, 1998). Similarly to other models (e.g., Salkovskis, 1985), individuals attempt to reduce the internal or external sources of threat through avoidance or other neutralizing strategies. However, these strategies provide only temporary relief, because as soon as the individual is re-exposed to either an external (situational cue) or internal (e.g., sweating) reminder, the obsession returns (Rachman, 1998; Clark, 2004). Neutralizing prevents exposure to any disconfirming evidence regarding the personal significance of the intrusive thoughts (Rachman, 1998). This cycle remains until the catastrophic misinterpretation is changed or reduced and the internal or external stimuli are no longer interpreted as threatening (Rachman, 1998).

Rachman also recognized a number of other cognitive processes that contribute to the catastrophic misinterpretation observed in OCD. Lopatka and Rachman (1995) found that



individuals with OCD tended to think that the probability of a negative consequence occurring was increased when they were personally responsible. Rachman (1998) replicated this finding and suggested that people who are inclined to make catastrophic interpretations of intrusive thoughts may be vulnerable to exaggerated responsibility beliefs (ref. Salkovskis, 1985). Rachman also emphasized a cognitive process whereby ones thoughts and actions become fused together. Rachman (1997, 2003) termed this phenomenon 'Thought-Action Fusion' (TAF), and proposed that TAF in combination with inflated responsibility beliefs, served to increase the catastrophic misinterpretation of significance of the unwanted thoughts.

#### 2.3.5.1 Thought-Action Fusion Beliefs (TAF)

Clinicians as early as 1934 observed TAF-like tendencies in obsessional patients (see Bleuler in 1934, Rachman, 1976 and Salkovskis, 1985). However, research has only just begun into this dysfunctional cognitive bias called TAF (e.g., Frost et al., 1993; Lopatka & Rachman, 1995; Rachman (1997); Rachman (1998); Shafran et al., 1996; Shafran, Watkins, & Charman, 1996). TAF is defined as the "*cognitive process whereby obsessive compulsives experience thoughts and actions concerning harm as equivalent and see themselves as equally responsible for thinking as for acting*" (Rachman, 1993). TAF is suggested to have two components; Moral-TAF (TAF-M) and Likelihood-TAF (TAF-L; Rachman, Thordarson, Shafran, & Woody, 1995; Shafran et al., 1996).

The first, Moral-TAF (TAF-M) refers to the belief that having an unacceptable thought is almost the moral equivalent of carrying out that particular behaviour (Rachman & Shafran, 2004). For example, a religious woman, while praying, experienced intrusive images of having sexual relations with Jesus. She believed she had sinned against God by having such an image, and was therefore an immoral person (Shafran, 1999, p.591). The second, termed likelihood-TAF (TAF-L) refers to the belief that the occurrence of a thought will

increase the likelihood that the specific negative event will occur (Thordarson & Shafran, 2002). Rachman (1993) suggests two forms of Likelihood-TAF. The first, “Likelihood-Self” (TAF-LS) refers to the fusion of thoughts and actions regarding oneself (e.g., “*If I think about being in a car accident, it makes it more likely that I will be in an accident*”). The second, “Likelihood-For-Others” (TAF-LO) represents the fusion of thoughts and actions regarding others (e.g., “*If I think about a friend in a car accident, it makes it more likely that they will be in an accident*”).

Rachman (1997, 1998) hypothesized that TAF leads to the catastrophic misinterpretations that unwanted thoughts are personally significant. This misinterpretation precipitates anxiety and efforts to eliminate the distress, such as neutralizing behaviour to eradicate the thought and its possible consequences. The use of neutralizing and compulsive behaviours serves to increase the salience and frequency of intrusive thoughts. Rachman (2003) postulates that both forms of TAF are closely connected to inflated responsibility. Preliminary research supports the proposition that TAF appraisals may play a causal role in increasing responsibility beliefs (Shafran et al., 1996; Freeston et al., 1996). The following sections review the evidence for this viewpoint.

#### 2.3.5.2 *The Development of the Thought-Action-Fusion Scale (TAFS)*

The majority of the studies investigating TAF have relied on the Thought-Action Fusion Scale (TAFS; Shafran et al., 1996). Shafran et al. (1996) developed the TAFS and tested the psychometric properties in two separate studies. In the first study, a scale consisting of 34-items (13 morality; 11 likelihood-to-others including positive and negative events; 10 Likelihood-to-oneself including positive and negative events) was administered to obsessional ( $n = 147$ )<sup>4</sup> and non-obsessional samples ( $n = 190$ ). The results suggested that people in the obsessional group scored higher than the student group on the TAF-M and

TAF-LO subscales; however, there was no significant difference between the groups on TAF-LS. The results also indicated that the division between positive and negative items in the Likelihood scales was not supported. No support for the division between positive and negative items, consequently the TAF-scale was revised in that the positive items were moved from the TAF-Likelihood subscales.

In the second study, Shafran et al revised version of TAS was used and consisted of 19 items (12 Moral, 4 Likelihood-for-others and 3 Likelihood-for-self). This scale was administered to three groups: obsessionals<sup>5</sup> ( $n = 118$ ), community ( $n = 122$ ), and student ( $n = 272$ ) samples. The results replicated findings from Study I with significant group differences between TAF-LO, but not between obsessional participants and students on TAF-LS or TAF-M. This result suggests that obsessional participants did not make the distinction between the influence of their thoughts over their own, and others behaviour (e.g., when controlling for depression, the only correlation to remain significant was TAF-LO and checking).

The TAFS has been shown to reliably discriminate between clinical and non-clinical samples (Rassin et al., 2001a; Shafran et al., 1996). However data regarding its convergent validity is not strong, as the TAFS does not always correlate with OCD related measures (Berle & Starcevic, 2005). For example, while there is consistent evidence for TAF-LO and OCD (Abramowitz et al., 2003; Amir et al., 2001; Clark, Purdon & Byers 2000; Muris et al., 2001; Rachman et al., 1996; Coles et al., 2001), the relationship between TAF-M and OCD is less clear (Shafran et al., 1996; Rassin, Merckelbach, & Muris, 2001b). The limitations associated with the TAFS has prompted some investigators to employ experimental paradigms (Rachman et al., 1996; Rassin et al., 2001a; van der Hout et al., 2001, 2002; Zucker et al., 2002; Shafran & Rachman, 2004) to assess TAF appraisals.

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<sup>4</sup> Inclusion in the obsessional sample (above 11 on the MOCI). 2/3 of the group had formal diagnosis.

<sup>5</sup> Approximately 20% of Ss had participated in the first study

### 2.3.5.3 *Empirical Support for TAF in OCD*

Research is still in infancy, and only twenty-one studies have examined the role of TAF in OCD. Of these studies, only six have used samples with individuals diagnosed with a psychiatric disorder (Abramowitz et al., 2003; Barrett & Healey, 2003<sup>6</sup>; Rassin et al., 2001a; Rassin et al., 2001b; Tallis, 1994; Shafran et al., 1996), with the remainder relying on undergraduate students (see Coles et al., 2001). One of the most pressing research questions is whether the TAF-bias leads to increased responsibility appraisals, which then leads to attempts to suppress the intrusions which precipitates obsessive thinking and behaviour. Researchers have attempted to address this question by investigating three main avenues: the specificity of TAF to OCD; TAF and inflated responsibility beliefs; and TAF and thought suppression. These findings are reviewed.

### 2.3.5.4 *Is TAF Specific To OCD?*

The majority of empirical studies find a moderate relationship between TAF and obsessional complaints as measured by scales like MOCI (Hodgson & Rachman, 1977), the Padua Inventory (PI; Sanavio, 1988) or the Obsessional Compulsive Inventory (OCI; Foa, Huppert, Leiberg, Langner, Kichic, Hajcak & Salkovskis, 2002). In a series of studies, Amir, Freshman, Ramsey, Neary and Brigidi (2001) administered a modified version of the TAFS<sup>7</sup> to a large group of clinical analogue participants<sup>8</sup>. The results suggested that individuals with obsessive compulsive symptoms gave higher ratings to the likelihood of negative events happening as a result of their negative thoughts. However, this effect was only found in the second study. The results of Amir et al. studies also demonstrated no significant differences between OC participants and healthy controls on the TAF-M subscale. These findings were

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<sup>6</sup> This study used 28 children (7-13 years) diagnosed with OCD (DSM-IV-TR)

<sup>7</sup> The modified version of the TAF-scale included thoughts about positive events and thoughts involving prevention of harm. The scale was also adapted so that the extent of responsibility that the individual felt for the thought could be assessed

replicated by Rassin et al. (2001a) who reported the weakest correlation between the Maudsley Obsessive Compulsive Inventory (MOCI) and the morality subscale.

TAF has been associated with other psychological disorders, most often depression (Hazlett-Stevens, Zucker & Craske, 2002; Muris, Meesters, Rassin, Merckelbach & Campbell, 2001; Shafran et al., 1996; Abramowitz et al., 2003). Shafran et al. (1996) found significant group differences between obsessional and student samples on TAF-M but only when the sample experienced high levels of depression. Similar findings were found by Abramowitz, Whiteside, Lynam and Kalsy (2003) who compared TAF across clinical ( $n = 95$ ) and non-clinical participants ( $n = 25$ ). Clinical participants included: OCD ( $n = 20$ ); Generalised Anxiety Disorder ( $n = 19$ ); Panic Disorder ( $n = 17$ ); Social Phobia ( $n = 20$ ) and Major Depressive Disorder ( $n = 19$ ). The results demonstrated that whereas anxiety was related to TAF-LO, TAF-M correlated with depression.

This has prompted several researchers to suggest TAF likelihood, especially TAF-LO, has a closer and more specific relationship with obsessionalism than TAF-M (Clark et al., 2000; Clark, 2004; Shafran et al., 1996). Rassin et al. (2001b) investigated the psychometric properties of the TAFS by comparing scores across psychiatric groups. Significant correlations between Likelihood-TAF and obsessional symptoms were found, but not for TAF-M. Some researchers (e.g., Coles, Mennin & Heimberg, 2001) have suggested that TAF-M only becomes significant when mediated through other comorbid conditions, like depression (Shafran et al., 1996) and religiosity (Rassin & Koster, 2003).

#### *2.3.5.5 Is TAF Specific to Obsessive Compulsive Symptoms?*

TAF measures have shown a small but robust relationship with OCD symptoms (Clark et al., 2000; Rassin & Koster, 2003; Sica, Novara & Sanavio, 2002; Gwilliam, Wells

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<sup>8</sup> Both studies relied on undergraduate participants divided into groups by their scores on the OCI (Foa, Kozak, Salkovskis, Coles & Amir, 1998).

& Cartwright-Hatton, 2004); Smari & Holmsteinsson, 2001; Yorulmaz, Yilmaz & Gencoz, 2004). Clark et al. (2000) investigated the differences in the appraisal associated with the perceived control of unwanted sexual and non-sexual intrusive thoughts by administering a series of questionnaires, including the TAFS to a large group of undergraduate students. Consistent with other results, this study found Likelihood-TAF to be a significant predictor of the perceived controllability of participants' most upsetting sexual and non sexual thoughts.

Some theorists have argued that religious insights are related to the TAF-M bias (Rassin & Koster, 2003; Sica, Novara & Sanavio, 2002). Rassin and Koster (2003) administered a series of questionnaires reflecting religion, TAF and OCD to undergraduate students ( $n = 100$ ). Participants were grouped according to religious background (e.g., Catholic, Protestant, Jewish, or atheist). The results found the Protestant sample to report the strongest correlation between religiosity and TAF-M as well as the highest levels of religiosity. In the Catholic group, religiosity correlated moderately with TAF-M, but also with TAF-LO, and MOCI. Overall, the results found a strong association ( $r = 0.53, p < .01$ ) between TAF-M and religiosity in undergraduate students, but not between Likelihood-TAF.

In a related study, Yorulmaz, Yilmaz and Gencoz (2004) investigated the cross-cultural utility of the TAFS in 251 Turkish undergraduate students. In contrast to most studies, Yorulmaz et al. found that the strongest correlations were between TAF-M and obsessive compulsive symptoms. These researchers' explained this finding by proposing that the presence of religious obsessions may be over-represented in some cultures (e.g., Jewish, Middle Eastern) in comparison to the clinical populations of the West (Tek & Ulug, 2001). Consequently, some obsessions tapping religious connotations (e.g., morality) may be particularly salient in a Turkish sample.

Shafran and Rachman (2004) hypothesize that the occurrence of TAF-M in combination with depression may be pathological and that this may be particularly the case in people who are religious. This raises the question of whether certain obsessive compulsive

symptoms have different cognitive bias. For example, research has shown stronger correlations between TAF-LO and individuals with predominant checking compulsions (Shafran et al., 1996: Study 2). Alternatively, Purdon et al. (2000) showed that individuals with unwanted sexual thoughts tended to exhibit higher levels of responsibility than those without sexual thoughts. Investigations in this area are sparse, and additional research using large clinical samples is required.

#### *2.3.5.6 Does TAF Precipitate Inflated Responsibility Appraisals?*

It has been suggested that engagement in TAF appraisals leads to an increased sense of responsibility (Rachman, 1993; Rachman et al., 1995; Rassin, Merckelbach, Muris and Spaan, 1999; Shafran et al., 1996). In comparison to TAF-M, TAF-likelihood appears to be closely related to responsibility for preventing harm (Berle & Starcevic, 2004). To investigate the relationship between TAF, responsibility and obsessive thinking, Rassin et al. (1999) induced TAF-like responses in a group of students ( $n = 45$ ). In order to induce TAF, participants were assigned to either an experimental or control condition. Participants in the experimental group underwent a bogus EEG recording session, where they were told that the equipment was able to pick up the word “apple”, and that thoughts of the word “apple” could result in the administration of an electrical shock to another person.

Participants in the control condition were told that the machine could detect their thoughts, but they were not told that any specific thought would result in negative consequences. After spending 15 minutes in the EEG laboratory, participants completed a short questionnaire relating to TAF. The results found that participants in the experimental condition had more than three times as many intrusions, felt more than three times as much discomfort, and engaged in neutralising in about half of the intrusions. The results showed that experimentally induced TAF produced 50 percent more thought intrusions, increased

discomfort and neutralization responses. Rassin et al. (1999) concluded that TAF does promote obsessive thinking in that it inflates the importance of intrusive thoughts.

In another study, Smari and Holmsteinsson (2001) evaluated the role of TAF, responsibility and thought suppression in obsessive thinking. A sample of undergraduate students ( $n = 211$ ) were administered the Distressing Thoughts Questionnaire (DTQ; Clark & de Silva, 1985), the Responsibility Attitudes Scale (RAS; Salkovskis et al., 2000), the TAFS (Shafran et al., 1996), Wegner and Zanakos' (1994) White Bear Suppression Inventory (WBSI) and the MOCI (Hodgson & Rachman, 1977). The results indicated that controlling for the mediating variables, thought suppression (WBSI) and responsibility (RAS), led to reductions in the relationship between intrusive thoughts (DTQ) and obsessive compulsive symptoms (MOCI). The findings also demonstrated that when the RAS was substituted with the TAFS, the results remained constant. These results suggest that TAF was highly associated with responsibility appraisals

Clark et al. (2000) demonstrated that TAF serves to inflate responsibility, especially when the obsessions involve aggression, blasphemous or sexual themes. Likewise, Rachman (2002) argues that intrusive thoughts of a sexual or aggressive nature arise because of the interpretation that one is 'mad, bad and dangerous', lending support to the hypothesis that some individuals fuse their thoughts and actions (e.g., thoughts reveal ones 'true disposition'). However, like the inflated responsibility hypothesis, it is unclear whether TAF acts as a general vulnerability factor across all anxiety disorders (see Rassin et al., 1999).

#### *2.3.5.7 TAF and Thought Suppression*

Thought suppression is one of the most common control strategies used to remove unwanted thoughts (Amir, Cashman, & Foa 1997a). Thought suppression refers to the conscious, intentional removal an idea, thought, image from attention, in an attempt to reduce (neutralise) any anxiety or discomfort associated with the idea (Beavers, Wenzlaff, Hayes &



Scott, 1999). There is an impressive amount of research on thought control strategies, particularly thought suppression (see Purdon, 1999 for review). Recent investigations suggest that TAF may lead normal intrusive thoughts to become clinical obsessions via thought suppression.

Rassin, Muris, Schmidt and Merckelbach (2000a) investigated the relationship between TAF and thought suppression by administering a number of TAF, thought suppression and OCD measures to a sample of undergraduate students. The results suggested that (i) TAF leads to suppression attempts, while suppression results in more obsessive compulsive symptoms; (ii) thought suppression is an antecedent of symptoms, rather than a mere reaction to the intrusion; (iii) the likelihood bias appeared to increase OCD symptoms, while TAF-M only increased OCD symptoms via thought suppression; and (iv) TAF appears to be a more fundamental cause of obsessive compulsive symptoms, with thought suppression conceptualised as playing a more intermediate role between TAF and OC symptoms.

In a subsequent study, Rassin et al. (2001a) sought to clarify whether TAF and thought suppression are susceptible to change. A number of self-report measures were administered to OCD-patients pre-and-post treatment. The rationale behind this study was that if TAF and thought suppression are important predictors of obsessional problems, then the pre-treatment scores on questionnaires tapping these phenomena should predict symptom severity. The results found that the TAF bias and the tendency to engage in thought suppression were unrelated, and that the TAF-bias occurs in other anxiety disorders. Secondly, it was found that high TAF and thought suppression pre-treatment scores did not influence treatment response across groups.

Although this study possesses some merit, one issue that deserves comment is its sole reliance on an inpatient sample. In line with Rachman's (1993) observation, that in structured environments, and in the presence of another person, obsessive patients' sense of

responsibility diminishes, perhaps the same phenomenon occurs for TAF. Given that responsibility and TAF have been theoretically and empirically linked (Rachman, 1993; Rachman et al., 1995; Shafran et al., 1996), it is possible that when in unfamiliar and structured environments surrounded by people in authority, the fusion of thoughts and actions diminishes as responsibility is transferred to another. This explanation could account for the findings in Rassin et al. (2001a) study.

In another study, Zucker et al. (2002) sought to investigate whether or not a brief educational intervention delivered prior to engaging in an anxiety-provoking task would be effective in offsetting anxiety in college students identified as having a strong propensity to endorse statements of TAF. Participants were included in the study if they scored at least one standard deviation above the mean on the TAF scale and were without major psychological disturbance. Participants were then randomly assigned to one of two experimental conditions: (i) the experimental group, who were given information regarding intrusive thoughts and TAF; and (ii) the control group, who were given a placebo message about stress. Participants were given questionnaires both pre-and-post scenario to measure responses.

The results of Zucker et al. (2002) suggested that (i) the educational tape given to the experimental group did correspond with significant decreases in TAF scores; and (ii) compared to the control group, the experimental group tended to report less post-task anxiety and less urge to neutralise. The results of this study lend support for a TAF bias in OCD (Rachman, 1993; Shafran et al., 1996), as evidenced by the reduction of anxiety following an intervention targeting TAF distortions. Unfortunately this study was conducted in a non-clinical population, and it is unclear whether these findings can be generalised to individuals with OCD.

### 2.3.5.8 TAF Summary

Based on these studies reviewed, the following conclusions can be drawn. Individuals with OCD score significantly higher than non clinical groups on measures of TAF-Likelihood (Rachman, 1993; Rachman et al. 1995; Shafran et al., 1996; Coles et al., 2001; Rassin et al., 2001a). TAF also correlates with other anxiety disorders (Hazlett-Stevens et al. 2002). There are inconsistent findings for TAF-M (Shafran et al., 1996), however research suggests a strong relationship with religiosity (Rassin & Koster, 2003) and depression (Abramowitz et al., 2003). Lastly, TAF may correlate with some types of obsessive compulsive symptoms (Coles et al., 2001; Emmelkamp & Aardema, 1999).

There are both theoretical and empirical grounds to propose that the fusion of thoughts and actions (TAF) and inflated responsibility beliefs are important constructs in OCD. However, it is still unclear whether TAF or responsibility beliefs are specific to OCD. It may be the case that TAF-LO applies more to OCD, whereas TAF-M is more in-line with other psychological disorders, like depression. Only one study (e.g., Abramowitz et al., 2003) has directly compared TAF across homogenous groups of anxiety disorders. Due to the central role of TAF and responsibility in Rachman (1993) and Salkovskis (1985; 1989, 1996) cognitive models, further investigation using clinical samples is warranted.

## 2.4 Chapter Summary

Etiological models of OCD differ in ethos, methodology and focus. The earliest models were psychodynamic in nature conceptualising OCD as a neurosis. The lack of empirical support for these models led to an emphasis on more behavioural aspects of obsessional and compulsions. Early behavioural theories (e.g., Mowrer) focussed on anxiety reduction of observable behaviours (e.g., overt compulsive behaviour). While achieving some success, these models lacked specificity to OCD and there was little evidence that obsessions were acquired via association with a traumatic experience (Steketee, 1993; Rachman &

Hodgson, 1980). This led to cognitive deficit theories, which proposed that obsessional symptoms represent a generalised and involuntary disturbance of information processing. However these models were weakened by inconsistent findings and a lack of specificity to OCD (Taylor, 2002).

In recent years there has been a plethora of research on cognitive-appraisal processes in OCD (Salkovskis, 1985, 1989, 1996; Purdon & Clark, 2002; Frost, Novara & Rheaume, 2002; Rachman, 1993, 1997). The two most current cognitive-appraisal models (e.g., Salkovskis, 1985, 1989, 1996; Rachman, 1993, 1997, 1998) propose that clinical obsessions are caused by the misinterpretation of significance of either the occurrence or content of the unwanted intrusion, image or impulse via inflated responsibility beliefs. The empirical basis for both models is strong, with support from a range of scientific modalities (e.g., self-report, interview-based, and experimental).

Based on the material reviewed, it can be concluded that the central tenets in these theories, namely inflated responsibility and TAF are highly relevant in OCD, but lack specificity. Moreover, while there is some evidence that TAF contributes to inflated responsibility beliefs in OCD, the empirical status of this relationship has not been firmly established. It also remains to be seen whether these appraisals are evident in certain types of OCD (e.g., religious-themed obsessions). Furthermore, the majority of studies investigating the association between TAF and responsibility have utilised either student samples and/or clinical analogue participants (based on high scores of psychopathology). This reliance on non-clinical samples means that certain findings may not be generalizable to individuals with a psychiatric disorder. These questions form the mainstay of the first study.

### CHAPTER 3

#### 3. OBSESSIVE COMPULSIVE DISORDER SUBTYPES

Obsessive Compulsive Disorder has been identified as a coherent constellation of symptoms for over a century (Berrios, 1989), and has been classed as a homogenous disorder since the first publication of Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 1952). The DSM system relies on identifying the ‘defining features’ of a disorder (i.e., intrusive thoughts), and often neglects the heterogeneity of disorder. Like other mental disorders, the presentation of OCD is highly variable. Individuals with OCD may experience multiple symptoms reflecting many different themes across the course of the illness (Summerfeldt, Richter, Antony, & Swinson, 1999). For example, obsessions about physical illness, contamination, religion, abhorrent sexual thoughts and symmetry concerns are all common (Rachman & Hodgson, 1980).

Several studies have found a significant relationship between symptom-based subtype and response to treatment (McLean, Whittal, Thordarson, Taylor, Sochting, Koch et al., 2001; Van Oppen et al., 1995; McKay, Abramowitz, Calamari, Kyrios, Radomsky, Sookman, Taylor & Wilhelm, 2004). Hoarding symptoms have shown a poor response to serotonergic medications, CBT (Mataix-Cols, Rauch, Manzo, Jenike, & Baer, 1999; Black et al., 1998)

and behaviour therapy (Mataix-Cols, Rauch, Baer, Eisen, Shera, Goodman, et al., 2002). Other research has found that sexual and religious obsessions (Mataix-Cols et al., 2002) and obsessive thoughts without overt rituals (Alonso, Menchon, Pifarre, Mataix-Cols, Torres, Salgado, et al., 2001) tend to respond poorly to behaviour therapy.

The enormous heterogeneity in OCD, coupled with the differential rates of responding to treatment, has led some researchers to suggest that OCD is composed of distinct subtypes (McKay et al., 2004; Calamari, Wiegartz, & Janeck, 1999). Recent studies have stressed the importance of evaluating the cognitive underpinnings of these symptom-based OCD subtypes. For example, several studies have shown that compulsive checking behaviour was reduced by cognitive therapy targeting responsibility beliefs (Ladouceur et al., 1996; Williams et al., 2002). This Chapter is divided into three sections. The first section outlines efforts to subtype OCD. The second section discusses the most important beliefs in OCD and the work by the OCCWG. The final section introduces the issue of whether certain beliefs are more applicable to certain subtypes of OCD.

### 3.1 Current Status of Obsessive Compulsive Disorder Subtypes

Currently, there is no agreed on framework for defining OCD subtypes (Calamari et al., 1999). In the past decade a number of different theoretical and empirical approaches have been employed to identify stable subgroups of OCD. These models tend to be conceptually very different and emphasise a number of variables. Researchers have used the following variables to subtype OCD: demographic and clinical characteristics, like age of onset (Cavallini, Albertazzi, Bianchi & Bellodi, 2002; Millet, Kochman, Gallarda, Krebs, Demonfaucon, Barrot et al., 2004; Rasmussen & Tsang, 1984), gender (Lensi et al., 1996), comorbidity (Hantouche, Angst, Demonfaucon, Perugi, Lancrenon, & Akiskal 2003; Nestadt, Addington, Samuels, Liang, Bienvenu, Riddle, et al., 2003; Sobin, Blundell, Weiller, Gavigan, Haiman & Karayiorgou, 2000b) particularly tic disorder (Holzer et al., 1994; Zohar

et al., 1997) and the presence or absence of childhood diseases, like streptococci-related autoimmune disorders (Swedo et al., 1998).

The models presented are by no means an exhaustive list of all subtype models. Given the time constraints, only the most empirically supported subtype models of OCD will be reviewed. This review is divided into three sections broadly defined as (a) subtyping by compulsive behaviour (*principal compulsion, psychometrics*); (b) subtyping through clinical descriptors (*age-of-onset, gender, comorbidity*); and (c) subtyping using multivariate statistical analysis (*factor analysis, cluster analysis*). The latter part of the section discusses current issues in subtyping and future directions, including the classification of underlying belief structures.

### 3.2 Subtyping by Compulsive Behaviour.

#### 3.2.1 Subtyping by Principal Compulsive Behaviour

The traditional method for subtyping OCD has focussed specifically on composite severity ratings (e.g., functional interference, distress) and/or indirect measures of overt symptoms (e.g., Amir, Foa, & Coles 1997b; Fals-Stewart, 1992; McKay et al., 1995, 2004). This approach relies on the most observable compulsive behaviour (i.e., classifying washing, checking, cleaning). The first two attempts to classify OCD by their principal compulsive behaviour (i.e., most common compulsive behaviour) was conducted by Hoehn-Saric and Barksdale (1983) and Rasmussen and Eisen (1991) respectively. The first authors' concluded that OCD should be divided into "impulsive" vs. "non-impulsive", whereas Rasmussen and Eisen suggested a typology based on the presence of tic disorder. While only tentative conclusions can be drawn from these studies as they were not subject to empirical standards, they did provide a valuable template from which further research could be conducted.

### *3.2.2 Identification Of OCD Schemas Using Psychometric Instruments*

The advent of sound psychometric instruments in the 1970s led to several studies reporting distinct symptom subgroups of OCD. Hodgson and Rachman (1977) developed the MOCI which assesses the severity and type of obsessive compulsive symptoms. Factor analysis of the MOCI revealed three major symptom dimensions: washing, checking, and doubting-conscientiousness. Later, these symptom dimensions were found to exist in non-clinical populations (Sanavio & Vidotto, 1985). This finding was substantiated by investigations by Freund, Steketee, and Foa (1987) on the Compulsive Activity Checklist (CAC) which showed that washing, cleanliness and checking were separate dimensions.

The PI (Sanavio, 1988) measures senseless, repugnant thoughts and unacceptable urges. Factor analysis of the PI using non-patient sample (Sanavio, 1988) revealed four main symptom dimensions, three of which corresponded to MOCI and CAC: (a) contamination; (b) checking behaviour; (c) impaired control over mental activities (corresponded to MOCI doubting-conscientiousness subscale); and (d) urges and loss of control over motor behaviour. These symptom dimensions were investigated in clinical groups by van Oppen, Hoekstra and Emmelkamp (1995b) who demonstrated five stable symptom dimensions: (a) washing; (b) checking; (c) rumination; (d) impulses, and (e) precision. Taken together, these results suggest three stable dimensions: washing, doubting-checking, and obsessional phenomena (McKay et al., 2004).

However, the abovementioned models tend to be limited in that often overtly similar behaviours have highly dissimilar causes and functions (e.g., childhood OCD vs. strep-induced childhood OCD). Additionally, many have argued that the reliance on composite severity ratings results in the content of these measures being too restrictive and biased towards the more recognised symptoms (e.g., washing), with the more atypical symptoms (e.g., religious rituals) being ignored (Summerfeldt et al., 1999; McKay et al., 2004; Calamari et al., 1999).



### 3.3 Subtyping by Clinical Descriptors

#### *3.3.1 Subtyping by age of onset: Early (EOCD) Vs Late Onset OCD (LOCD)*

Current estimates suggest that between one third and one half of all adult cases of OCD have their onset in childhood or adolescence (Kolada et al., 1994; Noshirvani et al., 1991; Ristvedt, Mackenzie, & Christenson, 1993). Family studies of OCD seem to indicate that there is a stronger familial component in childhood-onset cases of OCD compared to adult-onset cases (Riddle et al., 1990; Pauls et al., 1995). However, surprisingly little research has been conducted into the differences between child-and adult-onset OCD. Primarily, this is a result of methodological differences and confusion regarding what constitutes “early-onset” versus “late-onset”. For example, Pauls et al. (1995) considered all cases with an onset prior to age 18 as early-onset, whereas Bellodi et al.’s (1992) cut-off for early onset was development of symptoms prior to age 14 (Eichstedt & Arnold, 2001).

However, of the studies conducted, when compared to a LOCD cohort, adult individuals with EOCD are characterised by (a) male gender predominance (Geller et al., 2001b; Fontenelle et al., 2003; Bogetto et al., 1999); (b) a more aggressive clinical course, i.e., a shorter time between onset and clinical symptoms (Sobin et al., 2000a); (c) a greater number of obsessions and compulsions (Sobin et al., 2000a; Fontenelle et al., 2003); (d) a higher frequency of tic-like compulsions (Rosario-Campos et al., 2001; Bogetto et al., 1999) and (e) more ritual repetition (Fontenelle et al., 2003).

The differences in sex distribution, patterns of comorbidity, and familial loading in EOCD vs. LOCD have led some researchers to suggest that EOCD represents an etiologically distinct subtype of OCD (Eichstedt & Arnold, 2001; Fontenelle et al., 2003; Noshirvani et al., 1991). One hypothesis receiving growing empirical support is that EOCD cases represent genetic variants of Tourette’s syndrome (TS) and other Tic Disorders (e.g., Leckman, Peterson, Pauls, & Cohen, 1997; Miguel et al., 1997). While these subtype models exhibit

promise, the empirical evidence, to date, has been lacking or inconsistent (Summerfeldt et al., 1999).

### *3.3.2 Subtyping according to gender*

The majority of studies investigating childhood OCD have found that there is a male predominance, often by as much as 1.5 to 2.5 times (Hanna, 1995; Last & Strauss, 1989; Swedo et al., 1989; Thomsen & Mikkelsen, 1991). This contrasts with studies in adults, which have generally found an equal distribution of men and women (Kolanda et al., 1994; Rasmussen & Eisen, 1992). Eichstedt and Arnold (2001) have suggested that the overrepresentation of males among children and adolescents with OCD seems to reflect a tendency for males to have an earlier onset of the disorder than females (e.g., Rasmussen & Tsuang, 1986).

### *3.3.3 Subtyping by means of comorbidity*

Another investigative strategy which addresses some of the shortcomings of the above models is grouping by the structural characteristics of OCD symptoms like comorbidity.

#### *3.3.3.1 Tourette's Syndrome (TS) and Tic Disorders.*

TS is a chronic, neurobiological disorder characterised by multiple, recurrent motor and vocal tics (APA, 1994). Tic disorders are more prevalent in males (Leckman et al., 1997; Jaisoorya, Reddy & Srinath, 2003), and thus a relationship between some forms of early onset OCD and tic disorders could account for the preponderance of males among child-cases of the disorder. There is a high degree of comorbidity between OCD and tics, specifically TS, among child-onset cases. Comorbidity rates range from 20 to 38 percent, and there is a lifetime history of Tic disorders in as many as 26 to 59 percent of child-onset cases (Eichstedt & Arnold, 2001).

Several studies have found elevated rates of both OCD and tic disorders among the first degree relatives of child-onset probands (Pauls et al., 1995; Bellodi, et al., 1992).

Additionally, the high rate of tics and TS in the families of individuals with child-onset OCD, with or without comorbid tics, has led some researchers (e.g., Leonard et al., 1992) to suggest that tic disorders and child-onset OCD are related and may even be alternative manifestations of the same underlying illness (Eichstedt & Arnold, 2001).

Secondly, the exact nature of the relationship between tic disorders and child-onset OCD is unclear. The available evidence suggests that a high proportion of child-onset OCD is tic related (e.g., Leonard et al., 1992), in some cases, child-onset OCD may not be related to tic disorders. It is currently unknown whether “tic-related” OCD has a more neurological or familial basis when compared to early-onset OCD without tic disorder. Subsequently, it is also unknown whether cases of “tic-related” OCD may occur among individuals with adult-onset OCD (Eichstedt & Arnold, 2001).

Rates of tic disorders among children with OCD are estimated to exceed lifetime prevalence rates for tic disorders found in the general population, which are estimated to be between 0.01 percent and 0.40 percent for TS and 1 percent and 13 percent for tics (Apter, Pauls, Bleich, Zohar et al. 1993; Leckman et al., 1997; Leonard et al., 1992). Numerous other studies (e.g., Hanna, 1995; Riddle et al., 1990; Swedo et al., 1989; Zohar et al., 1992) have reported a high degree of comorbidity between OCD and Tic disorders and have also reported high rates of comorbid tics (TS, as well as transient or chronic tics) in children with OCD. Few studies have investigated the prevalence of tic disorders in adult onset cases; however, studies of adults with OCD, which include both child and adult onset cases, have generally found lower rates of tic disorders than in children with the disorder (Rasmussen & Eisen, 1992; Swedo et al., 1992).

### 3.3.3.2 *Separate Case For Hoarding?*

Hoarding symptoms have emerged as a distinct symptom dimension or subgroup in most studies (Calamari, Wiegartz, Riemann, Cohen, Greer, Jacobi, et al., 2004; Frost & Hartl,

1996; Frost & Steketee, 1999; Kyrios, Steketee, Frost & Oh, 2002). Hoarding behaviours occur in many clinical disorders, but are most commonly associated with OCD (Coles, Frost, Heimberg & Steketee, 2003). Clinical compulsive hoarding has been defined as (a) the acquisition of, and failure to discard a large number of possessions that appear to be useless or of limited value; (b) living spaces sufficiently cluttered so as to preclude activities for which those spaces were designed; and (c) significant distress or impairment in functioning caused by the hoarding (Frost & Hartl, 1996). It is estimated that 30% of individuals with OCD have hoarding behaviours (Rasmussen & Eisen, 1992; Samuels, Bienvenu, Riddle, Cullen, Grados, Liang, Hoehn-Saric & Nestadt, 2002).

Individuals with OCD (Non-hoarders) and compulsive hoarding (Hoarders) differ in several characteristics: (a) Hoarding is twice as prevalent in men as women (Samuels et al., 2002); (b) Hoarders have significantly higher levels of social disability than non-hoarders (Frost, Steketee, Williams, & Warren, 2000); (c) Hoarders tend to have more symmetry, ordering and counting obsessions compared to their non-hoarding counterparts (Samuels et al., 2002); (d) Hoarders tend to be younger at onset of OCD (Samuels et al., 2002); and (e) Hoarders are less likely than non-hoarders to get married (Frost & Gross, 1993; Samuels et al., 2002).

One of the primary features of compulsive hoarding is an excessive emotional attachment to possessions. Frost and Hartl (1996) reported a case where an individual with OCD became distraught about the prospect of discarding an old bank envelope on which was written how the money in the envelope was spent. There was nothing of special importance about the list (groceries, chemist, etc) and nothing significant as a reminder of an important time. The note had gained an emotional significance far beyond its face value. The acquisition of 'emotional significance' has been reported to stem from a number of erroneous beliefs (Frost, Hartl, Christian & Williams, 1995; Frost & Hartl, 1996; Greenberg, 1987).

Several beliefs about the role and meaning of possessions seem to distinguish hoarders from nonhoarders. Frost and Hartl (1996) suggested that three types of beliefs are central to compulsive hoarders; namely beliefs about the necessity of maintaining control over possessions, beliefs about responsibility for possessions, and beliefs about the necessity of perfectionism. In one study, Frost et al. (1995) found that hoarding among college and community samples was associated with an excessive desire for control over possessions. Specifically hoarders were less willing to share their possessions or have others touch or move them.

Greenberg (1987) has suggested that the possession is equated to safety, in that if others are allowed to touch or move the possessions, they may no longer signal safety, but uncertainty, since the status of the possession may be changed. Frost and Hartl (1996) suggested that hoarders seem to have a very elaborate sense of responsibility associated with possessions. These researchers suggest that there are two ways in which hoarding is associated with inflated responsibility. The first is a sense of responsibility for being prepared to meet a future need, the second sense of responsibility relates to 'harm' coming to the possession itself.

The cognitive behavioural model of compulsive hoarding (acquisition, saving, clutter) states that hoarding results from four basic deficits in (a) information processing, (b) difficulties in forming emotional attachments; (c) problems in emotional distress and avoidance behaviours; and (d) beliefs about the importance of their possessions (Frost & Hartl, 1996; Frost & Steketee, 1997; Hartl & Frost, 1999; Steketee, Frost, Wincze, Greene & Douglass 2000). Certain beliefs about possessions are hypothesized to lead some individuals to acquire, or save indiscriminately, to avoid emotional distress and/or prevent negative outcomes (Frost & Hartl, 1996; Frost & Steketee, 1998). As mentioned, these beliefs include: uncertainty (Frost & Shows, 1993); control and responsibility (Steketee, Frost & Kyrios, 2001).

Several studies have shown that hoarding behaviours strongly correlate with all types of obsessive-compulsive symptoms, except contamination (Frost, Kim, Morris, Bloss, Murray-Close, & Steketee, 1998). This finding has led some researchers to suggest that hoarding and contamination represent different factors (Baer, 1994; Coles et al., 2003) within OCD. Thus, there is a need for studies investigating these beliefs in individuals with OCD with and without hoarding behaviours.

Research suggests that possessions seem to have human-like status for hoarders and therefore must be protected from harm (Frost et al., 1995). Whereas Frost et al. (1995) have conceptualised the need to protect possessions in case they are needed in the future as representing an inflated sense of responsibility, others have suggested that this aspect of compulsive hoarding reflects an 'intolerance of uncertainty rather than inflated responsibility beliefs' (Frost & Shows, 1993). Research investigating the beliefs underlying compulsive hoarding have found that hoarding is in large part a problem of indecision about future need and about the cost of discarding a possession which may be needed later (Frost & Shows, 1993).

Consequently, where some researchers have suggested that inflated responsibility beliefs underlie the need to 'protect' possessions, it is also likely that the 'intolerance of uncertainty' could precipitate the responsibility beliefs relating to protecting one's possessions. This suggestion has been supported by high scores shown by compulsive hoarders on measures of indecisiveness, such as the Indecisiveness Scale (Frost & Shows, 1993). This finding provides support for the hypothesis that specific cognitive beliefs may be more aligned with certain subtypes of OCD.

Finally, some features of compulsive hoarding appear to reflect underlying beliefs about what is possible and what one should be expected to do. Frost and Hartl (1996) reported a case study in which an individual with OCD saved all her old newspapers because she had two specific concerns about throwing them away. Her first concern was that she had

not read them all. The second, was that she was fearful she could not remember all she had read in sufficient detail to suit her. Frost and Hartl (1996) suggested that for this individual, keeping old newspapers reflected perfectionist beliefs because she felt that if she did not do this task (reading the paper) thoroughly, she had somehow failed. Keeping the papers was one way of simply postponing the recognition of that failure. Therefore, not allowing opportunities to go unscrutinized was suggested to reflect perfectionism beliefs. In summary, research supports the significance of (a) the importance of controlling one's thoughts; (b) perfectionism; (c) responsibility; and (d) intolerance of uncertainty beliefs in compulsive hoarding.

### 3.4 Subtyping using Multivariate Statistical Methods

The most common measure used to assess the underlying structure of OCD symptoms is the Yale Brown Obsessive Compulsive Scale – semi-structured interview (YBOCS-SC; Goodman et al., 1989). The YBOCS-SC is a semi-structured interview which includes a checklist of over 60 specific OCD symptoms, organised into eight obsession categories (aggressive, contamination, sexual, hoarding, symmetry, religious, somatic, and miscellaneous) and seven compulsive categories (washing, checking, counting, ordering/arranging, hoarding, repeating, and miscellaneous). Most often, factor and cluster analyses have been employed to ascertain the underlying dimensions of the YBOCS-SC. The following sections review all studies of OCD symptom subtypes with the YBOCS-SC using factor and cluster analytic techniques.

#### *3.4.1 Factor Analysis to Delineate Subtype Schemas*

To date, seven studies have used factor-analytic methods to examine the latent structure of OCD symptoms (Baer, 1994; Leckman, Grice, Boardman, Zhang, Vitale, Bondi, et al., 1997; Hantouche & Lancrenon, 1996; Mataix-Cols et al. 1999; Mataix-Cols et al., 2002; Summerfeldt et al., 1999; Summerfeldt, Kloosterman, Antony, Richter & Swinson,

2004). Two of the studies (Hontouche & Lancrenon, 1996; Baer, 1994) found almost identical results using the YBOCS. Individuals' symptoms on each of the scale's 15 symptom categories were coded as follows: 0 = individual did not endorse any specific statements under that heading; 1 = individual endorsed one symptom but the category was not considered a *primary* or *principal* symptom; 2 = at least one of the symptoms in the category was considered a primary obsession or compulsion. A score of 0, 1, or 2 was assigned to each of the seven obsession categories and each of the eight compulsion categories of the YBOCS-SC. Results revealed three factors: symmetry and hoarding (common theme being a sense of imperfection and incompleteness); contamination and cleaning; and pure obsessions (included religious, sexual and aggressive obsessions with no compulsion category assigned as no compulsion category loaded onto these obsessions).

Leckman et al. (1997) examined the correlational relationship of OCD symptoms by grouping the 13 categories of the YBOCS in two independent samples of clients with OCD. In contrast to Baer (1994), Leckman used a different strategy to quantify responses on the YBOCS-SC. Specifically, the symptoms endorsed within each category were summed to produce a category score. Both current and lifetime symptoms were quantified. Factor analysis revealed four factors which are outlined in Fig.2. These symptom dimensions accounted for more than 60 percent of the variance. These results were dissimilar to Baer's (1994) who reported that all these factors were related, respectively, to contamination and symmetry related symptom clusters.

Support for Leckman et al. (1997) findings was obtained in two studies by Summerfeldt et al., (1999) and Mataix-Cols et al. (1999). Whereas, Summerfeldt et al. (1999) found near identical results, Mataix-Cols et al. (1999) identified a fifth factor, namely sexual and religious obsessions, which was separate from aggressive obsessions and checking compulsions. In a later study, Mataix-Cols et al. (2002) found a factor structure similar to Leckman's model: Religious obsessions loaded with aggressive obsessions and checking



rituals. Taken together, these results of the above mentioned studies suggest a three and five factorial model, including: (a) symmetry and ordering; (b) contamination and cleaning; (c) obsessions and checking (potentially further divisible into harm-related obsessions and checking and other obsessions); and (d) hoarding (Summerfeldt et al., 2004).

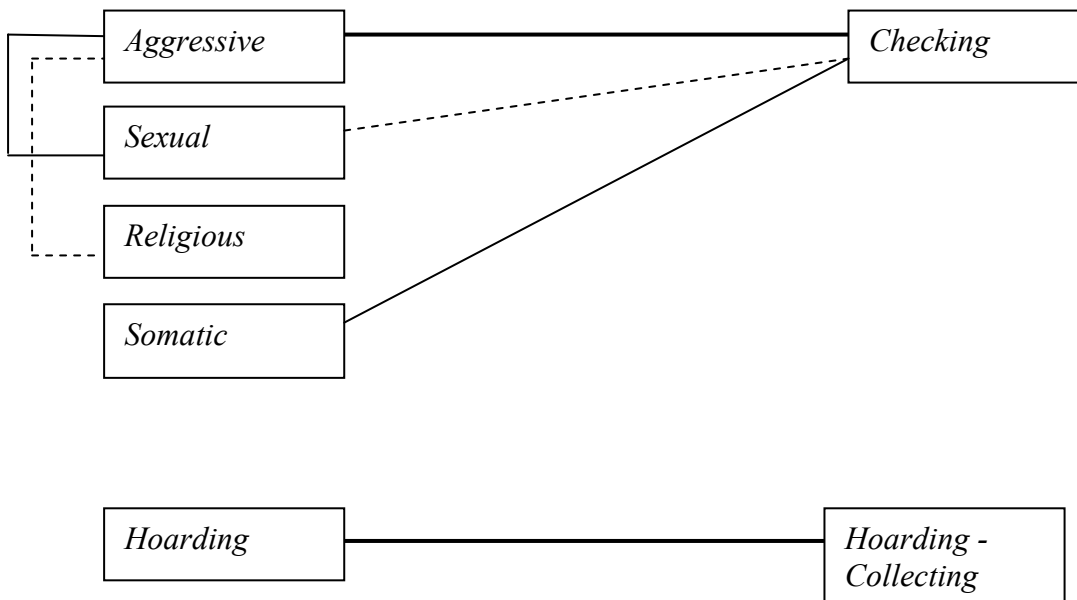


Figure 2: Pearson Correlations between Lifetime Scores on the Yale Brown Obsessive Compulsive Scale Symptom Checklist Categories in Two Data Sets.

Bold lines indicate correlations greater than or equal to 0.60 in both data sets. Solid lines indicate correlations between .4 and .6. Dashed lines indicate a correlation greater than or equal to 0.40 in one data set.

It has been argued that many contemporary subtype models neglect the less common "miscellaneous" symptoms seen in OCD (Summerfeldt et al., 2004). Miscellaneous obsessions refer to compulsive touching and tapping, fear of saying certain things, blinking and staring and the need to know or remember details (Summerfeldt et al., 2004; Holzer et al., 1994; Leckman et al., 1997; Miguel et al., 1997; Cath et al., 2001a). Summerfeldt et al. (2004) investigated whether certain miscellaneous symptoms of OCD were associated with the more recognised symptoms of OCD (e.g., Leckman et al., 1997 model).

In two independent groups of individuals with OCD ( $n = 381$ ;  $n = 107$ ), logistic regression analysis was used to determine the association of each of the 18 miscellaneous symptoms with the four symptom factors. Then a single confirmatory factor analysis was conducted to test the model of associations in the smaller sample. Figure 3 displays the relationship between the three symptom factors (obsessions and checking, symmetry and ordering and hoarding) and miscellaneous OCD symptoms<sup>9</sup>. A robust association between miscellaneous symptoms and the contamination and cleaning factor was not found.

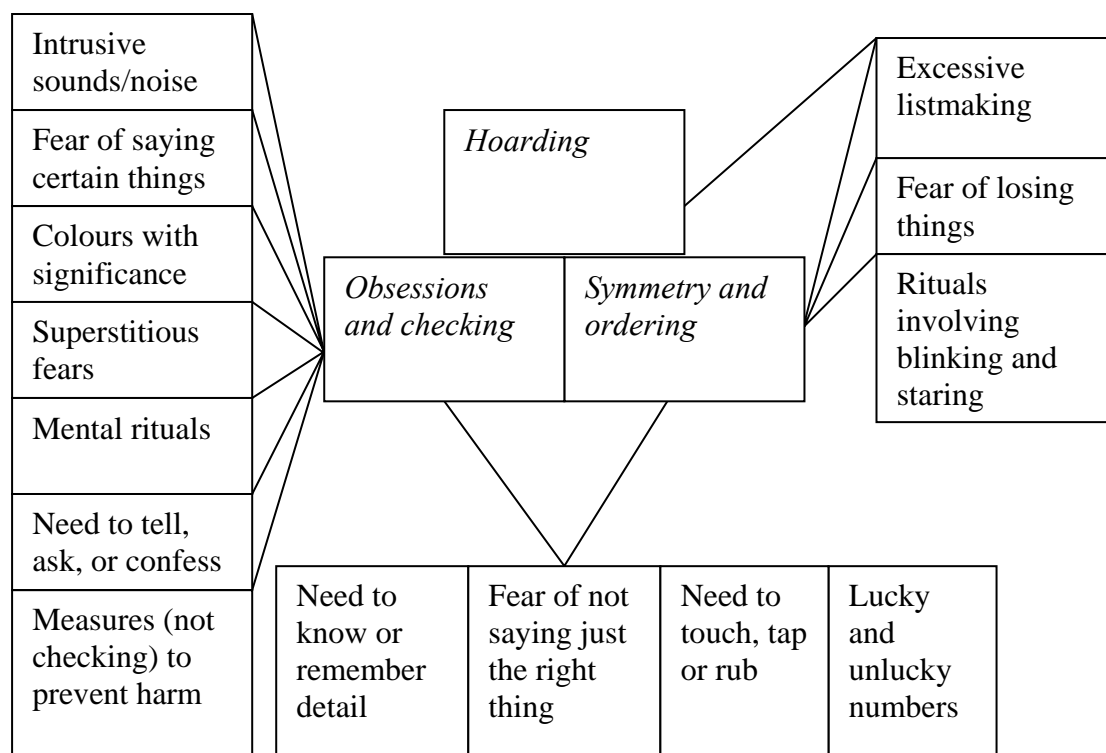


Figure 3: Logistic regressions predicting miscellaneous Y-BOCS symptoms from symptom factors ( $n = 381$ )

(Summerfeldt et al., 2004)

#### 3.4.2 Subgroups Derived Using Cluster Analysis

While factor analytic studies have provided interesting information on the structure of OCD symptoms, this technique has not been able to produce definite groupings of OCD

<sup>9</sup> ascertained by the Yale-Brown Obsessive-Compulsive Scale symptom checklist.

individuals (Calamari et al., 1999). For example, in Summerfeldt et al. (1999), it was also found that the discrete symptoms listed on the YBOCS-SC did not load well on the specific YBOCS dimensions they were supposed to measure (McKay et al., 2004). Subsequently, other methods of analysis have been proposed, one of these being cluster analysis. Cluster analysis is a technique for forming relatively homogenous subject groups within complex data sets (e.g., Borgen & Barnett, 1978), where cases are assigned to groups created by maximizing between-group differences and minimizing within-group variability on a set of measures (McKay et al., 2004). Lastly, it is also important to note that exploratory factor analysis cannot demonstrate the “correct” number of factors to describe a particular item domain.

Cluster analysis has been used in investigations of the relationship between OCD and comorbid conditions (Hasler, LaSalle-Ricci, Ronquillo, Crawley, Cochran, Kazuba, Greenberg & Murphy, 2005); schizophrenia (Lysaker, Lancaster, Nees & Davis, 2004); personality (Fals-Stewart & Lucente, 1993); OC spectrum disorders (Lochner et al., 2005) and symptom patterns in children (Ivarsson & Valderhaug, 2005). To date, five studies have used this type of analysis to identify OCD subgroups using the YBOCS-SC (Calamari, et al., 1999; Abramowitz, Franklin, Schwartz & Furr, 2003a; Calamari et al., 2004; Taylor, Abramowitz, McKay, Calamari, Sookman, Kyrios, Wilhelm & Carmin, 2006; Calamari, Cohen, Rector, Szacun-Shimizu, Riemann & Norberg, 2005).

One of the first studies to use cluster analysis to identify OCD subgroups using the YBOCS-SC was Calamari et al. (1999). In this study, the YBOCS symptom checklist was quantified, and the obsession and compulsion symptoms reported by an OCD sample ( $n = 106$ ) were used to form subgroups. The results were comparable with past studies (e.g., Baer, 1994; Leckman et al., 1997) and showed a five cluster solution. The five subgroups were characterized by dominant symptom patterns but also reported significant secondary concerns

and included: (a) harming (prominent harming obsessions and checking compulsions)<sup>10</sup>; (b) hoarding (prominent hoarding obsessions and compulsions and contamination concerns; (c) contamination (pronounced contamination obsessions and washing compulsions); (d) certainty (obsession and compulsion characterised by a need to be absolutely certain regarding a broad range of situations); and (e) obsessionals (included miscellaneous obsessions including mental rituals, lucky/unlucky numbers, superstitious fears, and need to know or remember).

A later study using cluster analysis by Calamari et al. (2004) confirmed these findings. In this study, participants were administered a battery of psychometric tests, including the YBOCS. The YBOCS symptom checklist scores<sup>11</sup> were then subjected to hierarchical cluster analysis. The results showed a stable contamination subgroup in both a five and seven subgroup model, but sample stability for harming, obsessionals, symmetry, and certainty subgroups was not as strong (Calamari et al., 2004). Once the samples were combined ( $n = 220$ ; Calamari et al., 1999 and the present sample) a reliable hoarding subgroup was found. The results of this study support a stable seven subgroup taxonomy: contamination, harming, symmetry, obsessionals, certainty, contamination and harming, and hoarding.

Abramowitz et al. (2003a) derived OCD subtypes using a revised form of the YBOCS-SC which contained a separate category for assessing *mental rituals*<sup>12</sup>. The scores of 132 individuals with OCD were subject to cluster analysis. The results showed the following five dimensions: (a) harming, (b) contamination, (c) hoarding (d) symmetry and (e) unacceptable thoughts. The last subgroup, the unacceptable thoughts domain, referred to

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<sup>10</sup>Predominance of symmetry-exactness obsessions in the Harming category, with high scores compared to all other obsession category scores except aggression obsessions (Calamari et al., 1999).

<sup>11</sup> Responses on each of the symptom categories of the YBOCS were scored 0 (the patient did not report any symptoms), 1 (the patient reported at least one symptom but the category was not considered primary), or 2 (symptoms were reported and the category was considered a principal problem).

mental rituals, aggressive, religious and sexual obsessions (Abramowitz et al., 2003). This subgroup was proposed to be akin to Baer's (1994) and Leckman et al.'s (1997) 'pure obsessionals' and 'obsessions and checking dimensions, respectively (McKay et al., 2004).

Taylor et al (2006) suggested that dysfunctional beliefs play a role in only a subgroup of cases of OCD (e.g., different models might apply to different subtypes). Individuals with OCD ( $n = 244$ ) completed measures of dysfunctional OC-related beliefs. There were three comparison groups; anxious ( $n = 103$ ), student ( $n = 284$ ), and community ( $n = 86$ ) controls. Cluster analysis revealed two OCD clusters: low versus high scores on beliefs (OC-low, OC-high). Belief scores for OC-low were in the range of scores for the comparison groups, which were all significantly lower than those of OC-high. Thus, a cluster of OCD individuals was identified who did not have elevated scores on measures of dysfunctional beliefs. OC-low and OC-high did not differ on some OC measures (contamination, checking, grooming), but OC-high had higher scores on measures of harming obsessions. These results are consistent with the view that dysfunctional beliefs may play a role in only some types of OCD.

In a recent study, Calamari et al. (2005) used clustering methodologies to form OCD subgroups and test Taylor et al.'s (2006) findings. Individuals with OCD ( $n = 367$ ) were administered the Obsessional-Beliefs Questionnaire. Individuals' scores on the OBQ subscales were subjected to cluster analysis, but several methodological enhancements were employed. Multiple methods were used to determine if belief-based subgroups were present, and the number of such subgroups. Different clustering methods were employed to determine if Taylor et al.'s findings (i.e., a High Beliefs and Low Beliefs group) might have resulted from the specific clustering methodologies used. The results were very similar to the subgroups identified by Taylor et al. (2006), in that a high-belief group (HB) and low-beliefs (LB) group were found. The LB scores were comparable to anxious control group without

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<sup>12</sup> Mental rituals: mental neutralising, praying, counting, list-making, reviewing events or conversations in one's

OCD and a control group. The results of Taylor et al (2006) and Calamari et al (2005) studies suggests that dysfunctional beliefs do not play a role in the etiology or maintenance of all cases of OCD.

Other methods to subtype OCD using cluster analysis have focussed on demographic (age, gender), and clinical variables (age of onset, obsessive–compulsive symptom severity and dimensions, level of insight, temperament/character, treatment response). Lochner et al. (2005) investigated the degree of comorbid obsessive–compulsive spectrum disorders (OCSDs) in individuals with OCD using cluster analysis. Three separate clusters were identified: (a) reward deficiency: associated with earlier age of onset and the presence of tics. Examples include pathological gambling, hypersexual disorder, and Tourette’s disorder; (b) impulsivity: associated with female gender and childhood emotional abuse. Examples include compulsive shopping, kleptomania, eating disorders, self-injury; and (c) somatic: associated with less insight, and somatic obsessions and compulsions. Examples: body dysmorphic disorder and hypochondriasis. These researchers concluded that it is likely that OCD symptoms and OCSD lie on a continuum.

While studies using demographic and clinical characteristics are promising, the most recent support is for symptom-based models using cluster analysis. Table.1. displays the results of these studies. As seen, in the literature reviewed four factors or subgroups appear highly replicable: (a) contamination and washing dimension; (b) harming and checking dimension; (c) hoarding dimension and (d) symmetry and ordering subgroup. The consistent findings using different statistical procedures (e.g., cluster vs. factor analysis) suggest that this method of subtyping holds some merit.

Table 1: OCD subgroups identified using clustering methodologies

<b>Model</b>	<b>Dimensions</b>	<b>Study<sup>13</sup></b>
3-Factor	Symmetry-hoarding Contamination-cleaning Pure obsessionals	Baer (1994) Hantouche & Lancrenon (1996)
4-Factor	Aggressive-checking Symmetry-ordering Cleanliness-washing Hoarding	Leckman (1997) Summerfeldt et al. (1999)
5-Factor	Contamination-washing Harming-checking Hoarding Symmetry-ordering Pure obsessions	Calamari et al. (2004) <sup>a</sup> Abramowitz et al. (2003)

<sup>a</sup> Identified 7 clusters in total, but 5 of these were consistent with Abramowitz et al. (2003)

### 3.5 The Obsessive Compulsive Cognitions Working Group (OCCWG)

The Obsessive Compulsive Cognitions Working Group (OCCWG) was formed following a symposium on OCD at the World Congress of Behavioural and Cognitive Therapies in Denmark in July 1995. The OCCWG consists of a large group ( $n = 46$ ) of international researchers dedicated to the study of the cognitive aspects of OCD. The purpose of the OCCWG was twofold: (a) to identify the most important belief domains in OCD and (b) to develop measures of beliefs that distinguish OCD from other psychological disorders. In June 1996, the group issued a template of beliefs and operational definitions. These beliefs include<sup>14</sup>: Over-importance of Thoughts; Importance of Controlling One's Thoughts; Perfectionism; Inflated Responsibility; Overestimation of Threat and Intolerance for Uncertainty. The first five beliefs were reported to be OCD-specific, whereas the final belief,

<sup>13</sup> All studies used the Yale Brown Obsessive Compulsive Scale to identify the subgroup categories.

<sup>14</sup> These beliefs selected were chosen from pool of 19 different domains of beliefs (refer OCCWG, 1997, p 669).

perfectionism was thought to be relevant but not exclusive to OCD (OCCWG, 1997; Clark, 2004). Based on these beliefs, the OCCWG (1997, 2001; 2003, 2005) generated two assessment measures: Obsessive Beliefs Questionnaire (OBQ-87) and Interpretations of Intrusions Inventory (III-31).

The remaining sections are structured as follows: (a) a review of research relating to each of the major belief domains. Two of the beliefs, *Inflated Responsibility*<sup>15</sup> and the *Thought-Action Fusion* (variant of the over-importance of thoughts domain), were omitted from the review as they were discussed in Chapter 2; (b) the development of the Obsessive Beliefs Questionnaire (OBQ-87) and Interpretations of Intrusions Inventory (III-31); and (c) the specificity of these beliefs to obsessive compulsive symptoms. This chapter concludes with a summary of the most important aspects of the literature reviewed and future directions.

### 3.5.1 Over-Importance of Thoughts

“Beliefs indicating an exaggerated estimation of the probability or severity of harm”  
(OCCWG, 1997, p 678)

This domain refers to the assumption that negative automatic thoughts are extremely important. The OCCWG (1997) stated that this domain reflects three central themes: (a) these negative thoughts are revealing and convey important information about me; (b) having negative thoughts increases the risk that they will come true (actuality); and (c) the mere occurrence of these thoughts means they are important. Embedded in this domain are beliefs that reflect Thought-Action Fusion. (OCCWG, 1997, p.678). These beliefs are reflected in statements like “thinking about something bad makes it more likely to happen” or “having a

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<sup>15</sup> “Belief that one is especially powerful in producing and preventing personally important negative outcomes. These outcomes are perceived as essential to prevent. They may be actual, that is, having consequences in the real world, and/or at a moral level. Such beliefs may pertain to responsibility for doing something to prevent or undo harm, and responsibility for errors of omission and commission.”



bad thought means I really want to do it” and/or “I am more likely than other people to accidentally cause harm to myself or others” (OBQ-87 items).

Dysfunctional appraisals of intrusive thoughts and beliefs about the importance of thoughts are central in contemporary cognitive models of OCD (e.g., Rachman, 1997, 1998; Salkovskis, 1985, 1989) and are empirically linked to OCD symptoms (Purdon & Clark, 1994). Research has found that decreases in the strength about the importance of thoughts were associated with reductions in the frequency of obsessions (Freeston, Rheaume & Ladouceur, 1996). Purdon and Clark (1994) have suggested that beliefs about the importance and subjective meaning of the obsessional thoughts are the major predictors of both the development and persistence of obsessional thinking. This proposition has support from the OCCWG (2001) who demonstrated the importance of the thoughts domain to individuals diagnosed with OCD relative to anxious controls, community adults and students.

Beliefs about the importance of one's thoughts are hypothesised to act as a precursor to beliefs about responsibility and the need to control one's thoughts (Thordarson & Shafran, 2002). The OCCWG (2001) demonstrated that beliefs about the importance of one's thoughts, control of thoughts and responsibility to be highly correlated in individuals with OCD and non-clinical controls. The relatedness of these constructs (e.g., importance of one's thoughts, responsibility and the control of thoughts) can be seen in the following example. If an unwanted thought is appraised as more likely to happen (TAF), then an exaggerated sense of responsibility may be activated, which may lead to attempts to suppress thoughts, which appears to increase the frequency of the obsessive thoughts (Thordarson & Shafran, 2002).

Research evidencing strong correlations between TAF and obsessive symptoms has strengthened the association between this domain and OCD (Clark et al., 2000; Rassin & Koster, 2003; Sica et al., 2002; Gwilliam et al., 2004; Smari & Holmsteinsson, 2001; Yorulmaz et al., 2004). As reviewed in Chapter 2, the majority of research examining TAF relies on the TAFS (Shafran et al., 1996), however, recently there has been interest in

experimental paradigms (see Rachman et al., 1996). This type of research design has the potential to elucidate the cause-effect relationship between cognition and obsessive compulsive symptom.

### *3.5.2 Importance of Controlling one's Thoughts*

“Overvaluation of the importance of exerting complete control over intrusive thoughts, images, and impulses, and the belief that this is both possible and desirable” (OCCWG, 1997, p.678)

The importance of mental control is one of the key cognitive variables in OCD. Several dimensions of belief within this domain have been identified and include: (a) excessive monitoring and hypervigilance of specific mental events (Clark & Purdon, 1993); (b) beliefs about the psychological and behavioural consequences of failing to control thoughts (OCCWG, 1997) ; (c) belief that one is morally responsible for the consequences of not controlling the thought (Clark & Purdon, 1993); and (d) the belief that the control of thoughts is achievable, essential and effective (Clark, 2004). These beliefs are reflected in statements like “Having control over my thoughts is a sign of good character” or “If I don't control my unwanted thoughts, something bad is bound to happen” or “If I exercise enough will-power, I should be able to gain complete control, over my mind”(OBQ-87 items).

Clark and Purdon (Clark & Purdon, 1993; Purdon & Clark, 1999) propose a theory based on the assumption that faulty beliefs about the importance of thought control and negative misinterpretations of the anticipated consequences of failed control of intrusive thoughts is an important cognitive variable in the development of OCD (Clark, Purdon & Wang, 2003). In one of their first studies, Clark and Purdon (1994) reported on the appraisal and thought control responses of students ( $n = 270$ ) to their most upsetting intrusive thoughts. The results showed that the two most important predictors of the frequency, persistence subjective distress of the intrusion were; (a) the belief that one could act on the intrusive thought; and (b) perceived uncontrollability of the thought. The results also suggested that individuals with high levels of obsessionality reported more intrusive thoughts and rated their

thoughts as significantly more frequent and believable than those who observed low scores on measures of obsessionality. In sum, those participants with obsessive tendencies believed they have less control over their thoughts.

In an attempt to assess beliefs about the importance of control and negative consequence of intrusive thoughts, Clark and Purdon (1995) developed a 67-item self-report psychometric scale called the Meta-Cognitive Questionnaire (MCBQ). In the validation study, Clark, Purdon and Wang (2003) administered the MCBQ alongside a battery of other tests measuring symptoms of mood, anxiety and obsessionality to a large group of university students ( $n = 560$ ). The results demonstrated a significant relationship between obsessions and beliefs about the controllability of one's thoughts and perceived negative consequences. The MCBQ also revealed three dimensions within this cognitive domain: (a) the possibility and importance of mental control; (b) perceived negative consequences resulting from a failure to control these thoughts; and (c) positive characteristics of unwanted intrusive thoughts. Clark, Purdon and Wang (2003) investigated the relationship between maladaptive meta-cognitive control beliefs and obsessional symptoms in a large sample of students ( $n = 560$ ). Participants were administered the MCBQ and a battery of questionnaires that assessed symptoms and cognitions of worry, OCD, anxiety, and depression. The results showed beliefs about the control of thoughts and perceived negative consequences due to uncontrolled intrusive thoughts had a significant association with obsessions, and to a lesser extent, worry.

Recently, the OCCWG (2001) have suggested that the control of thoughts domain correlates specifically with symptoms of obsessionality, and not just distress or anxiety (Purdon & Clark, 2002). Support for this premise is found in research by Clark et al. (2000), which examined the differences in the appraisal and thought control strategies associated with the perceived control of unwanted sexual and non-sexual intrusive thoughts in a sample of university students ( $n = 171$ ). Participants were administered the Revised Obsessive Intrusions Inventory-Sex Version. The results found that unwanted intrusive thoughts of

aggression, harm, dirt, contamination and disease were perceived as more difficult to control if individuals believed that they (a) could act on the thought (TAF-likelihood); (b) if they were concerned or worried that they could carry out the thought in real life (TAF-worry); and (c) if they tried very hard to suppress the thought (resistance). These researchers concluded that different appraisal processes may be associated with the control of non-sexual and sexual intrusive thoughts.

Tolin, Abramowitz, Hamlin and Synodi (2002) have demonstrated that participants with OCD report more personal weakness about controlling their thoughts compared to anxious and non-clinical groups. In following, Freeston and Ladouceur (1997) and Ladouceur and colleagues (2000) found that attempts to control unwanted intrusive thoughts was higher in clinical samples than non-clinical samples. These studies also found that clinical participants reported less success than control subjects. Calamari and Janeck (1998) confirmed these findings, showing individuals with OCD ( $n = 31$ ) to report less control over their thoughts, and an increase in emotional intensity when these thoughts occurred, compared to non-clinical ( $n = 35$ ) controls.

Recently, Clark (2004) posited a cognitive control theory. This model states that negative appraisals of intrusions result in significant distress which prompts efforts to control the thoughts, which paradoxically serve to increase the frequency of the thoughts and maintain the obsessional cycle. Specifically, *beliefs about the control of thoughts* refers to (a) conviction that particular intrusions must be controlled and kept out of conscious awareness; (b) strategies that are used to control unwanted intrusions (e.g., thought suppression) or mitigate the threat associated with them (e.g., mental checking, praying); and (c) perception about failure to control such intrusions (e.g., self-appraisals of oneself as a failure because of an inability to suppress unwanted thoughts).

There is significantly more research on the role of specific thought control strategies in the development of obsessive concerns than there is on the role of beliefs about the need to

control thoughts (Purdon & Clark, 2002). Thought suppression is one of the most common control strategies used to exclude unwanted thoughts (Amir et al., 1998). There is an impressive amount of research on thought suppression (see Purdon, 1999 for review). However, research tends to be limited in that (a) the causal pathways by which suppression strategies specifically relate to OCD have not been examined; (b) there is little information about the relationship between specific thought control strategies and beliefs about thought control; and (c) the generalizability of these findings are questionable as they were conducted in non-clinical samples.

The Thought Control Ability Questionnaire (TCAQ) is a self-report measure of individual differences in the perceived ability to control unwanted intrusive thoughts (Luciano, Algarabel, Tomas & Martinez, 2005). In the psychometric validation study, Luciano et al. (2005) administered the TCAQ as well as measures of anxiety, depression and obsessionality (MOCI) to a large sample of Spanish students. The results showed a significant correlation between the TCAQ and the checking subscale of the MOCI ( $r = .48$ ), which remained significant when controlling for depression and anxiety.

As mentioned earlier, beliefs about the importance of controlling one's thoughts are hypothesised to overlap with beliefs about responsibility and the importance of one's thoughts (Clark & Purdon, 1993; Thordarson & Shafran, 2002). Research conducted by the OCCWG in 2001 demonstrated that the control of thoughts subscale was correlated with the importance of thoughts subscale, but not perfectionism subscale. These findings remained constant when re-tested by the OCCWG in 2003.

### *3.5.3 Perfectionism*

“Belief that (1) there is a perfect solution to every problem; (2) that doing something perfectly (mistake free) is possible and necessary; and (3) that even minor mistakes have serious consequences” (OCCWG, 1997, p 678)

Perfectionism or “the tyranny of the shrouds” as described by Horney (1950) has long been associated with psychopathology. Perfectionism has played a major role in theories of OCD (McFall & Wollersheim, 1979; OCCWG, 1997) with excessive perfectionism linked to avoidance behaviour and failure expectancies (Jones & Menzies, 1997). Perfectionism has been characterised as an overly self-critical tendency to judge the self against excessively high standards (Riskland, Williams & Kyrios, 2002). Sample items of perfectionism include: “there is only one right way to do things” and/or “things should be perfect according to my own standards” and/or “if I fail at something, I am a failure as a person” (OBQ-87 items).

Viewed historically as a one-dimensional construct (see Pacht, 1984), perfectionism has undergone substantial revision and is now considered a multidimensional construct (e.g., Frost, Marten, Lahart & Rosenblate, 1990; Hewitt & Flett, 1991; Antony, Purdon & Swinson, 1999; Stober, 1998; Frost, Heimberg, Holt, Mattia & Neubauer, 1993). Slade and Owens (1998) have suggested a model based on the distinction between positive and negative perfectionism (see Terry-Short, Owen, Slade & Dewey, 1995). The model classes behaviours either positive or negative depending on the function of the perfectionist behaviour (Frost, Novara & Rheume, 2002).

Positive perfectionism is adaptive and reinforcing and refers to cognitions and behaviours designed to achieve goals and obtain positive reinforcement (Frost, Novara & Rheume, 2002). Positive reinforcement correlates with self-oriented perfectionism (e.g., tendency to set excessively high standards and to worry about failure to meet those standards; Frost, Novara & Rheume, 2002). Positive perfectionists tend to cope with problems by actively and conscientiously engaging in their problems (Burns & Fedewa, 2005). Negative perfectionism includes concern over mistakes, parental expectations and criticism, socially prescribed perfectionism (Frost, Novara & Rheume, 2002) and includes poor constructive thinking (e.g., concrete thinking) and maladaptive coping (e.g., avoidance, rumination) styles (Burns & Fedewa, 2005). Negative reinforcement involves cognitions and behaviours

designed to achieve goals to avoid or escape failure (Frost, Novara & Rheume, 2002). The dimensions of negative perfectionism are the ones of most interest in OCD (Frost, Novara & Rheume, 2002).

As seen above, the definition of perfectionism (OCCWG, 1997) emphasises the role of negative perfectionism<sup>16</sup> in OCD (e.g., belief in perfect solutions and excessive concern over mistakes). Negative perfectionism (e.g., concern over mistakes) has been found to correlate with measures of obsessive compulsive symptoms in non-clinical (Frost et al., 1990; Frost et al., 1994; Rheume et al., 1995) and clinical samples (Norman, Davies, Nicholson, Cortese & Malla, 1998; Antony, Purdon, Huta & Swinson, 1998; Ferrari, 1995; Frost & Steketee, 1997).

The concern over mistakes (negative perfectionism) refers to the interpretation of mistakes as indicating personal failure (Frost et al., 1990). Several studies have found that a high level of concern over mistakes correlates with symptoms of obsessionality (Frost, Novara & Rheume, 2002). Concern over mistakes has been associated with high scores on two obsessive compulsive measures, the MOCI and the PI (Frost et al., 1990; Rheume et al., 1995). There is also some evidence that concern over mistakes is associated with particular obsessive symptomatology. Frost and Gross (1993) found negative perfectionism (e.g., concern over mistakes and socially prescribed perfectionism) to correlate with hoarding symptoms in sample of adult students (Frost, Novara & Rheume, 2002).

Rheume, Freeston, Ladouceur, Bouchard, Gallant, Talbot and Vallières (2000a) administered the Perfectionism Questionnaire (PQ) to a selected sample of participants' classed as either functional perfectionists (FP) or dysfunctional perfectionists (DP). The FP reflects perfectionist tendencies with few negative consequences (positive perfectionism), whereas the DP group includes strong perfectionist tendencies with harsh consequences

(negative perfectionism; Frost, Novara & Rheume, 2002). The results showed that compared to the FP, the DP group scored higher on measures of obsessionality (PI), required more time to complete a precision task and hurried their decision when faced with uncertainty. Consequently, the results showed the FP group required more certainty than the DP group on the precision task (Frost, Novara & Rheume, 2002). Lastly, people in the DP participants also endorsed more beliefs about responsibility than those in the FP group.

Rheume, Ladouceur and Freeston (2000) explored the relationship of perceived danger, responsibility and perfectionism in the prediction of obsessive compulsive tendencies in a non-clinical sample ( $n = 182$ ). Participants were administered the Responsibility Questionnaire (RQ), the Perfectionism Questionnaire (PQ) and the PI. The results demonstrated moderate correlations between all three measures suggesting that both responsibility and perfectionism are related to obsessive compulsive symptoms. Perfectionism was shown to explain a significant part of the variance of obsessive compulsive tendencies after controlling for responsibility. Responsibility had the same beta weight as perfectionism.

To date only five studies have investigated the relationship between perfectionism and OCD in clinical samples (Norman et al., 1998; Antony et al., 1998; Ferrari, 1995; Frost & Steketee, 1997; Mavissakalian, Hamann, Haider & De Groot, 1993). Norman et al (1998) administered the Multidimensional Perfectionism Scale (MPS; Frost et al., 1990) to psychiatric outpatients ( $n = 129$ ). The results indicated that the concerns over mistakes (negative perfectionism) subscale of the MPS correlated with the MOCI and the PI, whereas few significant correlations were found with the subscales measuring positive perfectionism (Frost, Novara & Rheume, 2002).

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<sup>16</sup> Doubt over one's actions, was de-emphasized as it was believed to be more closely related to intolerance of uncertainty (Frost, Novara & Rheume, 2002).



This finding was supported by Frost and Steketee (1997) who examined perfectionist tendencies (e.g., MPS) in an OCD sample ( $n = 35$ ), anxious groups (AC; panic disorder and agoraphobia;  $n = 14$ ) and non-anxious controls (NAC;  $n = 35$ ). Participants were administered Frost's et al. (1990) MPS. The same pattern of results emerged, with the OCD and AC groups (panic disorder and social phobia) reporting significantly higher scores on the concern over mistakes (CM) subscale than the NAC group. However, no significant difference was found between the OCD and AC groups on the CM subscale. The doubts about actions (DA) subscale showed a different pattern. There was a significant main effect between groups, with post hoc analysis showing the OCD to have significantly higher DA scores than those with panic disorder. Frost et al. (1994) examined whether individuals with sub-clinical OCD were characterised by more risk aversion, perfectionism and guilt than non-clinical controls. Two large samples were administered a battery of self-report tests measuring the above mentioned cognitive variables. The results found that individuals with sub-clinical OCD reported greater risk aversion, guilt and perfectionism than the non-clinical group.

Another aspect of negative perfectionism refers to socially prescribed perfectionism. Antony et al. (1998) explored the role of perfectionism across individuals ( $n = 175$ ) with a variety of anxiety disorders (OCD, social phobia, panic disorder, specific phobia) and non-clinical controls. Participants were administered Frost's et al (1990) MPS and Hewitt and Flett, (1991) MPS. The results suggested that individuals with OCD scored higher than non-clinical controls on the subscales concerns over mistakes (CM) and doubts over actions (DA), and higher scores than panic disorder on the DA scale. Those with social phobia appeared to have the greatest concern with CM and DA compared to the other groups. The anxiety groups could not be differentiated on socially prescribed perfectionism on the Hewitt and Flett (1991) MPS scale. The results suggest that socially prescribed perfectionism is a relevant construct in many anxiety disorders, but is not specific to OCD.

Until recently, the conceptualisation of perfectionism lacked adequate definition and was plagued by inconsistent measures (Frost, Novara & Rheume, 2002). However, as Frost, Novara and Rheume (2002) suggest, a key theme in all definitions of perfectionism (e.g., Frost et al., 1990; Hewitt & Flett, 1991) is the avoidance of mistakes (negative perfectionism). The preoccupation with avoiding mistakes also explains the high degree of overlap observed on the OBQ uncertainty and control subscales (see OCCWG, 2001, 2003). Some theorists conceptualise perfectionism as an attempt to avoid *uncertainty* or establish *control*, whereas others propose that perfectionism produces uncertainty and the need control (Frost, Novara & Rheume, 2002). Clearly, these three beliefs are intertwined and warrant further investigation.

The research reviewed thus far suggests global perfectionism is not specific to OCD; however negative perfectionism (e.g., concern over mistakes and doubts over actions) has correlated with some measures of obsessionality (Frost, Novara & Rheume, 2002) and other cognitive variables like guilt (Frost et al., 1990), compulsive hoarding (Frost & Gross, 1993) compulsive indecisiveness (Frost and Shows, 1993) and/or “just right feelings”. However, research has also shown that negative perfectionism (e.g., concern over mistakes) also occurs in other anxiety disorders (Antony et al., 1998; OCCWG, 2001, 2003). Clearly, research utilizing experimental methodologies (e.g., Frost, Turcotte, Heimberg, Mattia, Holt & Hope, 1995a; Bouchard, Rheume & Ladouceur, 1999) is required.

#### 3.5.4 *Overestimation Of Threat*

“Beliefs indicating an exaggerated estimation of the probability or severity of harm.” (OCCWG, 1997, p.678)

This belief refers to the extent to which individuals with OCD overestimate the amount and severity of threat in the environment and threat associated with noxious thoughts or obsessions (e.g., Beck, 1976; Beck, Emery & Greenberg, 1985; Rachman, 1998; Salkovskis, 1989, 1996 cited in Riskind, Williams & Kyrios, 2002). Representative beliefs

included in this domain include: “bad things are more likely to happen to me than to other people” and/or “I often think things around me are unsafe” and/or “things that are minor annoyances for most people seem like disasters” (OBQ-87). Early models (e.g., Carr, 1974; Lazarus, 1966; McFall & Wollersheim, 1979) of dysfunctional beliefs about threat emphasised individuals with OCD tendency to underestimate their capacity (e.g., skills) to cope with the threat. It was hypothesised that the perception of inadequate coping resources lead to anxiety and precipitated repetitive behaviour which was conceptualised as attempts to reduce perceived danger (Sookman & Pinard, 2002).

Contemporary research has retained these principles. For example, Frost and Steketee (1997) suggested that beliefs about harm/danger encompass two important components: (a) tendency to *overestimate the likelihood of harm* occurring; and (b) beliefs about the consequences and *severity of threatening events* (e.g., Carr, 1974; Freeston et al., 1996; Salkovskis, 1985; Yaryura-Tobias & Neziroglu, 1983). Seminal research by Menzies and colleagues (Jones & Menzies, 1997, 1998b; Menzies et al., 2000) examined these two components of ‘the overestimation of threat’ domain by investigating danger expectancies (i.e., inflated probability and severity of harm) in OCD.

Menzies and Jones (1997) examined the role of various cognitive mediators (e.g., danger expectancies, responsibility, perfectionism and anticipated anxiety) in response to a contamination behavioural avoidance test (BAT) among individuals with OCD ( $n = 27$ ) with predominantly washing compulsions. Ratings were obtained before and during the BAT<sup>17</sup>. The results demonstrated that of the cognitive variables examined, danger expectancies were the most likely mediator of washing concerns in OCD. This relationship remained even when the other mediators were held constant. This study supports earlier theories proposing that

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<sup>17</sup> The BAT involved a compound stimulus of potting soil, animal hair, food scraps and raw meat.

danger expectancies may mediate anxiety and avoidance responses in individuals with OCD (e.g., Carr, 1974; McFall, & Wollersheim, 1979)

Simos, Vaiopoulos, Giouzevas and Paraschos (1995) cited in Sookman and Pinard (2002) investigated the perceived probability of threat associated with different types of dangerous events (e.g., fires, earthquakes). These researchers found that high estimations of threat did not correlate with measures of obsessionality (e.g., MOCI). This piece of research has important implications as it raises the question of whether obsessive compulsive symptoms are associated with *overestimation of personal threat* (e.g., exaggerated threat responses only if the stimuli is personally relevant), rather than more *over-estimation of generalised threat* (e.g., earthquakes; OCCWG, 1997).

Preliminary research suggests that compared to mood and other anxiety disorders, individuals with OCD tend to produce the highest scores on overestimation of *personal threat* (Steketee, Chambless, Tran, Worden, H et al., 1996a; Riskind, Abreu, Strauss & Holt, 1997; OCCWG, 1997). Menzies et al. (2000) examined the association between responsibility for a negative outcome, perceived severity of the outcome and perceived likelihood of the outcome in a sample of university students ( $n = 70$ ). The results demonstrated that there is a tendency for individuals to regard an outcome as more aversive if they believe they are personally responsible for that outcome, rather than someone else being responsible. These authors concluded that in addition to responsibility, excessive danger expectancies may be a crucial component in OCD.

Woods, Frost and Steketee (2002) measured subjective probability and severity ratings for negative events (salient to the individual) and obsessive compulsive symptoms. It was hypothesized that as participants' coping abilities decreased, the obsessive compulsive (OC) symptoms would increase. Using an idiographic approach, Woods et al. (2000) requested that the OCD participants ( $n = 18$ ) rate how well they would cope with the occurrence of personally relevant negative events. The hypothesis was supported in that as

OC symptoms increased, severity estimation increased and coping ability decreased. This finding suggests that individuals with OCD tend to underestimate their ability to cope with feared events compared to anxious controls (Woods et al., 2000; Freeston et al., 1996).

In line with this argument, Foa and Kozak (1986) denote that individuals with OCD appear to suffer from *epistemological reasoning*, whereby events are viewed as dangerous until proven safe (Sookman & Pinard, 2002; OCCWG, 1997). This proposal has support from research showing a correlation between OCD and exaggerated threat (Freeston et al., 1992; Steiner, 1972; Steketee et al., 1996a; Kozak, Foa & McCarthy, 1987). Some researchers have suggested that the occurrence of epistemological reasoning in OCD may be particularly relevant in certain types of OCD. Frost and Hartl (1996) argued that this concept might explain why compulsive hoarders attach such meaning to their possessions, as these possessions represent safety in an environment perceived as dangerous.

The tendency to over-estimation of threat is proposed to overlap with TAF (Rachman, 1993), perfectionism and intolerance of uncertainty beliefs (particularly doubt over actions; Sookman & Pinard, 2002). As seen in Menzies et al., (2000), inflated responsibility beliefs appear to lead to severity estimates (e.g., threat), which in turn precipitates anxiety and avoidance-coping behaviours (e.g., compulsions). Most of the research into this domain has been conducted on non-clinical samples. Further clinical studies using experimental research are needed to explicate the causal relationship between cognition and OCD.

### 3.5.5 *Intolerance for Uncertainty*

“This domain encompasses three types of beliefs: (a) beliefs about the necessity for being certain; (b) beliefs that one has a poor capacity to cope with unpredictable change; (c) beliefs about the difficulty of adequate functioning in inherently ambiguous situations.” (OCCWG, 1997, p.678)

For more than two decades, ‘doubting’ has been considered a hallmark symptom of OCD (“folie du doubt” or the “doubting disease” see Berrios, 1989; Ciarrocchi, 1995). In one

of the first studies, Krohne (1993) proposed that intolerance of uncertainty and intolerance of emotional arousal were the main variables underlying anxiety disorders. According to this model, an elevated level of intolerance of uncertainty provokes reactions of hypervigilance when individuals are faced with uncertain or ambiguous problems. These elevations in intolerance were thought to stimulate cognitive avoidance reactions. Excessive anxiety was seen as the result from the constant shifting from a hypervigilant state (linked to the uncertainty of the situation) to a state of avoidance (linked to the anxious reactions felt by the individual). Sample items reflecting intolerance of uncertainty beliefs include: “if I’m not absolutely sure of something, I’m bound to make a mistake” and/or “I must be certain of my decisions” and/or “it is essential for everything to be clear cut, even in minor matters”.

Intolerance of uncertainty has been linked to pathological worry, GAD (e.g. Dugas, Gosselin, & Ladouceur, 2001; Ladouceur, Dugas, Freeston, Rheame, Blais, Boisvert, et al. 1999; and Sexton, Norton, Walker, & Norton, 2003), and OCD symptoms (Tolin, Abramowitz, Brigidi, & Foa, 2003a; Steketee et al., 1998; Antony et al., 1998; Frost & Steketee, 1997; Summerfeldt, Huta & Swinson, 1998). Recently, Holaway, Heimberg and Coles (2006) compared intolerance of uncertainty in individuals with analogue GAD and/or OCD. The results showed clinical participants (analogue GAD or OCD) to report more intolerance of uncertainty beliefs than controls, however, the clinical groups could not be significantly distinguished from each other. These authors concluded that intolerance of uncertainty is likely to be relevant to a number of the anxiety disorders. However, as this study used analogue samples, it is questionable whether the levels of intolerance of uncertainty were similar to those diagnosed with OCD or GAD.

Sookman and colleagues (Sookman & Pinard, 2002; Sookman, Pinard, & Beck, 2001) proposed a treatment model of OCD involving dysfunctional vulnerability schema (e.g., beliefs). Sookman et al proposed that specific schemas provoke the perception of threat appraisals in OCD. Sookman and Pinard (1995) proposed four classes of dysfunctional

schema in OCD: (a) perceived vulnerability; (b) perception of coping resources; (b) novelty and change; (c) view of strong affect; and (d) need for control (Sookman & Pinard, 2002). It was hypothesized that individuals with OCD demonstrated exaggerated threat responses when the situation or events involved unpredictability, newness and change that required flexible coping skills (Sookman & Pinard, 2002). Sookman et al. proposed that the misinterpretation of inadequate coping resources and inability to tolerate strong negative affect (e.g., anxiety) leads to the perception of vulnerability (Sookman & Pinard, 2002).

Doubts about actions, long associated with maladaptive beliefs of perfectionism (Antony, Purdon, Huta & Swinson, 1998; Frost, Novara & Rheume, 2002) reflect the level of confidence people have about their ability to complete tasks (Frost et al., 1990). Given this definition, the OCCWG (2001) concluded that doubting the quality of one's actions (Frost, Novara & Rheume, 2002) is more likely to be a characteristic of uncertainty (e.g., concerns about being certain). Frost and Shows (1993) demonstrated that compared to other clinical groups, individuals with OCD tend to display greater doubt about the correctness of their decisions (e.g., compulsive indecisiveness). In a recent study, Frost and Steketee (1997) found that doubt about one's actions significantly differentiated individuals with OCD compared to panic disorder (Sookman & Pinard, 2002).

Tolin et al. (2003a) administered the Intolerance of Uncertainty Scale (IUS; Freeston, Rheume, Letarte, Dugas & Ladouceur 1994) to an OCD sample ( $n = 55$ ), some of which had predominately checking compulsions ( $n = 43$ ) and non-anxious controls ( $n = 14$ ). The results demonstrated the OCD checkers to evidence significantly higher scores on the IUS compared to the OCD non-checkers and non-anxious controls. These results remained significant when controlling for depression. However, while intolerance of uncertainty was higher in OCD-checkers, the OCD sample in general, did not demonstrate significantly greater uncertainty beliefs compared to the non-anxious controls. This finding was supported by Rassin and Muris (2005) who found indecisiveness, as measured by the Indecisiveness Scale, to be

positively correlated with sub-threshold obsessive compulsive symptoms (e.g., checking and rumination).

In a related vein, Gallagher, South and Oltmanns (2003) tested the hypothesis that individuals with Obsessive Compulsive Personality Disorder (OCPD) exhibit intolerance of uncertainty. The Personality Diagnostic Questionnaire-4 (PDQ-4) was administered to a large group of undergraduate students to form the following groups: OCPD group (n = 60); NAC (n = 60) and an Avoidant Personality Disorder group (APD). Participants completed an attentional coping task (ACT)<sup>18</sup>. Participants were told they were about to complete the ACT, which would provide an estimate of general cognitive ability. Participants were assigned to two conditions, where their level of uncertainty was manipulated. The results showed the OCPD group spent more time listening to information about the ACT prior to taking the test, and requested more information about their test scores during the ACT, compared to the other groups. Given the clinical similarities between OCPD and OCD, this study supports the hypothesis that intolerance uncertainty may be important in OCD.

Recently, Ladouceur, Gosselin and Duglas (2000) refined the concept of uncertainty to include the subjective appraisal of uncertainty: “a predisposition to react negatively to an uncertain event or situation, independent of its probability of occurrence and of its associated consequences” (p.934). These authors suggest that anxiety is precipitated by the uncertainty about whether the intrusive thoughts are potentially dangerous (Sookman & Pinard, 2002). One of the key components in this domain is negative beliefs about coping. Several researchers have shown that: (a) individuals with OCD endorse more negative beliefs about coping than non-clinical controls, but not anxious controls (Steketee et al., 1998); and (b) coping ability can predict obsessive compulsive symptoms and the perception of inadequate coping resources predates threat estimation (Woods et al., 2000).

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<sup>18</sup> This ACT was based on the Mental Rotations Test (MRT; Vandenberg & Kuse, 1978)



Recently, van den Hout and Kindt (2004) investigated whether repetitive checking behaviour precipitates uncertainty. In five separate experiments, NAC participants were requested to repeatedly check virtual gas rings<sup>19</sup> via an interactive computer animation programme. Participants were tested in a dimly lit and sound-attenuated laboratory room where they sat at a table with a PC. During the experimental task, the experimenter observed the participants through a one-way mirror. The results of the five separate studies suggested the following: (a) repeatedly checking the same class of items resulted in sharp decreases in detail and vividness of memory of the checked events while the accuracy of the memory remained intact; (b) the quality of the experienced memory distrust was similar to the ambivalence individuals with OCD report about their memory after checking; and (c) repeated checking tends to undermine trust in memory (e.g., *confidence*), but may also reduce the sense that one acted responsibly.

While some researchers have maintained that doubt and uncertainty in OCD is caused by general memory deficit (e.g., Tallis, 1995), the majority of studies do not support this hypothesis (see Hermans et al., 2003 for review). As seen in the van den Hout and Kindt (2004) study, there has been increasing evidence for the concept of “reduced confidence” in memory abilities. Dar (2004) has suggested that individuals with OCD are characterised by doubt and uncertainty because they “*distrust their own memory and judgement and engage in endless futile attempts to reconstruct events in their memory .....a lack of confidence in OCD is not restricted to memory judgement*”. (p.154).

There is some support for this assertion as research has shown individuals with OCD to report less confidence in their memory abilities compared to the non-clinical group (NAC), despite good performances which were equivalent to the NAC group (Dar, 2004; Brown,

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<sup>19</sup> Participants were trained to turn animated gas rings and animated light bulbs on and off. As for the gas stove, the monitor displayed a gas stove with six knobs that corresponded to six gas rings. By moving the cursor with

Kosslyn, Breitler, Baer & Jenike, 1994; Constans et al., 1995; MacDonald, Anthony, MacLeod & Richter, 1997; McNally & Kohlberg, 1993). Frost, Lahart, Dugas and Sher (1988) demonstrated that individuals with OCD requested more information, appeared more cautious and required more time than non-clinical cohorts. Many researchers have speculated that these decision-making difficulties seen in OCD (Beech & Liddell, 1974; Guidano & Liotti, 1983; Kozak, Foa & McCarthy, 1987) stem from beliefs about the need for certainty (Sookman & Pinard, 1995; Sookman et al., 1997).

Similar to the Foa and Kozak (1986) concept of *epistemological reasoning*, Dar (2004) asserted that individuals with OCD have a tendency to feel uncertain in situations that appear ambiguous. In a series of studies, Dar (2004) investigated reduced confidence in OCD. In the first study, Dar et al., (2000) tested the hypothesis that uncertainty is a general feature of OCD checking-type. The sample included an OCD group (OCD), Panic Disorder group (PD) and non-anxious control group (NAC). Participants were given a general knowledge test and asked how confident they felt about their answers. The results found that OCD participants reported less confidence than the PD compared to NAC. The second study replicated these findings. In the third study, Dar (2004) examined what happens to the levels of confidence in OCD checking-type ( $n = 6$ ) and NAC ( $n = 6$ ) participants when they are presented with the same question over and over again. A shortened version of the general knowledge test used in the first study (20-items) was administered to participants (three times). The results showed the OCD checkers confidence to decrease over presentations, compared to the NAC participants' confidence which increased.

In the literature, intolerance of uncertainty has usually been researched in GAD samples, with only recent attention paid to the relevance of this construct to OCD (Holaway et al., 2006). There is little empirical research on *beliefs about uncertainty* in clinical samples

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the mouse, participants could turn any particular gas ring on, after which a rather realistic gaslight occurred. The

(Steketee et al., 1998; Antony et al., 1998). Research thus far has focussed on the *symptoms of uncertainty*, rather than on the underlying beliefs (Sookman & Pinard, 2002). Research has also been complicated by the multidimensionality of this belief domain (e.g., intolerance of uncertainty versus intolerance of emotional arousal; see Krohne 1993 for discussion). Likewise, the role of intolerance of uncertainty beliefs in disorders other than OCD (e.g., DPD; Dependent Personality Disorder) is also unclear, and additional studies are needed to examine the extent of contribution across the psychiatric disorders. Doubt over actions has shown the strongest association with OCD (Frost, Novara & Rheume, 2002). As such, an interesting area for future research would be to investigate the association between intolerance of uncertainty and negative perfectionism in OCD (see Frost et al., 1990).

#### *3.5.6 Obsessive Beliefs Questionnaire (OBQ-87) and Interpretations of Intrusions Inventory (III-31; OCCWG, 2001; 2003, 2005)*

The Obsessive Beliefs Questionnaire (OBQ-87) measures the strength of belief related to inflated responsibility, overestimation of threat, importance of thoughts, and intolerance of uncertainty, perfectionism and control of thoughts. The Interpretations of Intrusions Inventory (III-31; 1997, 2001) assesses appraisals regarding inflated responsibility, control of thoughts and importance of thoughts. In order to assess the psychometric properties of these measures the OCCWG conducted three large scale studies over a period of 5 years. The first study (OCCWG, 2001), referred to as Stage II data, included 101 individuals with a DSM-IV diagnosis of OCD ( $n = 101$ ), undergraduate students ( $n = 374$ ), and English-speaking adult community controls ( $n = 76$ ), non-OCD anxious controls ( $n = 12$ ) and Greek-speaking controls ( $n = 35$ ). The study spanned ten different treatment sites in four different countries. Factor analysis resulted in a reduction of the item composition of the measures. The OBQ was reduced from 129 items to 87, and the III was reduced from 43 to a 31-item inventory.

The second study in 2003 (Stage III data), involved the OBQ-87 and the III-31 being administered to a large sample of individuals from 17 different sites (Australia, Canada, France, Greece, Italy, Netherlands and the USA). The sample included 248 individuals with OCD ( $n = 248$ ), non-obsessional anxious individuals ( $n = 105$ ), non-clinical adults from the community ( $n = 87$ ), and undergraduate students ( $n = 291$ ). The results suggested that the OBQ and III appeared to assess various prominent features of OCD-related cognition. However, the various subscales of the OBQ and III remained highly correlated, and both measures evidenced low discriminant validity. The domains intolerance of uncertainty, overestimation of threat and perfectionism were highly correlated ( $r$ 's near 0.80). Likewise, the correlations between the subscales responsibility, overestimation of threat and importance and control of thoughts were elevated ( $r$ 's > 0.7). Additionally, factor analyses demonstrated that the OBQ beliefs related to threat, uncertainty and perfectionism appear to be OCD-relevant, but not OCD-specific.

In 2005, OCD participants ( $n = 244$ ) were re-administered the OBQ-87 and III-31. These scores were then factor analysed with the result being a reduction in the number of OBQ subscales, from six to three. This new scale was called the OBQ-44 and included the following three empirically based subscales: (1) inflated personal responsibility and the tendency to overestimate threat (Responsibility/Threat), (2) perfectionism and intolerance of uncertainty (Perfectionism/ Certainty), and (3) over-importance and over-control of thoughts (Importance/Control; OCCWG, 2005). The hypothesized domains of III-31 (importance and control of thoughts and responsibility) loaded together onto a single factor described as 'the negative interpretation of thoughts'.

The results indicated that even after controlling for general distress, two of the OBQ subscales and III predicted OC symptoms. The Responsibility/Threat Estimation subscale predicted Harming and Contamination thoughts on the PI-R; and Perfectionism/Certainty subscale predicted Grooming and checking behaviours on the PI-R scales. Unfortunately, the

importance/Control of Thoughts subscale did not predict any specific symptomatology on the PI-R scale. The negative interpretation of thoughts domain predicted harming thoughts on the PI-R.

Since its development, the OBQ has been used in several studies (Taylor, Abramowitz, McKay, 2005; Aardema, O'Connor, Emmelkamp, Marchand, Todorov, 2005a; Faull, Joseph, Meaden, Lawrence, 2004; Sica, Coradeschi, Sanavio, Dorz, Manchisi, Novara, 2004). However, it is not currently known whether these beliefs are specific to OCD, and further still, to certain symptoms of OCD (Anholt et al., 2004; Clark, 2002a; Abramowitz, Deacon, Woods & Tolin, 2004).

### 3.6 OCCWG Beliefs and Symptom Specificity

Recent evidence demonstrates high correlations between dysfunctional beliefs and the content of obsessive-compulsive symptoms (Clark, 2002a). For example, research has shown beliefs about perfectionism to correlate with compulsive checking (Gershunsky & Sher, 1995), cleaning (Tallis, 1996), and hoarding (Frost & Gross, 1993). The following sections discuss the OCCWG beliefs in relation to the most empirically-based OCD subtypes (Abramowitz et al., 2003a; Calamari et al., 1999, 2004; Summerfeldt et al., 2004).

#### 3.6.1 Contamination Obsessions and Washing/Checking Compulsions

Rachman (2004) defined contamination as “*an intense and persisting feeling of having been polluted or infected or endangered as a result of contact, direct or indirect, with a person/place/object that is perceived to be soiled, impure, infectious or harmful*” (p.1229).

Rachman (2004) states that obsessions involving contamination revolve around four main themes:

- (a) *Soiled substances*: faecal matter, putrefying flesh, decaying vegetable matter (Rachman, 2004, p.1229).

- (b) *Infectious contaminants*: contact with items or people carrying germs, contact with bodily products such as blood/saliva, contact with people or places believed to be infected (e.g., blood, hospitals, places/people thought to be associated with sudden acute respiratory syndrome, AIDS; Rachman, 2004, p.1229).
- (c) *Harmful material*: chemicals, pesticides and certain foods (Rachman, 2004, p.1229).
- (d) *Mental pollution*: caused by associations with impurity, dirtiness (rupophobia), immorality, accusations, nasty memories, direct or remote contacts with people who are regarded as enemies or as untouchables (culturally or personally defined), and by aversive events such as a sexual assault (Rachman, 2004, p.1229).

Contamination obsessions are perceived as highly threatening. The person believes that the 'contaminated material' acquires the ability to cause serious harm to self (e.g., spread to other parts of one's body) or others (e.g., transmissible to other people, places or objects). However, research has shown that compulsive washing occurs in response to two distinct motivations: (group a) those that wash to reduce discomfort without fears of harm ; and (group b) those that wash to prevent harm from occurring to self or others as a result of the contamination (Feinstein, Fallon, Petova & Liebowitz, 2003; McKay et al., 2004). Individuals with OCD in the first category, group (a), tend to reported fewer compulsions, a preoccupation with contamination and wash excessively to reduce the feeling of contamination (Feinstein et al., 2003).

Those in the latter category, group (b), may demonstrate a preoccupation on threatening consequences associated with contamination. Feinstein et al. (2003) suggests that this group of washers may display washing or checking rituals to reduce/avoid the perceived threat. Research has shown compulsive washers to over-estimate the amount of threat in a

situation (e.g., Lelliott et al., 1988; Jones & Menzies, 1997); however, it may be the case that this tendency is more applicable to the latter group. This suggestion has not been tested and warrants investigation.

A final category has been proposed by Tallis (1996) who reported that some individuals with OCD wash not to remove contamination, but to achieve a state of cleanliness and is closely tied to perfectionism. Extending this research, Coles et al. (2005) suggested that individuals with obsessive-compulsive disorder perform compulsions to reduce feelings of something not being just right or sensations of incompleteness. Research using self-report questionnaires has demonstrated a link between not just right experiences (NJREs) and OCD symptoms, including washing concerns.

The cognitive beliefs considered relevant in this subtype include: over-estimation of threat (e.g., Lelliott et al., 1988; Jones & Menzies, 1997); responsibility (Salkovskis, 1989); and perfectionism (Tallis, 1996). The beliefs thought less specific to contamination/ washing include TAF (Shafran et al., 1996) importance of thoughts (OCCWG, 2001); intolerance of uncertainty (Sookman & Pinard, 2002) and Magical thinking (MI; Einstein & Menzies, 2004a)<sup>20</sup>. However, there is some discrepancy in research. For example, whereas Tallis (1996) found perfectionism to correlate with compulsive washing, other studies have found the opposite (Gershuny & Sher, 1995; Ferrari, 1995). It may be that these studies were measuring different groups of compulsive washers (e.g., group (a) or (b)). Currently, there is a need for more research into the specific cognitive correlates of these subgroups of compulsive washers<sup>21</sup>.

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<sup>20</sup> Due to the time constraints, only the OCCWG beliefs have been covered. However, the author recognises that other beliefs such as disgust sensitivity (Olatunji & McKay, 2006; Tolin, Woods, & Abramowitz, 2006b; Olatunji et al., 2004) and sympathetic magic (tendency for disgust evoking stimuli to transfer that property to previously neutral stimuli; McKay, 2006; Tolin, Worhunsky & Maltby, 2004) are also important constructs in contamination fears.

<sup>21</sup> A more in-depth review of contamination obsessions can be obtained in Rachman (2004).

### 3.6.2 *Harming Obsessions and Checking Compulsions*

The content of ‘harming obsessions’ is wide ranging, but most often includes: situations (e.g., thoughts of fire, flood, theft), aggressive behaviour (e.g., “did I just run that person over?”) and/or sexual violation. Compulsive checking is conceptualised as an attempt to reduce the perceived likelihood of the event/behaviour occurring which reduced anxiety. However, like the previous subgroup, checking compulsions are performed in response to a range of obsessions (McKay et al., 2004). This finding is reflected in recent research which shows compulsive checking to correlate with all six cognitive domains (OCCWG, 2001, 2003; McKay et al., 2004).

Harming obsessions have been strongly related to responsibility (Rachman, 1997, 1998; Salkovskis, 1985; Rachman & Shafran, 1998); threat estimation (Frost and Sher, 1989; Tolin, Woods, & Abramowitz, 2003b); TAF-Likelihood (Shafran et al., 1996); importance of thoughts (OCCWG, 2001); intolerance of uncertainty (Reed, 1985; Tolin et al., 2001; Tolin et al., 2003a; Sookman & Pinard, 2002) including reduced confidence in memory and indecision (Dar, 2004; Rachman, 1998); negative perfectionism (Norman et al., 1998; Gershuny & Sher, 1995; Ferrari, 1995); Magical thinking<sup>22</sup> (MI; Einstein & Menzies, 2004)

### 3.6.3 *Symmetry Obsessions and Ordering Compulsions*

Symmetry, ordering and arranging compulsions refer to the need to ensure that their belongings, clothes or appliances are “just right”. Individuals with this type of OCD will often feel unable to move on with their day until these objects are arranged “exactly the right way” and may spend several hours repositioning objects until their anxiety dissipates (Radomsky & Rachman, 2004a). This subtype of OCD is one of the more common presentations (Radomsky & Rachman, 2004a; Rasmussen & Eisen, 1992; Sasson et al., Leckman et al., 1997), however surprising little research has been conducted in this area.

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<sup>22</sup> Magical thinking (MI) in the context of OCD refers to “the belief that certain thoughts or behaviours exert a causal influence over outcomes” (Evans et al., 2002 cited in Einstein & Menzies 2004, p. 540).



Radomsky and Rachman (2004a) conducted three studies in this area. In the first study, participants ( $n = 211$  undergraduate students) were administered the Symmetry, Ordering and Arranging Questionnaire (SOAQ). In the second study, participants ( $n = 74$ ) were asked to sort 60 photographs into one of six piles, indicating how comfortable/uneasy they would feel if they were in the environment depicted in each of the pictures. In the third study, participants ( $n = 48$ ) who had scored highly in study II were invited back and told to prepare a 5-minute speech on a topic of their choice, which would be presented to three faculty members. Participants were informed that their speech was to be graded on both its content and style. They were told that because this task often produces some anxiety, they would be given a few minutes and a space in which to prepare their speech. Participants were then randomly assigned to one of two workspace conditions: (condition 1;  $n = 24$ ) a standardized orderly and arranged room; or (condition 2;  $n = 24$ ) a standardized disorderly room.

After 3 minutes, an experimenter asked participants to provide another (post-provocation) SUDS rating to indicate how anxious they were after preparing their speech. Participants were not given instructions about whether or not to alter their workspace, although they were free to do so. Participants in the condition 1 were then given a very brief interview to assess their cognitions and beliefs about disorderly objects, environments, etc., and about why it was important for them to order and arrange their surroundings. Following this, participants were told that there was no speech to be given and were debriefed from the study.

The results demonstrated that individuals with ordering and arranging behaviour experience anxiety in disorderly or disorganized environments. However, there appeared to be a discrepancy between the beliefs and cognitions associated with ordering and arranging and other OCD subtypes. In most manifestations of OCD (e.g., checkers and washers), the person engages in compulsive activity to prevent something terrible from occurring

(Rachman & Hodgson, 1980 cited in Radomsky & Rachman, 2004a). However, this study showed the symmetry group to engage in compulsive ordering to reduce anxiety, but not threat. Radomsky and Rachman (2004a) further found that none of the participants in the condition 1 (high symmetry) were able to state a negative consequence should they be unable to perform their compulsive ordering. These findings imply that the function of ordering and arranging compulsions may be to promote and maintain certainty and/or 'just right' feelings, as opposed to the prevention of harm.

The Radomsky and Rachman (2004a) investigation is a very important study as it shows clear cognitive differences between the subtypes of OCD. Given these results, combined with the OCCWG (2001), it is likely that the two beliefs of most importance to the symmetry, ordering and arranging group is perfectionism and uncertainty (OCCWG, 2005; Tolin et al., 2003b). The beliefs less relevant with symmetry obsessions and ordering compulsions may include TAF (Shafran et al, 1996) importance of thoughts (OCCWG, 2001). As this is the only study of its kind, further research is required to validate any distinct cognitive profiles.

#### 3.6.4 Hoarding Obsessions And Compulsions

Hoarding concerns are present in approximately 18-35% of cases with OCD (Frost, Krause & Steketee, 1996; Rasmussen & Eisen, 1989; Samuels et al., 2002). Hoarding has been characterised as a *symptom* of OCD (Frost et al., 2000; Stein et al., 1999 cited in Wu & Watson, 2005), a *manifestation* of OCD (Shafran & Tallis, 1996 cited in Wu & Watson, 2005) and a *subtype* of OCD (Saxena, Maidment, Vapnik, Golden, Rishwain, Rosen, et al. 2002; Christensen & Greist, 2001). Since the DSM-III-R, hoarding has constituted a core diagnostic marker of OCPD. Hoarding is one of eight symptoms of OCPD (DSM-IV-TR). Interestingly, few studies have evaluated the relationship between OCPD and hoarding (Stein, et al., 1999), and of the studies conducted, hoarding was not correlated with measures of OCPD (Frost & gross, 1993). However as discussed earlier in the chapter (refer section

3.3.3.2), hoarding behaviours have consistently emerged as separate from obsessive symptoms (Leckman et al., 1997; Summerfeldt et al., 1999; Calamari et al., 1999, 2004), leading some theorists to postulate that hoarding represents a fundamentally distinct disorder (Grisham, Brown, Liverant, Campbell-Sills, 2005; Wu & Watson, 2005; Black et al., 1998). This finding is further supported by the fact that the DSM-IV-TR has not included hoarding as a diagnostic criteria of OCD (Wu & Watson, 2005).

In a series of studies, Wu and Watson (2005) examined two issues: (a) the strength of correlations among OCD symptoms and hoarding; and (b) group-level differences on OCD and hoarding symptoms among samples of students, mixed psychiatric outpatients, and OCD patients. The association between OCD and hoarding with negative affectivity was also evaluated. The results of this study suggested that in contrast to the other types of OCD (e.g. checking, cleaning, and ordering) which correlated strongly, hoarding was only moderately correlated with these symptoms. Further, classic OCD symptoms distinguished individuals with OCD from other individuals with a psychiatric diagnosis other than OCD and non-clinical controls, but not hoarding. In sum, OCD patients in general did not endorse hoarding concerns more than other psychiatric populations. These results suggest that while hoarding correlates with some aspects of OCD, it does not show a strong or specific link to OCD.

Differences between compulsive hoarders and other types of OCD include the degree of insight (Frost & Gross, 1993). Compulsive hoarders have been shown to view their behaviour as ego-syntonic (consistent with self/identify, reasonable and socially desirable) as opposed to the other type of OCD which are typically ego-dystonic (separate from the self, unreasonable). Some research has found clinical hoarding to be associated with increased levels of anxiety, depression (Frost et al., 1996; Frost et al., 2000) and personality disorders (Frost et al., 2000; Samuels et al., 2002; Grisham et al., 2005) compared to non-hoarding OCD. However, other studies have reported hoarding to be associated with significantly less anxiety and negative affect because of the ego-syntonic nature of the concerns (Grisham et

al., 2005; Wu & Watson, 2005). Furthermore, treatments demonstrated to be effective for other OCD subtypes have produced little or no effect on hoarding symptoms (Black et al., 1998, Mataix-Cols et al., 1999, Mataix-Cols et al., 2002, Saxena et al., 2002). Clearly the clinical differences between non-hoarding OCD and hoarding warrants further investigation.

While the standing of hoarding in OCD is currently being debated, there is consistent evidence that individuals with hoarding concerns experience the following dysfunctional beliefs: negative perfectionism (Frost & Gross, 1993; Frost & Hartl, 1996; Frost, Novara & Rheaume, 2002; Steketee, Frost & Kyrios, 2003); importance of controlling one's thoughts (Coles et al., 2003); responsibility (Frost et al., 1995); magical thinking (Einstein & Menzies, 2004a); over-estimation of threat (e.g., negative consequence of forgetting; Hartl, Frost, Allen, Deckersbach, Steketee, Duffany et al., 2004) and intolerance of uncertainty (e.g., indecisiveness; Frost & Hartl, 1996).

The association between intolerance of uncertainty and hoarding is complicated, in that some researchers have suggested that memory deficits (see Hartl et al., 2004) are responsible for the excessive doubting, rather than uncertainty or indecisiveness. Individuals with predominantly hoarding behaviours have been shown to (a) report less confidence in their memory; (b) tend to overestimate the value of remembering information and possessions; (c) exaggerate the consequences of forgetting (e.g., negative cost); and (d) distrust memory, preferring to keep possessions in sight to serve as visual cues (Frost & Hartl cited in Hartl et al., 2004). However, whether the excessive doubting observed in compulsive hoarding reflects memory difficulties or erroneous beliefs relating to the intolerance of uncertainty remains unknown (see Hartl et al., 2004 for review). Likewise, there is debate as to whether the need to protect possessions relates to inflated responsibility rather than intolerance of uncertainty.

### 3.6.5 Miscellaneous Obsessions and Compulsions

This category refers to (a) obsessions without overt compulsions<sup>23</sup>, mental rituals, and atypical obsessions and compulsions. The obsessional content often revolves around religious and sexual images (repugnant images). The compulsions can include mental rituals (e.g., counting, repeating phrases), praying, tapping, touching and posturing. Religious obsessions have received the most attention (see Rassin & Koster, 2003). Common religious obsessions include the fear that one has or will commit sin (e.g., eating on a fasting day), sacrilegious images or blasphemous thoughts and/or fear of being sent to hell by God (Abramowitz, Huppert, Cohen, Tolin & Cahill, 2002; Olanunji, Tolin, Huppert & Lohr, 2005). Religious obsessions have been shown to correlate with TAF (Rassin & Koster, 2003); magical thinking (Tolin et al., 2001; Einstein & Menzies, 2004b); control of thoughts (Abramowitz, Deacon, Woods & Tolin, 2004) and responsibility (Abramowitz et al., 2004).

Repugnant obsessions refer to thoughts or images that are a “*profound violation of the individual’s morality and values*” (Purdon, 2004, p 1169). Examples of repugnant obsessions include: (a) harming or injuring a vulnerable person (e.g., hitting a baby or elderly person; Purdon, 2004); (b) sexual obsessions (acts of sexual molestation against someone without his/her permission; Purdon, 2004); (c) religious obsessions; Purdon, 2004); and (d) obsessive doubt (e.g., “What if I am gay but have not realised it?” or “did I run someone over without realising it?”; Purdon, 2004). The cognitive domains implicated in repugnant obsessions include TAF<sup>24</sup> (Rachman, 1997, 1998; Purdon, 2004); importance of one’s thoughts (OCCWG, 2001; Thordarson & Shafran, 2002); importance of thought control (OCCWG, 2001; Purdon & Clark, 1999; Purdon, 2004) and responsibility (Rachman, 1997; Salkovskis, 1989, 1999; Purdon, 2004). Rachman (1997) suggests that TAF plays a central role in obsessions involving sexual, aggressive or blasphemous images or thoughts because they are

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<sup>23</sup> Approximately 25 percent of individuals with OCD report obsessions without over compulsions (McKay et al., 2004).

important themes of all moral systems and thus serve to inflate responsibility beliefs about one's duty to protect or prevent possible harm occurring to self or others. The harm may be real (e.g., have consequences in the real world) and/or occur at a moral level.

### 3.7 Chapter Summary

Extending the theoretical work of Rachman (1997), Salkovskis (1996), and others, the Obsessive Compulsive Cognitions Working Group (OCCWG, 1997; 2005) proposed six domains of dysfunctional beliefs considered to underlie OCD symptoms: over-importance of thoughts; importance of controlling one's thoughts; perfectionism; inflated responsibility; overestimation of threat and intolerance of uncertainty. The first five beliefs were reported to be OCD-specific, whereas the final belief, perfectionism was thought to be relevant but not exclusive to OCD (OCCWG, 1997; Clark, 2004). The investigations by OCCWG have provided a template regarding the most important beliefs involved in OCD. However, much testing is required to validate the specificity of these cognitive beliefs to OCD. In addition, current research still assumes that the cognitive beliefs and appraisal processes do not vary across the diverse range of obsessive symptomatology or subtypes. As seen in the literature reviewed, this assumption may be premature. The hypothesized relationship between the five OCD subtypes and the six cognitive beliefs can be seen in Table 2.

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<sup>24</sup> TAF-Likelihood is particularly important in sexual intrusive thoughts (Clark, Purdon & Byers, 2000)

Table 2:

## Hypothesized Relationships between OCD Subgroup and Cognitive Domain

<b>Subgroup</b>	<b>Cognitive domain</b>	<b>Research</b>
Contamination-washing	Over-estimation of threat Perfectionism Responsibility	Emmelkamp (1987) Lelliott et al (1988) Jones & Menzies (1997) Tallis, (1996)
Harming-checking	Over-estimation of threat Perfectionism Importance of thoughts Importance of control Intolerance of uncertainty Inflated responsibility	Rachman (1997, 1998) Frost and Sher (1989) Salkovskis (1985) OCCWG (2001) Sookman & Pinard (2002) Norman et al (1998) Shafran et al. (1996)
Symmetry-ordering	Perfectionism Intolerance of Uncertainty	OCCWG (2005) Tolin et al (2003)
Hoarding	Perfectionism Intolerance of uncertainty Importance of control Responsibility	Frost & Gross (1993) Frost & Hartl (1996) Steketee et al. (2001) Frost et al. (1995)
Miscellaneous		
<i>Religious</i>	TAF Magical thinking Importance of control Responsibility	Rassin & Koster (2003) Einstein et al (2004) Abramowitz et al (2004)
<i>Repugnant</i>	TAF Importance of thoughts Importance of control Responsibility	Purdon (2004) Rachman (1997) Thordarson et al (2002) OCCWG (2001) Purdon & Clark (1999)

The identification of stable groups of OCD has relied on many classification variables, including: patterns of comorbid conditions, variability in age at onset, absence versus presence of neurological features, and PANDAS. However, the most common approach has been to focus on the primary obsessional complaint. However, there is a need for research to establish empirically based subtypes of OCD which reflects the diverse

heterogeneity of the disorder. Currently, the most efficacious method of identifying the latent dimensions of OCD appears to be multivariate analyses (e.g., factor or cluster analysis). Researchers using statistical procedures have reliably shown the following symptom dimensions: contamination and washing, harming and checking, hoarding, covert obsessionals with no overt compulsions (Calamari et al., 2004; McKay et al., 2004).

However, while the empirical standing of these subgroups has improved, there is a need to validate these subtypes, as subgroup classifications according to similar symptoms have the potential to overlook important underlying meanings (Summerfeldt, 2004). As Summerfeldt (2004) states, often highly similar symptoms may have very dissimilar motivations. For example, someone may clean to “eradicate germs and prevent harm or to preserve the perfect pristine state of belongings and regain a sense of satisfaction or inner completeness, with little sense of threat” (Tallis, 1996; Summerfeldt, 2004). However, based on the early model all behaviours would be collapsed into the “cleaning category” (Summerfeldt, 2004). This drive for diagnostic clarification of OCD subgroups has led to resurgence in experimental paradigms.

The OCCWG (1997, 2003) have suggested that self-report methods may be less well suited to assessment of intrusive thoughts or images than experimental methods (e.g., laboratory tasks). This is surprising given that the majority of research on the cognitive domains has been correlational and relied on retrospective self-report questionnaires (Clark, 2002a). While this type of research provides valuable information, it does not allow for any causal inferences regarding cognitions and symptoms. Coupled with the issues surrounding self-report questionnaires (e.g., response bias), and the finding that the most comprehensive cognitive psychometrics, the OBQ and III are highly inter-correlated, experimental paradigms are becoming increasingly more attractive in cognitive research (e.g., Rheume et al., 2000a; Riskind et al., 2002; Rheume et al., 2000; Mancini et al., Coles et al., 2005).



Several key researchers (see Rheume et al., 2000a; Riskind et al., 2002; Mancini, et al., 2004; Coles et al., 2005) have started to employ experimental paradigms with promising results. Several studies (e.g., Lopatka & Rachman, 1995; Mancini et al., 2004; Shafran, 1997) have shown that direct and indirect manipulation of the OCCWG beliefs corresponds to changes in OCD symptomatology. Currently, there is a need for more experimental research in the subtyping arena to dissect the motivational underpinnings symptom clusters. However to date, no study has experimentally manipulated all six beliefs in empirically derived OCD subtypes. Thus, it would appear that one of the key issues in obtaining support for the cognitive model of OCD is one of research design. This issue will be addressed in the final study of this thesis.

#### *Studies I, II and III*

This thesis aims to establish connections between cognitive beliefs, appraisal processes and obsessive themes. Specifically, whether the different cognitive beliefs outlined by the OCCWG are associated with the different types or themes (e.g., symmetry, somatic, religious) in OCD (Clark & Purdon, 2002; Leckman et al., 1997; Rachman, 2002). The terms cognitive symptoms and cognitive characteristics appear synonymous, however, they are conceptually distinct. Cognitive symptoms refer to intrusive thoughts, while cognitive characteristics relate to dysfunctional cognitions. Clarification of the research question has both theoretical and clinical implications as if specific cognitive beliefs are identified in certain themes of obsessional problems then more effective treatment may be developed.

The first study addresses one of the critical issues in the cognitive-appraisal research, namely whether certain beliefs act as a precursor to others (Clark, 2002a). Thordarson and Shafran (2002) have suggested that beliefs in the importance of thoughts precipitate beliefs about the control of thoughts and responsibility appraisals. Given the role of the two domains: *importance of thoughts* and *responsibility* in contemporary models of OCD (e.g. Rachman, 1993; Salkovskis, 1985), these constructs will be addressed first. This study

provides the theoretical basis for the second study which investigates all six OCCWG beliefs. Using the subtype models described earlier in the Chapter (e.g., Calamari et al., 1999), the second study will address whether some beliefs appear to show a relationship to OCD symptoms or “subtypes”. As many have questioned whether self report questionnaires can reliably distinguish between appraisals and belief (OCCWG, 1997), the final study of this dissertation employs experimental methodologies to investigate whether specific kinds of dysfunctional beliefs characterise obsessive–compulsive symptomatology. This type of study has the potential to enhance treatment for OCD as interventions become tailored to individual concerns.

## CHAPTER 4

### 4. THOUGHT-ACTION FUSION & RESPONSIBILITY BELIEFS IN ADULTS WITH OCD

#### STUDY I

##### 4.1 Introduction

Obsessive Compulsive Disorder is a multifaceted condition, which is as varied in presentation as in its supposed etiology. In the last two decades, increasing interest in the cognitive theory of OCD has resulted in a myriad of studies, with results both for and against the cognitive hypothesis of OCD. Whilst there is a consensus among cognitive theorists that underlying threat cognitions serve to both exacerbate and maintain the disorder, there is disparity as to which beliefs are central in OCD. For example, Purdon and Clark (2002) have suggested that individuals with OCD tend to over-evaluate the importance of exerting complete control over intrusive thoughts, images, and impulses. Others have argued the case for perfectionism (Shafran, Teachman, Kerry & Rachman, 1999). Whilst it is recognised that these beliefs are not mutually exclusive, there is a clear need for clarification as to the role of these cognitive biases in OCD.

Prior to investigating which beliefs are most prevalent in OCD, it is necessary to first establish empirical support for the cognitive models of OCD outlined in Chapter 2 within a New Zealand context. As reviewed earlier, the most prominent cognitive theories of OCD are those of Salkovskis (1985, 1989, 1996) Rachman (1993, 1997, 1998). Collectively, these models posit that it is the *interpretation* of the intrusive thoughts, images or impulses that is crucial in the acquisition and maintenance of OCD. There is strong empirical support for Salkovskis' (1985, 1989) hypothesis that individuals with OCD interpret intrusive thoughts as indicating personal responsibility for harm to self or others, however, evidence is lacking for the hypothesized link between TAF, inflated responsibility and obsessive compulsive

symptoms. Consequently, Rachman's proposal that TAF may serve a mediating role between inflated responsibility beliefs in OCD clients requires further investigation.

The importance of this issue can be seen if placed within a therapeutic context. Previous research has demonstrated the limited effectiveness of traditional behaviour therapy in the treatment of OCD (Salkovskis, 1985, 1989). Research by Foa et al. (1983) has demonstrated that 25 percent of patients refuse this type of therapy and approximately 25 percent do not benefit from it. These findings are comparable to NZ, with recovery rates for individuals with OCD estimated at 50% after a 12 months follow-up (Oakley-Browne, Joyce, Wells, Bushnell & Hornblow, 1989). Coupled with the limited effectiveness of behaviourally based treatments, research has also found substantial relapse rates, with many individuals with OCD reporting residual symptoms following treatment (Whittal & McLean, 2002).

Despite research suggesting that cognitive therapy should be considered an alternative to traditional behaviour therapy (Bouchard et al., 1999; Zucker et al., 2002), behaviour therapy, particularly ERP is still considered the most effective therapy for OCD (Salkovskis & Kirk, 1989). The finding that traditional behaviour therapy and/or psychopharmacological interventions are effective in only 50 per cent of cases has not dented the reliance on a behavioural ethos to guide treatment of anxiety disorders in NZ. In order to increase the efficacy of psychological interventions, a more comprehensive understanding of the cognitive biases associated with OCD is required.

#### *4.1.1 New Zealand Context*

The Christchurch Psychiatric Epidemiological Study (1989) showed the prevalence rates of mental disorders in NZ to be comparable to those in European and North American countries (Oakley-Browne, Joyce, Wells, Bushnell, & Hornblow, 1989; Wells, Robins, Bushnell, Jarosz, & Oakley-Browne, 1994). In NZ, primary mental health care is in part reliant on community-based services under the umbrella of the Canterbury District Health Board. (Oakley-Brown et al., 1989) There are two outpatient units that specialise in anxiety

disorders, however only one of these is accessible to individuals in the South Island, namely the Anxiety Disorders Unit (ADU). Acceptance into this service is contingent on the individual being between the ages 18-64 and having a primary diagnosis of a DSM-IV-TR anxiety disorder. As current prevalence rates of OCD in NZ are unavailable, the following sections are based on unpublished reports collected from the ADU over a three year period (2002-2005)<sup>25</sup>.

Fourteen percent of the 592 individuals assessed by the ADU were diagnosed with OCD. This result means that OCD was the third most commonly diagnosed anxiety disorder, trailing Social Phobia at 34 percent. Consistent with research suggesting that OCD is among the most intractable of disorders (see Mayerovitch, du Fort, Kakuma, Bland, Newman, & Pinard, 2003), the past three years has seen an increasing number of people in NZ diagnosed with OCD. In 2002, 11 percent of those assessed at ADU were diagnosed with OCD. This percentage has steadily increased over the years, with an estimated 19 per cent of 600 individuals assessed by the ADU in 2005 fulfilling DSM-IV-TR criteria for OCD. Based on the information, 5.8 percent of the 33, 0000 individuals living within the Canterbury region would meet DSM-IV criteria for OCD (lifetime prevalence of 2.5 percent).

These figures stress the importance of relying on empirically supported psychological theories to guide treatment and maintain recovery. Currently, the treatment of choice for OCD among most NZ services includes individualised format, time-limited Cognitive Behavioural Therapy (CBT), supplemented with pharmacotherapy if required. While the efficacy of CBT for OCD is well documented, an increasing number of researchers are incorporating Salkovskis' (1985, 1989) and Rachman's (1993) cognitive models in the treatment protocol for OCD. The need for efficiency coupled with a shortage of services

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<sup>25</sup> Accumulated by the author over the two year recruitment period.

specialising in anxiety disorders in NZ necessitates further investigation into these cognitive models in NZ samples.

The majority of mental health studies tend to focus on either the prevalence (Wells et al., 1989; Oakley-Browne et al., 1989), and/or accessibility of services (MaGPIE, 2001 study), often neglecting the clinical characteristics of many psychiatric disorders. This fact is rather surprising given that the level of disability associated with a mental disorder is reported to be equivalent to those of chronic physical conditions (Wells et al., 1989). While our conceptual understanding of OCD has grown through the efforts of international research, the clinical picture of OCD in NZ remains ambiguous.

Similarly, the lack of NZ research may impact internationally as significant cultural differences associated with OCD may be obscured (see Trujilo, 2000 for review). For example, Okasha and colleagues (1994) assert that the strong emphasis of religious rituals in Egyptian cultures explains why the most common symptoms of Egyptian individuals with OCD are religious obsessions and repeating rituals, whereas the predominance of aggressive obsessions in Brazilian samples are explained by Petribu and Bastos (1997) in terms of accelerated rates of urbanisation. These studies demonstrate the dynamic relationship between one's culture and beliefs (e.g., stronger associations between TAF and religious rituals, (Rachman 1997) and support the conceptualisation of OCD as an extremely heterogeneous disorder.

Given these issues, the current study addressed several key issues. Firstly, the cognitive theories of Salkovskis et al (1985) and Rachman (1996) were investigated to assess applicability of these models to individuals diagnosed with OCD in a NZ context. Secondly, the specificity of TAF and inflated responsibility beliefs to OCD was questioned. The last objective of this study was to provide preliminary support for a larger follow-up study examining the interaction between several cognitive biases associated with OCD.

## 4.2 Study I

The central question in the current study is whether TAF and inflated responsibility beliefs are higher in a group of adults diagnosed with OCD (DSM-IV-TR) compared to other anxiety disorders. Consequently, the degree, level, and strength of association between TAF and responsibility were assessed by administering a series of specific psychometric measures to three different samples: (a) adults diagnosed with OCD (OCD); (b) adults diagnosed with another anxiety disorder, other than OCD (AC); (c) non-clinical controls (NAC). The hypotheses were:

- (i) The OCD group will evidence higher TAF scores compared to the comparison anxious group (AC) and the non-anxious control group (NAC).
- (ii) The OCD group will demonstrate significantly higher inflated responsibility scores relative to both the comparison anxious group (AC) and the non-anxious control group (NAC).
- (iii) Significant correlation between TAF and inflated responsibility beliefs

### *4.2.1 Method*

#### *4.2.1.1 Participants*

Clinical participants were recruited from the ADU ( $n = 41$ ). Non-clinical participants were recruited through presentations given by the primary investigator inviting those with no known current or past psychiatric history to be involved in the current study. Participants in the latter category were primarily recruited from student populations ( $n = 22$ ). Based on diagnosis, participants were divided into three groups: OCD group (OCD;  $n = 20$ ) individuals' fulfilling DSM-IV-TR diagnosis of OCD; Anxious group (AC;  $n = 21$ ) individuals' fulfilling DSM-IV-TR diagnosis of an anxiety disorder, other than OCD; and Non-clinical control group (NAC;  $n = 22$ ) individuals' with no known current or past psychiatric disorder. All participants received a ten-dollar food voucher for participation.

#### *4.2.1.1.1 Inclusion-exclusion criteria*

##### Clinical Participants

Inclusion in the clinical groups (OCD; AC) was based on whether the individual met DSM-IV-TR criteria for an anxiety disorder(s). All assessments were conducted by experienced clinicians at the ADU. Inter-rater reliability was ensured as all diagnoses were discussed in a multidisciplinary meeting following the assessment. Participants were included in the study providing they were post-assessment and pre-treatment. Participants were excluded if they were actively psychotic and/or had experienced a head injury resulting in cognitive impairment. Three participants were excluded as the obsessive symptoms were best explained within the confines of Anorexia Nervosa.

##### Non-clinical Subjects

The non-clinical control group (NAC) were interviewed by the primary examiner and given a paper-an-pencil form assessing current or past psychiatric diagnosis prior to inclusion.

#### *4.2.2 Materials*

##### *4.2.2.1 Yale Brown Obsessive Compulsive Scale-checklist (Y-BLOCS Goodman et al., 1989).*

The Yale-Brown Obsessive Compulsive Scale-checklist (Y-BOCS) is a 10-item self-report scale that assesses OCD on two dimensions, namely obsessions and compulsions, independently of each other (Goodman & Price, 1992). Each item is rated on a five point scale ranging from 0-4, with a 0 reflecting no symptoms and a 4 associated with greater pathology. Subscale scores are obtained for obsessions (sum of items 1-5) and compulsions (sum of items 1-6). The subscale items each assess the same dimensions for obsessions and compulsions as follows: frequency, interference, distress, resistance and control. A total score on the Y-BOCS is obtained by calculating the sum of items 1-10. The total Y-BOCS score can range from 0-40 and the total subscale scores can range from 0-20. The Y-BOCS requires 15 minutes to administer.



Internal consistency is reported to be high for the total Y-BOCS scale, with Cronbach's alphas ranging from .88 to .91 (Goodman et al., 1989). The Y-BOCS is reportedly sensitive to change following cognitive-behavioural and pharmacological treatments for OCD (Goodman et al., 1989; van Oppen, et al., 1995), and has excellent test-retest reliability (Kim et al., 1990). The total and subscale scores on the Y-BOCS have generally been found to correlate significantly with other measures of OCD symptomatology, but also with anxiety and depression (Goodman, et al., 1989; Richter et al., 1994; Woody, Steketee, & Chambless, 1995). The Y-BOCS is generally considered the gold standard for measuring symptom improvement in OCD treatment studies (Steketee, Frost & Bogart, 1996).

#### *4.2.2.1.1 Beck Depression Inventory-II (BDI-II; Beck Steer, & Garbin, 1998).*

The BDI-II is a widely used 21-item self-report inventory that measures the presence and severity of affective, cognitive, and motivational aspects of depression. Participants are required to answer each item based on the '*past two weeks, including today*'. Each item includes a list of four self-evaluative statements, which describe a single categorical symptom or attitude related to depression. The statements are displayed in order of increasing severity and numerical values ranging from 0 (no symptoms) to 3 (maximum severity). The total BDI-II score is obtained by calculating the sum of items 1-21. The total BDI-II score can range from 0-63, with suggested cut-offs being: 10 = no depressive disorder; 10-18 = mild to moderate depressive symptomatology<sup>26</sup>; 19-29 = moderate to severe; 30 plus = severe depression. Internal consistency for the BDI-II is high (alpha = .92) and test-retest reliability = .93 (Beck,, Steer & Brown, 1996). Widespread support for the BDI-II's validity and

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<sup>26</sup> psychiatric patients, a 12/13 cut-off point is more appropriate than the >10.

reliability has been demonstrated with samples from various populations, including non-clinical, psychiatric and medical settings (McDowell & Newell, 1996).

#### 4.2.2.2 Thought-Action Fusion Scale (TAFS; Shafran et al., 1996).

The TAFS is a 19-item self-report scale that measures three types of TAF: (1) Morality bias (TAF-Moral): 12 items probing the fusion of thoughts and actions regarding issues of morality (e.g., “*Having a blasphemous thought is almost as sinful to me as a blasphemous action*”); (2) Likelihood-TAF for events happening to other people (TAF-Others): 4 items assessing the fusion of thoughts and actions regarding causing harm to others (e.g., “*If I think of a friend/relative being in a car accident then this increases the likelihood that he/she will have a car accident*”); and (3) Likelihood-TAF for events happening to oneself (TAF-Self): 3 items investigating the fusion of thoughts and actions regarding causing harm to oneself (e.g., “*If I think of myself being in a car accident then this increases the risk that I will have a car accident*”). Each item is scored on a 5-point scale, ranging from 0 (*strongly disagrees*), to 4 (*strongly agree*). Total TAF scores are obtained by adding up the items in each of the three subscales. Total scores can range from 0 to 76, with higher scores indicating stronger TAF. No items are reverse scored.

The internal consistency for the TAF subscales is reported to range from good to excellent, with Cronbach alpha ranging from 0.85 to 0.96 across obsessional and non-obsessional groups (Shafran et al., 1996). There are contradictory findings regarding the relationship of TAF to OCD (Rassin et al., 2001a; Rassin et al., 2001b) however, numerous studies have demonstrated the TAFS to reliably discriminate between OCD subjects and other groups, particularly on the TAF-Others subscale (Shafran et al., 1996; Taylor et al., 2002). For example, in a study comparing individuals with OCD and students without mental health diagnosis, all three TAF subscales were significantly correlated with measures

of OCD checking ( $r$ s ranged from .31 to .38) and depression ( $r$ s ranged from .33 to .42; Shafran et al., 1996).

Furthermore, the TAF scale is reported to correlate with other measures of obsessional problems (e.g., Maudsley Obsessive Compulsive Inventory) and depressive symptoms (BDI-II) in both clinical, and non-clinical samples (Shafran et al., 1996). Additionally, the TAF concept has also been adapted for use with clients with eating difficulties (e.g., thought-shape fusion; Shafran et al., 1999). Unfortunately, test-retest reliability is not available for the TAFS.

#### 4.2.2.2.1 Responsibility Appraisal Scale (RAS; Salkovskis et al., 2000)

The RAS is a 26-item questionnaire designed to assess general attitudes, beliefs, and predisposing characteristics of responsibility and harm concerns in OCD (Salkovskis et al., 2000). Participants are required to rate how much they either agree or disagree with specific statements (e.g., “*To me, not acting where disaster is a slight possibility is as bad as making that disaster happen*”) using a 7- point scale, with 1 (*totally agree*) to 7 (*totally disagree*). A total score for this measure is obtained by reverse scoring all items, summing all 26 items, and then obtaining a mean score ranging from 1 (no responsibility appraisals) to 7 (very high responsibility appraisals). Test-retest reliability ( $r = .94$ ) and internal consistency (Cronbach alpha of .92) for the RAS is reported to be excellent (Salkovskis et al 2000).

The RAS has demonstrated adequate concurrent validity with other measures of obsessiveness, with Pearson correlations ranging from ( $r = 0.57$ ) with the Maudsley Obsessive Compulsive Inventory (MOCI), and ( $r = 0.54$ ) for the Obsessive Compulsive Inventory (OCI; Salkovskis et al., 2000). Research has demonstrated that individuals with OCD score significantly higher on the RAS compared to anxious controls (Steketee et al., 1998) even when controlling for comorbid depression and anxiety (Salkovskis et al., 2000).

#### 4.2.2.2.2 *Responsibility Interpretation Questionnaire (RIQ)*

(Salkovskis et al., 2000).

The RIQ is a 22-item self-report scale designed to assess the frequency and strength of interpretations of recently occurring intrusive thoughts, images, or impulses about responsibility (including TAF, importance and control of thoughts; Taylor, 2002). Prior to beginning the questionnaire, participants are given written instructions intended to prime negative interpretations to intrusive thoughts. For example, participants are given written definitions of intrusive thoughts, impulses, and images (e.g., *“repeated urge to attack or harm somebody, even though you would never do this”*). Following this, participants are requested to *“write down the intrusions that you have had in the last two weeks”*, and then answer the following items with that intrusion in mind (e.g., *“Think of times when you were bothered by intrusive thoughts, impulses and images in the last two weeks and answer the following questions”* (original emphasis).

The RIQ assesses the frequency and degree of belief in clinical intrusions, thus the scale is divided into two sections: Frequency (F) and Belief (B). In the frequency sections, individuals rate the frequency with which they experienced 22 specific responsibility-related ideas during periods when they were bothered by intrusive thoughts, impulses, or images in the previous two weeks. Items are divided into two sections: (HR-F) consists of 16-high responsibility statements (e.g., *“If I don’t act now then something terrible will happen and it will be my fault”*); and (LR-F) comprises 6-low responsibility statements (e.g., *“this is just a thought so it does not matter”*). Each item is rated using a five-point scale, ranging from 0 (*idea never occurred*) through to 4 (*always occurred when I had worrying intrusive thoughts*).

Having rated the frequency for each of the items, participants rate the degree of belief in each of the 22 responsibility-related ideas over the past two weeks. Again, items are divided into two sections: (HR-B) comprises 16 high responsibility ideas; alternatively, (LR-

B) contains 6 low responsibility statements. In the belief subscales, each item is rated on a scale ranging from 0 (*I did not believe this idea at all*) to 100% (*I was completely convinced this idea was true*). The RIQ generates four subscales. An HR-F score is computed by calculating the means of the 16 items in section HR-F. An LR-F score is computed by calculating the means of the six items in section LR-F. A HR-B score is computed by calculating the means of the 16 items in HR-B. A LR-B score is computed by calculating the means of the six items in LR-B. Scores for the TAF subscales range from 0-4 for the frequency scales (HR-F and LR-F) and 0 to 100 for the belief scales (HR-B and LR-B).

Like its companion measure, the RAS, this instrument has performed well in studies of reliability and validity, with the exception of the low-responsibility interpretations (Salkovskis et al., 2000). In a mixed sample of anxious and non-anxious participants, test-retest reliability coefficients were .90 for the frequency of high responsibility interpretation, .80 for the belief in high responsibility interpretations, but .22 for the belief in the low responsibility interpretations (Salkovskis et al., 2000). Internal consistency for all four subscales of the RIQ is reported to be excellent with Cronbach alphas ranging from .86 to .93 (Salkovskis et al., 2000). The high responsibility subscales have been shown to discriminate between individuals with OCD, other anxiety disorders and non-clinical controls (Salkovskis et al., 2000). The RIQ subscales are reported to be significantly correlated with other OCD-measures, but not with anxiety or depression (Salkovskis et al., 2000).

#### *4.2.2.3 Procedure*

Prior to recruitment, clinicians at the Anxiety Disorders Unit were asked to inform any client who met DSM-IV-TR criteria for an anxiety disorder of the current study. Those who expressed interest were then introduced to the primary examiner by the assessing clinician, and a time was arranged for testing. Upon arrival, the purposes and procedures of the study were explained to participants, and they were given a written description of the

study (see Appendix A) and requisite consent forms were completed (see Appendix B). Participants were shown into a secure room and given the five questionnaires in a randomised order to complete. The session lasted between twenty to forty minutes; however no time limit was enforced.

Non-clinical participants were recruited following presentations by the primary examiner to several undergraduate university courses. Prospective participants were given instructions regarding time requirements and expectations. If agreed, participants were then given a screening form to complete in order to determine inclusion/exclusion criteria (see Appendix C). Successful participants were then invited to a secure room to complete the questionnaires. Participants unable to complete the questionnaires following the presentation were given alternative times for testing. NAC were given identical questionnaires to clinical participants. All participants completed the questionnaires in one session varying from twenty to forty minutes.

#### *4.2.2.4 Statistical Analysis*

Results were analysed using the Statistical Package for the Social Sciences-Windows version 12. Group differences were examined using multivariate and univariate analyses of variance (MANOVA and ANOVA). Three MANOVAs were conducted to account for the subscales of two of the measures (TAF, RIQ). Wilks' lambda was used as the overall test of significance and if the overall group  $F$  was significant ( $p < .05$ ), the subsequent univariate analyses were interpreted. Group differences on all five measures were examined with post-hoc Tukey tests using a  $p$  value of .05. Multiple correlations were computed on the TAF and RIQ subscales to investigate the degree of association between the two variables. A multivariate analysis of covariate (MANCOVA) with depression as the covariate was performed on the two clinical groups (OCD, AC) to assess whether depression had any

impact on results. Based on observed group differences, regression analysis was performed to establish which variables best predicted high obsessive-compulsive symptomatology.

### 4.2.3 Results

#### 4.2.3.1 Statistical analysis

Between group differences in demographic variables were examined first (Table 1), with the level of comorbidity across anxious samples shown in Table. 4. Following this, the self-report measures of OCD, depression and inflated responsibility of all three groups were analyzed. As there were a priori reasons to consider the possibility of links between responsibility, TAF and obsessive compulsive symptoms (Rachman, 1993; Salkovskis, 1989, 1996), each of these measures (including the subscales of the RIQ and TAF) were analysed using a multivariate analysis of variance (MANOVA): AC (comparison anxious group); OCD (obsessive compulsive disorder group); and NAC (non-anxious controls). Effect sizes were calculated according to Cohen's  $d$  (1988) correlation. Post hoc tests were Tukey's HSD. Statistical analyses were performed using the SPSS package (version 12.0).

#### 4.2.3.2 Sample Characteristics

Mean current age and standard deviations for each group are shown in Table.3. Analysis of variance revealed no statistically significant differences in age across groups ( $F(2, 61) = 1.8, p < .17$ ). The proportion of males was 40 percent in the OCD group (OCD), 29 percent in the anxious group (AC) and 35 percent in the non-anxious control groups (NAC). Chi-squared analyses showed no significant differences in gender distribution across the three groups ( $\chi^2 [2] = .62, p = .73$ ). Ethnicity was reported in 97% of cases with the majority of the sample being New Zealand European (88%), with the remainder being of mixed origin (Malaysian; Western Samoan; Australian; Romanian; French; Maori). Of participants with OCD, 17 (85%) reported being on medication, compared to 16 (76%) in the anxious group (see Table 3).

**Table 3**

Sample Characteristics: Means and Standard Deviation

Variable	OCD ( <i>n</i> = 20)		AC ( <i>n</i> = 21)		NAC ( <i>n</i> = 23)	
	Mean	SD	Mean	SD	Mean	SD
Age	32.1	11.9	32.2	10.9	26.8	9.2
% Male	40%		29%		35%	
% Female	60%		71%		65%	
<u>Medication</u>						
Fluoxetine	17%		25%			
Citalopram	18%		25%			
Paroxetine	47%		31%			
Clomipramine	6%		6%			
Clonazepam	12%		6%			
Other: (amitriptylene/tegratol)			13%			

*Note.* Obsessive Compulsive group; AC = Anxious group; NAC = Control group

#### 4.2.3.3 Co-morbidity

In terms of comorbidity, both clinical groups (OCD; AC) exhibited a high degree of overlap with both anxiety and mood disorders. Comparable rates of depressive symptomatology was observed in both the OCD and AC groups, with 50 percent of all clinical participants reporting a current or past major depressive episode in the past six months. Table 4 shows the distribution of comorbid disorders across clinical groups.



**Table 4**

Percentage Comorbidity with DSM-IV-TR Anxiety Disorders Across Clinical Groups

<b>OCD Group (n = 20):</b>		
	<i>N</i>	%
OCD alone (OCD)	3	15%
Comorbid Panic Disorder (PD)	2	10%
Comorbid Social Phobia (SP)	6	30% ( <i>n</i> = 3, 15 % comorbid MDD)
Comorbid Generalised Anxiety (GAD)	4	20% ( <i>n</i> = 2, 10% comorbid MDD)
Comorbid Depressive Disorder (MDD)	5	25%
<b>AC Group (n = 21):</b>		
	<i>N</i>	%
Generalised Anxiety (GAD)	3	14%
Panic Disorder (PD)	4	19% ( <i>n</i> = 2, 10 % comorbid MDD)
Social Phobia (SP)	10	48% ( <i>n</i> = 4, 19 % comorbid MDD)
Anxiety Disorder NOS	4	19% ( <i>n</i> = 4, 19 % comorbid MDD)

#### 4.2.3.4 Clinical Variables

The means and standard deviations of study measures across groups are presented in Table 3. A multivariate analysis of variance (MANOVA) was conducted on the BDI, TAF, RAS, RIQ and YBOCS and indicated significant group difference ( $F(6, 61) = 18.9, p < .001$ ). Subsequently, a one-way analysis of variance (ANOVA) was conducted with the results discussed below.

**Table 5**

Means (standard deviation), F and p-values of OCD, AC and NAC Groups

Variable	OCD		AC		NAC		<i>F</i> (2,61)	Contrasts <sup>a</sup>	Effect Size	
	Mean	SD	Mean	SD	Mean	SD			G1 <sup>b</sup>	G2 <sup>c</sup>
YBOCS	20.6	4.5	6.5	6.2	2.8	3.4	78.8***	OCD>AC>NAC	2.6	4.5
BDI-II	20.1	11.4	18.9	10.8	3.2	3.7	21.2***	OCD, AC>NAC	.1	2.0
RAS	81.0	25.5	103.2	21.2	122.8	19.8	19.1***	OCD>AC>OCD	-.9	-1.8

*Note.* <sup>a</sup> Tukey's HSD,  $p < .05$ . <sup>b</sup> Effect size OCD + AC. <sup>c</sup> Effect size OCD + NAC. YBOCS = Yale Brown Obsessive Compulsive Scale, BDI-II = Beck Depression Inventory-II, RAS = Responsibility Attitudes Scale. OCD = Obsessive Compulsive group; AC = Anxious group; NAC = Control group, \*\*\* significance level  $p < .001$

#### 4.2.3.5 Symptoms of Obsessionality

As expected, a one-way ANOVA of the YBOCS scores revealed group differences, ( $F(2, 61) = 78.8, p < .001$ ). Post hoc *Tukey HSD* tests ( $p$ 's  $< 0.05$ ) revealed that the OCD group evidenced significantly higher scores on the YBOCS ( $m = 20.6; SD = 4.5$ ) compared to the AC ( $m = 6.5; SD = 6.2$ ) and NAC ( $m = 2.8; SD = 3.4$ ) groups. The AC group had higher scores on the YBOCS than the NAC group, but did not reach clinical criteria for OCD (see Table 5).

#### 4.2.3.6 Symptoms of Depression

A one-way ANOVA of the BDI-II scores revealed group differences, ( $F(2, 61) = 21.2, p < .001$ ). Post hoc *Tukey HSD* tests ( $p$ 's  $< 0.05$ ) indicated that participants with OCD had higher BDI scores ( $m = 20.1; SD = 11.4$ ) compared to the control group ( $m = 3.2; SD = 3.7$ ), but not the anxious group ( $m = 18.9; SD = 10.8$ ). The BDI-II positively correlated with the YBOCS ( $r = .51, p < .01$ ), but was non-significant when the control group was excluded from analysis ( $r = .25, ns$ ). These findings are expected given that both groups' mean scores represented moderate levels of depressive symptomatology and the literature demonstrating the high comorbidity between anxiety and mood disorders. Participants in the AC group evidenced significantly higher scores than the NAC group.

#### 4.2.3.7 Responsibility Attitudes and Ideas

Consistent with earlier reports, one-way ANOVA's of the RAS and RIQ total scores revealed significant group differences, ( $F(2, 61) = 19.1, p < .001$ ) and ( $F(2, 61) = 9.9, p < .001$ ) respectively. Post hoc *Tukey HSD* tests ( $p$ 's  $< 0.05$ ) indicated that participants with OCD ( $m = 4.9; SD = .97$ ) endorsed significantly more items on the RAS compared to their anxious counterparts ( $m = 4.0; SD = .81$ ). Post hoc tests revealed that the NAC group could be significantly differentiated from the clinical

groups with much lower RAS scores ( $m = 3.3$ ;  $SD = .76$ ). Regarding the RIQ, post hoc analyses revealed the OCD group ( $m = 107.5$ ;  $SD = 16.3$ ) reported significantly more responsibility interpretations than the AC ( $m = 78.8$ ;  $SD = 27.2$ ) and NAC groups ( $m = 91.4$ ;  $SD = 16.9$ ), but no significant differences were found between the AC and NAC groups (refer Table 6). This result is best understood by examining the NAC group's responses to the LR-B subscale. As the NAC group ( $m = 76.1$ ;  $SD = 21.3$ ) agreed that they were not personally responsible for their thoughts, they received significantly higher scores on this scale compared to the AC ( $m = 52.4$ ;  $SD = 22.2$ ) and OCD ( $m = 49.1$ ;  $SD = 23.9$ ) groups. These subscale score then contributed to the total score.

Based on the pattern of responding, it is likely that the RIQ total score is misleading as considerable variability exists across subscales. MANOVA on the subscales of the RIQ revealed significant group difference,  $F(8, 61) = 10.9, p < .001$ . Subsequently, ANOVA's were conducted with the results seen in Table 6. In comparison to the AC group, participants with OCD were more likely to report statements reflecting high responsibility beliefs (HR-F;  $m = 1.9$ ;  $SD = .51$ ) and believe more strongly in these ideas (HR-B;  $m = 54.9$ ;  $SD = 17.6$ ). While the AC group demonstrated significantly stronger frequency of high responsibility statements (HR-F;  $m = .92$ ;  $SD = .71$ ) than the NAC group (HR-F;  $m = .39$ ;  $SD = .47$ ), the difference between the AC (HR-B;  $m = 23.7$ ;  $SD = 20.0$ ) and NAC (HR-B;  $m = 13.1$ ;  $SD = 16.8$ ) groups' degree of belief in these statements was not significant. This result suggests that while high responsibility beliefs may underlie several anxiety disorders, these ideas seems specific to individuals with OCD.

**Table 6**

Means (Standard Deviation), F and P-Values for the RIQ Subscales

Variable	<u>OCD</u>		<u>AC</u>		<u>NAC</u>		<i>F</i> (2, 61)	Contrasts <sup>a</sup>	<u>Effect Size</u>	
	Mean	SD	Mean	SD	Mean	SD			G1 <sup>b</sup>	G2 <sup>c</sup>
HR-F	1.9	.51	.92	.71	.39	.47	41.6***	OCD>AC>NAC	1.9	3.1
LR-F	1.5	.72	1.8	1.0	1.8	1.4	.40	<i>ns</i>	-.3	-.3
HR-B	54.9	17.6	23.7	20.0	13.1	16.8	30.0***	OCD>AC, NAC	1.7	2.4
LR-B	49.1	23.9	52.4	22.2	76.1	21.3	9.5***	OCD, AC>NAC	-.1	-1.2
RIQ Total	107.5	16.3	78.8	27.2	91.4	16.9	9.9***	OCD>AC, NAC	1.3	1.0

(HR-F) assesses the frequency of high-responsibility statements; (LR-F); assesses the frequency of low-responsibility statements; (HR-B) assesses the degree of belief in the HR statements; and (LR-B) assesses the degree of belief in the same LR statements.

**Table 7**

Means (Standard Deviation), F and P-Values for the TAF Subscales

Variable	<u>OCD</u>		<u>AC</u>		<u>NAC</u>		<i>F</i> (2, 61)	Contrasts <sup>a</sup>	<u>Effect Size</u>	
	Mean	SD	Mean	SD	Mean	SD			G1 <sup>b</sup>	G2 <sup>c</sup>
TAF-M	24.5	12.0	19.0	12.5	12.6	8.5	6.3**	OCD, AC>NAC	.4	1.1
TAF-LO	4.5	4.8	2.3	3.5	1.4	2.1	4.0*	OCD, AC>NAC	.5	.8
TAF-LS	4.4	3.6	4.0	3.9	1.7	2.2	4.1*	OCD, AC>NAC	.1	.9
TAF Total	33.3	14.7	25.2	15.7	15.7	11.1	8.7***	OCD, AC<NAC	.5	1.4

*Note.* <sup>a</sup> Tukey's HSD,  $p < .05$ . <sup>b</sup> Effect size OCD + AC. <sup>c</sup> Effect size OCD + NAC. TAF-M = (fusion of thoughts and actions regarding issues of morality), TAF-LO = (fusion of thoughts and actions regarding causing harm to others), TAF-LS = (fusion of thoughts and actions regarding causing harm to self). OCD = Obsessive Compulsive group; AC = Anxious group; NAC = Control group, \*significance level  $p < 0.05$ , \*\* significance; level  $p < 0.01$ , \*\*\* significance level  $p < 0.001$

#### 4.2.3.8 Thought-Action Fusion

A multivariate analysis of variance (MANOVA) was conducted on the TAF scales and indicated significant group difference ( $F(8, 61) = 3.5, p < .05$ ). Subsequently, ANOVAs were conducted with the results presented in Table 7. Contrary to the prediction, TAF was not significantly higher in the OCD group compared to the AC group,  $F(3, 61) = 8.7, ns$ . However, the OCD group did evidence considerably higher TAF scores, especially TAF-Moral compared to the NAC. No significant correlations were found between the TAF subscales and the BDI ( $r = .17, ns$ ). These results tend to support the argument that TAF-bias is relevant to OCD, but not specific. The following sections elucidate the indirect role of TAF in OCD.

#### 4.2.3.9 Correlations between TAF and responsibility

Correlational analysis was conducted to test for the predicted positive relationship between TAF and inflated responsibility variables. The results of these analyses are presented in Table 8. Consistent with the hypothesis, high responsibility beliefs were positively associated TAF scores ( $r = .38, p < .01$ ), with the strongest correlation being Moral-TAF ( $r = .33, p < .01$ ). The RAS was strongly correlated in a positive direction with moral and likelihood-other TAF, and moderately correlated with likelihood-self TAF. This result suggests that participants who endorsed statements like “*If I don’t act now then something terrible will happen and it will be my fault*” (HR-F) were also likely to believe that “*Thinking about making a critical remark to a friend is almost as bad as actually saying it*” (Moral-TAF). These results imply that individuals, who have a strong propensity to TAF, may also have a tendency to believe they are personally responsible for the occurrence of intrusive thoughts.

As expected, the correlation between TAF subscales and LR-F scale (frequency of low responsibility) statements were not significant. Given that items on the LR-F subscale essentially tap into ‘every-day statements’, a negative correlation is expected. Consistent with this finding, a negative correlation was observed between the degree of belief in LR statements and Moral ( $r = -.32, p < .01$ ) and Self-TAF ( $r = -.28, p < .05$ ). This finding supports the viewpoint that individuals who tend to discount their thoughts and actions as being synonymous (TAF-M) are less inclined to report strong responsibility beliefs (LR-B).

Given the research on the relationship between TAF and depression (Abramowitz et al., 2003), partial correlations were computed to determine whether scores on the BDI-II accounted for correlations between TAF subscales and the RIQ and RAS. When levels of depression were controlled, the correlation between TAF and RIQ ( $r = -.59, p < .001$ ) and the RAS remained significant ( $r = .59, p < .001$ ).

**Table 8**

Pearson correlations between subscales of the RIQ, RAS and TAF Subscales

	Subscales									
	TAF	RIQ	RAS	M	LO	LS	HR-F	LR-F	HR-B	LR-B
TAF	-	.09	.596**	.91**	.67**	.59**	.38**	-.09	.44**	-.36**
RIQ	-	-	.232*	.04	.20	.06	.45**	.29*	.45**	.44**
RAS	-	-	-	.54**	.48**	.28*	.49**	-.16	.54**	-.33**
TAF-M	-	-	-	-	.35**	.26*	.33**	-.06	.35**	-.32*
TAF-LO	-	-	-	-	-	.70**	.28*	-.11	.40**	-.22
TAF-LS	-	-	-	-	-	-	.28*	-.10	.34**	-.28*
HR-F	-	-	-	-	-	-	-	-.08	.85**	-.47**
LR-F	-	-	-	-	-	-	-	-	-.27*	.50**
HR-B	-	-	-	-	-	-	-	-	-	-.59**
LR-B	-	-	-	-	-	-	-	-	-	-

*Note.*  $N = 64$ . TAF-M (fusion of thoughts and actions regarding issues of morality); TAF-LO (assessing the fusion of thoughts and actions regarding causing harm to others); TAF-LS (investigating the fusion of thoughts and actions regarding causing harm to self). (HR-F) frequency of high responsibility statements; (LR-F) frequency of low responsibility statements; (HR-B) strength of belief in high responsibility ideas; (LR-B) strength of belief in low responsibility statements. \* $p < .05$ , \*\* $p < .01$



#### 4.2.3.10 *The Relationship between TAF, Inflated Responsibility and OCD?*

Correlations were conducted to test for the hypothesised positive relationship between OCD, TAF and responsibility. The results of these analyses showed the YBOCS was positively correlated with TAF total ( $r = .28, p < .05$ ), but disappeared when the influence of depression was controlled ( $r = .23, ns$ ). Likewise, when the responsibility measures were held constant, the correlation between TAF and the YBOCS was not significant ( $r = -.02, p = .86, ns$ ). Contrary to past research, analyses by subscale revealed that Moral-TAF was positively correlated with the YBOCS ( $r = .24, p < .05, 1$ -tailed), but that the likelihood scales were not ( $r = .20, p < .056, 1$ -tailed). Further analysis demonstrated that TAF was strongly correlated with high responsibility scale of the RIQ ( $r = .38, p < .01$ ), but again lost significance when depression was controlled for ( $r = .35, ns$ ). Consistent with previous research, the relationship between TAF and inflated responsibility beliefs appears dependant on the presence of negative affect.

Correlational analyses between the responsibility measures and the YBOCS demonstrated a strong positive association, RAS ( $r = .52, p < .01$ ) and the RIQ ( $r = .41, p < .01$ ). This relationship remained significant when controlling for levels of TAF ( $r = .40, p < .001$ ). The most robust finding was seen on RIQ scale HR-F ( $r = .77, p < .01$ ) and HR-B ( $r = .74, p < .01$ ). These results indicate that a strong sense of personal responsibility for protecting against harm is associated with high levels of obsessionality. This result is supported by the negative correlation observed between high YBOCS scores and the LR-B scale ( $r = -.38, p < .01$ ). This pattern of responding (high responsibility-high obsessionality) held when the control group was excluded from analysis (HR-F;  $r = .66, p < .01$  and HR-B;  $r = .65, p < .01$ ), with the exception of the LR-B scale ( $r = -.14, ns$ ). Partial correlations between the high responsibility subscales (HR-F; HR-B) and obsessive compulsive symptoms (YBOCS) while

controlling for the effects of depression (BDI-II) had no effect (HR-F;  $r = .70, p < .01$  and HR-B;  $r = .68, p < .01$ ). Altogether, these results support Salkovskis' hypothesis regarding the role of inflated responsibility beliefs in OCD.

As correlational analysis does not inform on the sequential relationship between variables, multiple regression analyses were performed to assess the relationship among TAF, OCD and responsibility beliefs. A series of multiple regression analyses were performed with TAF, RIQ and RAS as the predictor variables and the YBOCS as the dependent variable. All three groups were included in analyses with the results presented in Table 9. The overall result was significant,  $R^2 = .36, F(3, 60) = 11.0, p < .001$ . The RIQ ( $\beta = .30, t = 2.8, p < .01$ ) and RAS ( $\beta = .46, t = .35, p < .001$ ) emerged as the best predictors of obsessionality. Regression analysis of the RIQ by subscale revealed the HR-F (high occurrence of ideas reflecting personal responsibility) subscale to be the only significant predictor of obsessive compulsive symptoms ( $\beta = .50, t = 3.2, p < .001$ ). Thought-Action Fusion did not emerge as a significant predictor of obsessionality in analyses, ( $\beta = -.02, t = -.18, ns$ ).

**Table 9**  
Regression Analysis for Variables Predicting Obsessive Compulsive Symptoms

	<i>Means</i>	<i>SD</i>	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
RIQ	92.3	23.4	.12	.04	.30	2.8**
RAS	4.0	1.1	3.9	1.1	.46	3.5***
TAF	24.3	15.5	-0.1	.08	-.02	-.18 <i>ns</i>

$R^2 = .36$ , Adjusted  $R^2 = .32$ ,  $R = .60$

*Note.*  $N = 64$ . TAF (Thought-Action Fusion Scale); RIQ (Responsibility Interpretations Questionnaire); RAS (Responsibility Attitudes Scale) \*Correlation is significant at the .05 level (1-tailed), \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ;

#### *4.2.4 Discussion*

The current study examined TAF and inflated responsibility in a small sample of adults ( $n = 63$ ) with and without OCD (DSM-IV-TR). This study was unique because it was the first to examine these cognitive variables within a New Zealand context. Secondly, it was different to most international research in this area, as clinical samples were employed. The main results can be catalogued as follows. Firstly, the hypothesis that inflated responsibility beliefs are involved in the acquisition and maintenance of OCD (Salkovskis, 1985, 1989) was supported. Secondly, the hypothesis that TAF is specific to OCD was not supported. The third hypothesis that TAF serves as an internal source for inflated responsibility beliefs was partially supported. The following sections discuss these findings and where possible compare with comparable research studies. The chapter concludes with the limitations and clinical implications of the current study.

Consistent with previous research (Steketee et al., 1998; Bouchard et al., 1999) inflated responsibility beliefs were notably higher in participants with OCD, even after controlling for depressed mood and TAF levels. Further, regression analyses showed the responsibility measures to be predictive of obsessive compulsive symptoms (Freeston et al., 1992; Rheume et al., 1995). However, in line with previous research (e.g., Foa et al., 2001) inflated responsibility beliefs were also present in anxious individuals without OCD and were significantly differentiated from control participants. As evident from the results, inflated responsibility seems to operate across the spectrum of anxiety disorders, but appears particularly elevated in OCD. Contrary to other research (e.g., Tolin et al., 2006a), the current study supports the hypothesis that inflated responsibility beliefs fuel the (mis)interpretation of

intrusive thoughts as being threatening and contribute to the development of clinical obsessions.

The (within group) variability observed in the OCD sample on measures of responsibility suggests there may be substantial variation across different types of OCD. This hypothesis has support from several lines of investigation (Rachman & Hodgson, 1980; Lopatka & Rachman, 1995; Freeston et al., 1996; van Oppen et al., 1995) and particularly the Obsessive Compulsive Cognitions Working Group (OCCWG; 1997, 2001) who have demonstrated strong links between responsibility, harming and contamination thoughts. Recently, Farrell (2004) demonstrated that inflated responsibility beliefs in OCD emerged late adolescence and/or adulthood. Given the predominance of aggressive obsessions during this time, it is possible that responsibility beliefs correlate with specific obsessive compulsive symptoms outside of these age-related differences.

Contrary to expectation, no group differences were observed between the OCD and anxious group on measures of TAF. Consistent with past research (Rachman & Shafran, 1999) a significant group difference was found between those with and without an anxiety disorder, supporting the premise that TAF is an easily activated cognitive bias in all anxiety disorders (Rassin et al., 2001c). Consistent with previous studies the correlation between TAF and obsessionality appeared dependant on negative affect (MacLeod & Byrne, 1996; Muris et al., 2001). These findings support the hypothesis that TAF is best conceptualised as a general vulnerability factor occurring along a continuum of anxiety disorders (Rassin et al., 1999; Ferrier & Brewin, 2005), rather than specific to OCD (Rachman et al., 1995).

It may also be the case that like different aspects of TAF are related to different types of pathology (Abramowitz et al., 2003). Clark, Purdon and Byers (2000) lend support for this argument demonstrating that obsessional clients with

predominantly aggressive obsessions experience high levels of TAF, while Emmelkamp and Aardema (1999) argue the case for TAF in washing and checking. Similarly, Rachman (1993) reported that TAF might be more closely associated with impulses rather than with intrusive thoughts or images, because in obsessional impulses, the form of action and often the victim are more vivid than in ruminative intrusive thoughts.

Consistent with research done by Rachman et al. (1995) and Shafran et al. (1996), the results partially supported the hypothesis that TAF serves to inflate responsibility appraisals, which in turn leads to obsessive compulsive symptoms. However, in contrast to Smari and Holmsteinsson's (2001) study, the current investigation found this relationship between variables to be predominantly due to differences in negative affect. The results suggested that depression mediates the relationship between TAF and responsibility, with both variables independently correlated with measures of obsessionality. It can be concluded that TAF plays some role in the inflated responsibility but does not appear to be crucial for the development of such beliefs.

In contrast to Shafran et al. (1996), and Rassin et al. (2001a) who showed stronger correlations for *likelihood* TAF and obsessionality than TAF-*morality*, the current study found TAF-*morality* scores to be more strongly associated with obsessive compulsive symptoms and high inflated responsibility beliefs. It may be the case that the OCD sample had high levels of magical ideation which research suggests is a central construct underlying the relationship between TAF-moral and obsessive compulsive symptoms (Einstein & Menzies, 2004). Alternatively, it is also likely that the discrepancy in findings is due to the trans-cultural aspects of OCD. For example, research has shown TAF-*morality* to correlate strongly with religiosity (Rassin & Koster, 2003), urbanisation (Petribu & Bastos, 1997), and aggressive

obsessions (Rachman, 1993). Based on this review, it is possible that TAF-*morality* bias is related to some factors embedded in the New Zealand culture. This issue deserves further study and attention.

Lastly, while the current findings supported Salkovskis (1985) model, they are also in line with more general models of emotional disorders (Clark and Watson, 1991; Barlow, 1991, 2000, 2002) as responsibility beliefs were also present in other anxiety disorders. Likewise, the finding that negative affect mediated the relationship between TAF and obsessionality, supported the hypothesis that anxiety and mood disorders may be minor variations of broader underlying syndromes (Clark, Allen & Choate, 2004). However, whether this result is a reflection of the shared characteristics across the anxiety disorders, or suggests distinct relationships between disorder and dysfunctional cognitions remains to be seen.

### Limitations

The findings of this study are limited by a number of methodological weaknesses. The most significant shortcoming relates to the small sample size of the study which may impact on the generalizability of findings and may account for the fact that group differences in feelings of TAF failed to reach significance. Consequently, the results should be interpreted with caution as they may reflect methodological problems inherent in a small sample size. This being said, the data found is largely consistent with the body of literature on the cognitive processes associated with OCD.

The use of a student sample as a comparison group should also be considered a limitation as the level of educational attainment was higher than the patient groups. Likewise it could also be argued that this group is not representative of the general population.

Another limitation may relate to the measures themselves. The pattern of data observed for TAF was not that different from the responsibility measures, in that scores were highest in the OCD group and intermediate in the AC group. This raises the possibility that this measure was simply a less reliable indicator of its intended construct, rather than the conclusion drawn which was that TAF is not specific to OCD. Coupled with this, self-report measures also have the potential for social desirability response biases. Research by Newth and Rachman (2001) has shown that many individuals with OCD are reluctant to disclose information or endorse specific items to either a therapist or investigator due to the sensitive nature of some obsessive thoughts (i.e., perverse repugnant sexual obsessions).

Another limitation relates to the correlational nature of the study which does inflate the chances of Type I error. While a stringent level of significance was selected, it would have been beneficial to include the Bonferroni procedure to correct for the inflated alpha level. The design of the study also precluded the examination of the causal role of TAF in the pathogenesis of OCD. A prospective design examining the participants' TAF and inflated responsibility levels over time as a predictor of obsessive compulsive symptoms may help illuminate the relationship between TAF, responsibility and OCD.

### Clinical Implications

The results suggest that whereas inflated responsibility appears to be a core cognitive belief in OCD, TAF may be best conceptualized as a non-specific cognitive bias in most anxiety disorders. Based on the variable rates of responding across groups, it is highly likely that several cognitive constructs are involved in the development and maintenance of obsessions and compulsions. For example, Coles et al., (2005) have suggested that feelings of incompleteness or “not just right” experiences play a role in OCD, while Tolin et al (2006a) have argued the case for

beliefs regarding the 'need to control one's thoughts'. Recently, the Obsessive Compulsive Cognitions Working Group (OCCWG; 1997) have identified six key belief domains that should be included in the cognitive conceptualisation of OCD.

Another issue relates to whether these cognitive processes (e.g., beliefs and/or appraisals) are equally relevant in all types of obsessive-compulsive behaviour (e.g., symptom-based subtypes). Previous research has demonstrated that OCD symptom subtypes differ with regard to treatment response (Abramowitz et al., 2003; Mataix-Cols et al., 2002), relapse rates (Abramowitz et al., 2003; Mataix-Cols et al., 2002) and developmental differences (Geller et al., 2001a; Barrett & Healey, 2003; Farrell, 2004). One explanation for these variable rates may be that the types of obsessive compulsive symptoms have different underlying cognitive processes. The identification of subtype specific dysfunctional beliefs has the potential to increase the efficacy of cognitive therapy, as more specific treatment protocols using the relevant beliefs can be developed. The subsequent study investigates whether the OCCWG (1997) belief domains vary across symptom-based subtypes of OCD.



## CHAPTER 5

### 5. Cognitive Processing Characteristics in Obsessive-Compulsive Disorder (OCD):

#### Exploring the relationship between specific cognitive beliefs and OCD subtypes

#### STUDY II

##### 5.1 Introduction

It is widely acknowledged that certain dysfunctional beliefs contribute to the clinical presentation and maintenance of OCD. However less understood is whether different “subtypes” of OCD are associated with a specific constellation of cognitive distortions. Individuals with OCD describe obsessive compulsive symptoms belonging to a number of different subtypes (e.g., contamination, sexual, symmetry, hoarding; e.g., Calamari et al., 1999; Leckman et al., 1997; Abramowitz, 2004). As seen in Chapter 3, preliminary research has shown correlations between several cognitive domains and obsessive symptoms (e.g., threat estimation to contamination obsessions; Tolin et al., 2006a; OCCWG, 2001); however, a comparison between empirically based-subgroups of OCD and cognitive variables is required.

##### *5.1.1 OCD Subtypes*

Research to identify specific subtypes of OCD has been diverse and wide ranging from (a) symptom theme (Calamari et al., 1999); (b) age of onset (Geller et al., 1998); (c) comorbidity (Nestadt et al., 2003); and (d) neuropsychological features and performance (Mataix-Cols et al., 2003). The methods used to document different subtypes vary greatly and often reflect a certain discipline. Whilst research employing symptom, theme-based subtypes has been criticised for methodological inconsistencies across studies (e.g., factor versus cluster analysis) and number of symptoms assessed (e.g., 10 versus 8 symptom items), it appears to be the most

empirically supported method for establishing subgroups of OCD. As a result, in order to identify the latent dimensions of symptoms and form subgroups, the present study will rely on multivariate statistical methods (e.g., cluster analysis) which allow for the complex patterns and symptom overlap often seen in OCD.

### 5.1.2 *Obsessive Compulsive Cognitions Working Group (OCCWG; 1997, 2001, 2003, 2005)*

Following a symposium on OCD-related beliefs at the World Congress of Behavioural and Cognitive Therapies in 1995, a small group of researchers met to discuss the cognitive assessment of OCD. Later, a working group was formed (OCCWG; 1997, 2001, 2003, 2005) with the goal being to develop measures of beliefs that distinguished OCD from other disorders. The OCCWG was divided into subcommittees and asked to review belief domains that appear most relevant to OCD as well as assessment methods (e.g., idiographic versus self-report). Ten years later, this group has made substantial progress with scale development and a template of the dysfunctional beliefs underlying OCD.

The OCCWG (1997) define *appraisals* as ways in which meaning is attributed to specific events such as the occurrence of an intrusion. Particular expectations, interpretations and judgements are also considered part of the appraisal process. *Beliefs* on the other hand, refer to enduring patterns of responding or assumptions. These assumptions are non-specific and tend to be generalised to most situations (e.g., dysfunctional attitudes and irrational beliefs). Prior to discussing recent methods of assessment, it is necessary to briefly review the specific domains thought important in obsessive compulsive beliefs (see Chapter 3 for full discussion).

Six belief domains are considered important, but not necessary exclusive to OCD. The first, *inflated responsibility*, the cornerstone of Salkovskis (1985, 1989) cognitive model refers to appraisals of personal responsibility for the occurrence and consequences associated with intrusive thoughts. Second is the belief that the mere

presence of a thought is significant (*over-importance of thoughts*). Thought-Action Fusion (TAF) is a subcategory of this belief. The third belief relates to the *importance of controlling one's thoughts*. The tendency for individuals with OCD to *over-estimate threat* (e.g., the probability and cost of aversive events) forms the fourth domain. The fifth belief coined *intolerance of uncertainty* taps into the great doubt, indecision and cautiousness observed in OCD. *Perfectionism*, defined as the excessive concern over mistakes is the final belief domain.

To facilitate research into the cognitive mechanisms of OCD, the OCCWG (1997, 2001) developed the 87-item Obsessive Beliefs Questionnaire (OBQ) and the 31-item Interpretations of Intrusions Inventory (III). Together, these measures represent the abovementioned beliefs which are thought to characterise OCD. The OBQ measures beliefs related to inflated responsibility, overestimation of threat, importance of thoughts, intolerance of uncertainty, perfectionism and control of thoughts. The III assesses appraisals regarding inflated responsibility, control of thoughts and importance of thoughts. However, recent studies using factor analytic techniques on non-clinical (Woods, Tolin & Abramowitz, 2004) and clinical samples (OCCWG, 2005) has shown the OBQ-87 and the III to be highly inter-correlated.

In the first of two studies, the OCCWG (2001) demonstrated that participants with OCD scored significantly higher than non-clinical participants on every OBQ subscale, and scored higher than anxious controls on three (*Responsibility, Control and Importance of Thoughts*) of the six OBQ subscales (see Taylor et al., 2002). Regarding the III, participants with OCD scored higher on two (*Responsibility, Control of Thoughts*) of the three III subscales, but not appraisals related to Importance of Thoughts. Consequently, many questioned the specificity of beliefs related to *Tolerance for Uncertainty, Over-estimation of Threat* and *Perfectionism* to OCD (Taylor et al., 2002).

In the second study, the OCCWG (2005) used exploratory factor analysis to reduce the six theoretically derived subscales (OBQ-87; OCCWG, 2001) to three empirically based subscales (OBQ-44; OCCWG, 2003): (a) *Responsibility/Threat Estimation* (RT: a perceived need to prevent harm from happening to oneself or others, fears of the consequences of inaction, and responsibility for bad things happening); (b) *Perfectionism/Certainty* (PC: high, absolute standards of completion, rigidity, concern over mistakes and feelings of uncertainty); and (c) *Importance/Control of Thoughts* (ICT: fears of the consequences of having intrusive and/or distressing thoughts or images, thought-action fusion, and the need to rid oneself of intrusive thoughts). The hypothesized domains of the III (importance and control of thoughts and responsibility) loaded together onto a single factor described as ‘the negative interpretation of thoughts’.

The OCCWG (*in press*) has shown the III total score and the 44-item version of the OBQ to be predictive of obsessive compulsive symptomatology. However, as the focus of the present investigation is on the specific content of *individual* belief domains to specific manifestations of OCD (e.g., subgroups), the current study compared the subgroups across the six *individual* belief domains of the OBQ-87, and then the three *pooled* subscales of the 44-item version. This method was employed to assess the degree of contribution of belief domain in each subgroup.

## 5.2 Study II

Recent theoretical and empirical work on OCD emphasises the importance of cognitive beliefs and appraisals in the etiology and maintenance of OCD (Freeston et al., 1996; Frost & Steketee, 2002; Purdon, 2001; OCCWG, 1997, 2001, 2003, 2005). However at this time, there is no consensus about the extent to which maladaptive beliefs underlie the different symptom-based subtypes of OCD. The present investigation addressed this question by examining whether the six OBQ-87 scales

and the three OBQ-44 scales were significantly associated with one or more empirically derived OCD subtypes. In line with previous research, it was predicted that the relationship between cognitive variables and OCD subtypes would be characterised by specificity and congruence:

- (i) The OCD subgroups will endorse different OBQ domains (*specificity*).
- (ii) Different obsessive beliefs relate to the different OCD subtypes in a meaningful way (*congruence*).

### 5.2.1 Method

#### 5.2.1.1 Participants

Participants ( $n = 67$ ) were recruited from one out-patient unit, the Anxiety Disorders Unit (ADU) in Christchurch over a period of one year (24-11-03 to 04-10-04). All participants met DSM-IV-TR (American Psychiatric Association, 2000) diagnostic criteria for OCD as assessed by a senior clinician at ADU. Comorbid diagnoses were allowed, providing OCD was the primary diagnosis. For those individuals meeting DSM-IV-TR criteria, diagnoses were confirmed using the anxiety disorders module of the Structured Clinical Interview for DSM-IV Axis I Disorders: Clinician Version (SCID-CV; First et al., 1997) by the principal researcher.

Participants' educational and occupational levels were obtained using a self-report checklist (refer Appendix D). Most of the participants were receiving medication for OCD and related disorders but remained symptomatic. Likewise, those participants involved in treatment at the time of testing were not excluded provided they remained symptomatic. Participants were excluded if they had a diagnosis of current substance abuse or a lifetime history of developmental or psychotic disorders and/or had experienced a head injury resulting in cognitive impairment. Participants received a ten dollar food voucher for participation.

### 5.2.1.2 Materials

#### 5.2.1.2.1 Structured Clinical Interview for DSM-IV Axis I Disorders:

##### *Clinician Version (SCID-CV; First et al., 1997)*

The SCID was administered by the principal investigator to assess DSM-IV-TR Axis I psychological disorders. It is a widely used instrument with acceptable psychometric properties (First et al., 2004). The SCID was developed for use in research and incorporates: (a) obligatory questions; (b) operational criteria from the DSM-IV; (c) a categorical system for rating symptoms; and (d) an algorithm for arriving at a final diagnosis (Ventura, Liberman, Green, Shaner & Mintz, 1998). The SCID is routinely used in research because it minimises inconsistencies in the application of criteria and increases diagnostic accuracy. The principal investigator was trained in the use of the SCID by a senior clinical psychologist. In the present study, the reliability of diagnoses was assessed by audiotaping one in every five of these interviews and giving it to a clinical psychologist to document the percent diagnostic agreement for each diagnosis.

#### 5.2.1.2.2 Yale Brown Obsessive Compulsive Scale (YBOCS; Goodman et al., 1989).

The YBOCS consists of three parts: (a) definitions and examples of obsessions and compulsions; (b) symptom checklist, containing over 40 obsessions and 29 compulsions; (c) severity checklist of symptoms independent of symptom content. The YBOCS has acceptable-to-good internal consistency with coefficients ranging from .69 to .91 (Goodman, et al., 1989).

*Interview Schedule:* The YBOCS-SC (symptom checklist) requires an average of 40 minutes per person from a trained interviewer (Taylor, 1995). The YBOCS interview allows clinicians to rate the current presence, or absence, of obsessive compulsive symptoms. The full checklist comprises 74 items. Each item represents

one discrete obsessive or compulsive symptom, which corresponds to one of fifteen rationally derived categories of obsessions or compulsions. In a similar vein to Baer (1994) and Calamari et al. (1999; 2004), responses on each on the 15 symptom categories of the YBOCS were assigned a numerical value: 0 (the participant did not endorse any symptoms), 1 (the participant endorsed at least one symptom but the category was not considered primary) or 2 (symptoms were endorsed and the category was considered a principal problem). In contrast to previous studies (e.g., Mataix-Cols et al., 1999; 2002), the miscellaneous obsession and compulsion categories were also scored and included for analyses. The scoring procedure described by Calamari et al. (1999; 2003) was selected over others (see Leckman et al., 1997), because the participants' major obsessional concern is distinguished from the most endorsed symptom category (see Calamari et al., 2003 for discussion of this issue).

*Severity checklist:* YBOCS-severity checklist consists of 10 core items assessing five parameters of obsessions (items 1-5) and compulsions (items 6-10): (i) duration/frequency; (ii) interference in social and occupational functioning; (iii) associated distress; (iv) degree of resistance; and (v) perceived control over obsessions or compulsions. Each core item is rated on a 5-point scale, ranging from 0 (none) to 4 (extreme). Participants are required to answer these questions based on the severity over the past week. Scores on the 10-core items are summed to yield scores for the obsessions subscale, the compulsions subscale, and the total (10-item) YBOCS severity score. A cut-off of 16 or higher is generally required to determine eligibility in clinical studies (Shear, Feske, Brown, Mammen and Scotti, 2000).

#### 5.2.1.2.3 Beck Depression Inventory-II (BDI-II; Beck et al., 1998).

The BDI-II is a self-report measure of depression. The psychometric properties of the BDI-II have been described in earlier sections (refer section 5.3).

#### 5.2.1.2.4 Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988).

The psychological and physiological symptoms of anxiety were assessed using the Beck Anxiety Inventory. The BAI is a 21-item self-report measure which instructs participants to rate each item as to how much the symptom has bothered them in the past week. Ratings are made on a scale from 0 = not at all to 3 = severely. The BAI has been shown to have high short term test/retest reliability and internal consistency as well as strong convergent and discriminant validity (Fydrich, Dowdall, & Chambless, 1992).

#### 5.2.1.2.5 Obsessive Beliefs Questionnaire-87 (OBQ-87; OCCWG, 1997)

The OCCWG developed the OBQ-87 and the III in order to assess specific cognitive characteristics of obsessional thinking. The OBQ consists of 87-items reflecting certain belief statements which form six rationally derived subscales (see Woods et al., 2004 for review of beliefs): (a) control of thoughts (14 items); (b) importance of thoughts (14 items); (c) responsibility (16 items); (d) intolerance of uncertainty (13 items); (e) overestimation of threat (14 items); and (f) perfectionism (16 items). On each item, participants are required to indicate their general level of agreement with each statement (*'what you are like most of the time'*) on a 7-point rating scale that ranges from (1) *'disagree very much'* to (4) *'neutral'* to (7) *'agree very much'*. Subscale scores are calculated by summing across their respective items. Internal consistency and test-retest reliability estimates are good to excellent for all subscales (0.93-0.82) and (0.83 – 0.48) respectively (OCCWG, 2003).

#### 5.2.1.2.6 Obsessive Beliefs Questionnaire-44 (OBQ-44; 2003)

The revised OBQ consists is a subset of the OBQ-87 and consists of 44 belief items which form three factor analytically distinguishable subscales: (a) Inflated personal responsibility and the tendency to over-estimate threat (perceived need to



prevent harm from happening to oneself or others, fears of the consequences of inaction, and responsibility for bad things happening); (b) perfectionism and intolerance of uncertainty (high, absolute standards of completion, rigidity, concern over mistakes and feelings of uncertainty); and (c) over-importance and over-control of thoughts (fears of the consequences of having intrusive and/or distressing thoughts or images, thought-action fusion, and the need to rid oneself of intrusive thoughts). The scoring procedure is the same as the OBQ-87 and the OBQ-44 does not contain any new items.

#### *5.2.1.2.7 Interpretations of Intrusions Inventory (III; OCCWG, 1997).*

The aim of the Interpretations of Intrusions Inventory (III; (OBQ; Obsessive Compulsives Cognitions Working Group, 1997, 2001, 2003) is composed of 31 items reflecting three appraisal domains: (a) importance of thoughts (10 items); (b) control of thoughts (11 items); and (c) responsibility (10 items). Participants are given a verbal definition of unwanted ego-dystonic mental intrusions, as well as examples of obsessive themes and content. Participants are required to write in the space provided two intrusive thoughts, images or impulses they have recently experienced. Participants then complete single-item ratings of the recency, frequency, and distress of the intrusions.

Participants rate their level of belief within the past two weeks for each of the 31 statements as they relate to the two intrusive thoughts they recorded on the questionnaire. Strength of belief in the appraisals is then assessed from 0 '*I did not believe this idea at all*' to 100 '*I was completely convinced this idea was true*'. To facilitate interpretation, the 100-point scale was transformed arithmetically by dividing the total score by 10 so that the III total score ranged from 0 to 310. Subscale scores are calculated by summing over their respective items. The III has been

reported to have high internal consistency across subscales (0.93-0.79), and test/retest reliability ranging from 0.77 to 0.64 (OCCWG, 2003).

#### *5.2.1.3 Procedure*

Prior to recruitment, clinicians at the Anxiety Disorders Unit were asked to inform any client who met DSM-IV-TR criteria for OCD of the current study. Those who expressed interest were assessed for eligibility in the study by the first author using the SCID-CV. Following confirmation of diagnosis, participants were shown into a secure room at the ADU. Participants were given an information sheet which explained the aims and procedures of the research (refer Appendix E) and written consent was obtained (refer Appendix F). Participants were given the opportunity to indicate on the consent form whether to participate in the follow up study.

Next, participants were interviewed by the primary examiner using the SCID. Of those referred, only one person was eliminated because the symptoms were more consistent with Body Dysmorphic Disorder rather than OCD. One in five of these interviews were audio taped and sent to another clinical psychologist to rate in order to monitor consistency and reliability of interpretation. There was 100 per cent inter-rater agreement for all diagnoses. The YBOCS clinician-rated symptom and severity checklists were then administered to establish subgroups. After a short ten minute break, participants completed the following self report measures in order: BAI, BDI-II, OBQ-87, and the III (order). The session lasted between 60 to 120 minutes; however no time limit was enforced.

#### *5.2.1.4 Statistical Analysis*

The demographic and clinical characteristics of all 67 participants were examined by means of chi-square tests. The formation of OCD subgroups was achieved using hierarchical cluster analysis on the YBOCS symptom checklist rating

scores. In line with Calamari et al. (1999) study, Ward's hierarchical agglomerative cluster analysis was used to establish initial clusters, as this technique finds groupings that have the smallest ratio of within group to between groups, variance (Borgen & Barnett, 1987; Calamari et al., 1999). The percentage change in agglomeration and introspection of the dendrograms were used to determine the number of clusters for the hierarchical solution. As the statistical software required to cross-validate these cluster solutions using  $K$  means analysis was not available, the means of the identified cluster solutions were compared to those obtained by Calamari et al. (2004). Whilst it is recognised that this procedure is not subject to the same rigorous standards as those of Calamari et al. (1999), the use of comparative analysis provides the best option given the aforementioned restrictions.

The relationship between demographic characteristics and the five subgroups were examined by means of chi-square tests. Following this, within group differences on the six subscales of the OBQ-87 and 44 were examined using one-way between-subjects multivariate analysis of variance (MANOVA). Next, a one-way analysis of variance (ANOVA) was conducted on the subgroups and the OBQ subscales with *Wilks'* lambda used as the overall test of significance ( $p < .05$ ). Subgroup differences on all five measures were examined with post-hoc HSD Tukey tests using a  $p$  value of .05. Effect sizes were calculated according to Cohen's  $d$  (1988). Pearson correlations were computed between the subgroups and the OBQ-87 and the revised 44-item version. Partial correlations while controlling for depression (BDI-II) and generalised anxiety (BAI) were performed to assess the influence of these variables on the results. regression analysis was performed to establish which variables best predicted the OCD subtypes. Lastly, the results should be interpreted with caution given the limitations associated with multivariate analysis (e.g. inflation of Type I error).

### 5.2.2 Results

#### 5.2.2.1 Sample Characteristics

The sample included 67 adults (28 males and 39 females) who met DSM-IV-TR criteria for OCD (refer Appendix G for sample characteristics). The mean age (standard deviations) of the sample was 37 (11.7). The age of onset of OCD<sup>27</sup> in the sample was evenly split with 54 percent reporting late onset OCD (LOD); 40 percent early onset OCD (EOD) and six percent OCD onset post partum. The majority of the sample were (a) New Zealand European (87%); (b) attained a secondary level education (67%); (c) were employed (55%); (d) were single or divorced (55%); (e) receiving Selective Serotonin Reuptake Inhibitors (SSRI) antidepressant medication (85%); and (f) had a positive a family history of a psychological disorder (75%).

Consistent with other research (Brown et al., 2001), a high degree of comorbidity was observed with Social Phobia (SP; 30%) and Major Depressive Disorder (MDD; 36%; see Appendix G). The sample varied in terms of symptom severity, but all scores were within the clinical ranges (see Table 10).

**Table 10**

Symptom Severity	Study (n = 67)	Clinical sample	Non-clinical sample
<b>Symptom severity</b>			
YBOCS Total: <i>M (SD)</i>	22.3 (7.6)	21.3 (5.3) <sup>28</sup>	12.6 (9.3)
Compulsions	11.4 (4.0)	10.7 (3.3) <sup>a</sup>	6.0 (5.0)
Obsessions	11.3 (4.0)	10.6 (2.7) <sup>a</sup>	6.6 (5.1)
BDI-II score: <i>M (SD)</i>	18.5 (14.3)		
BAI score: <i>M (SD)</i>	16.4 (12.4)		

Clinical sample = OCD + AC groups; Non-clinical = NAC Group.

<sup>27</sup> In the present study, early onset OCD (EOD) was defined by symptom development before the age of 15 years (Hemmings, Kinnear, Lochner, Niehaus, Knowles, Mool-Smook, Corfield & Stein, 2004) and development of clinically *significant distress* (Cavallini et al., 2002) not onset of OCD *symptomatology* (Rosario-Campos et al., 2001).

<sup>28</sup> Steketee et al., 1996)

5.2.2.2 Five subgroup taxonomy

Fig. 4 displays the dendrogram (tree diagram) derived from cluster analysis of obsessive compulsive symptoms assessed by the YBOCS-SC. Consistent with previous research (Leckman et al., 1997; Mataix-Cols et al., 1999; 2002; Summerfeldt et al., 1999; Calamari et al., 2004), a solution of five clusters was obtained through the hierarchical procedure: (a) aggressive obsessions - checking compulsions ( $n = 17$ ); (b) symmetry obsessions – ordering compulsions ( $n = 16$ ); (c) contamination obsessions – cleaning compulsions ( $n = 16$ ); (d) miscellaneous obsessions (sexual, religious, somatic) – miscellaneous compulsions (repeating, counting;  $n = 11$ ); and (e) hoarding obsessions – hoarding compulsions ( $n = 7$ ). Cluster solutions of six or seven did not improve the interpretability of clusters. Table 11 displays the YBOCS mean scores for this five group arrangement. The cluster solutions were consistent with those of the other studies (see Appendix H for a comparison with Calamari et al., 2004 study).

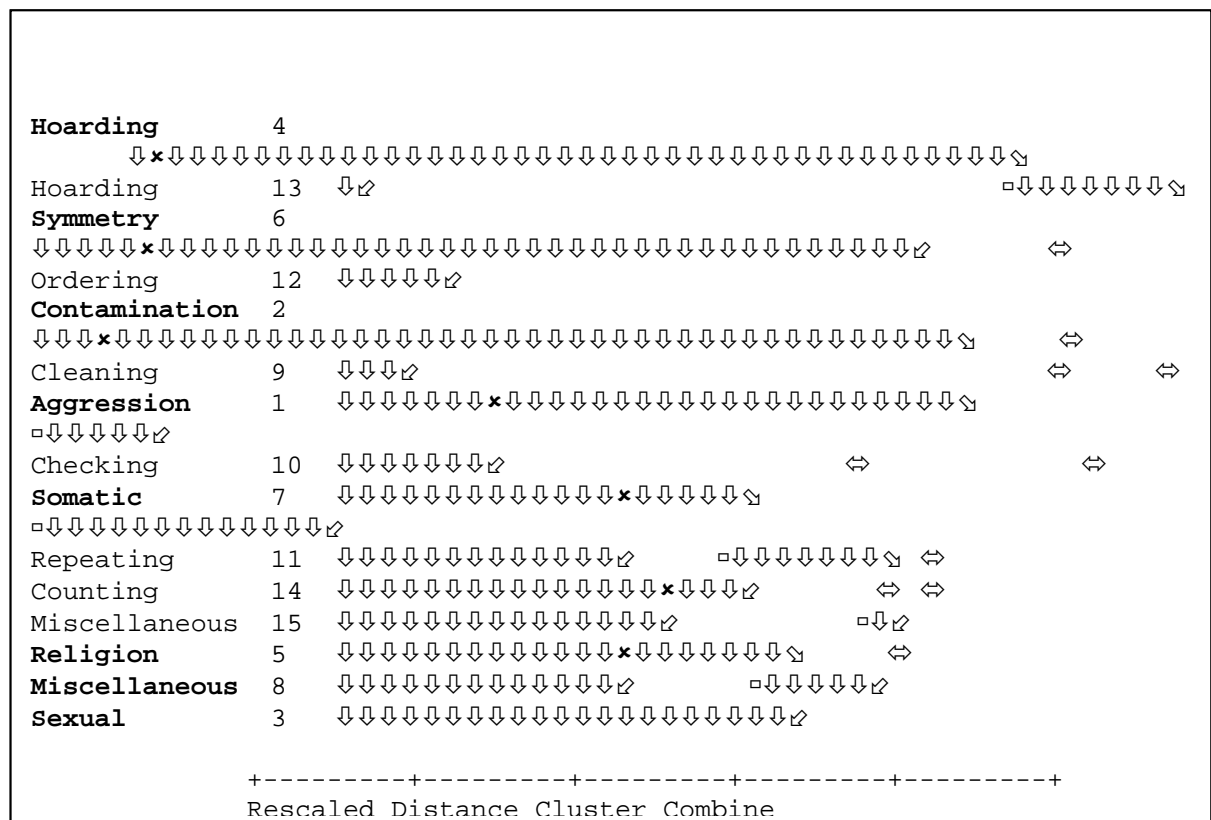


Figure 4: Dendrogram Representing Cluster Analysis of OCD Symptom Categories

### 5.2.2.3 Demographic and clinical characteristics of subgroups

Contrary to previous research (see Geller et al., 1998), the subgroups were very similar demographically. As seen in Table 12, despite a higher representation of women in the hoarding subgroup, no significant gender differences [ $\chi^2 [4, 62] = 6.5, p = .16, ns$ ] were found. Likewise, the subgroups did not significantly differ in age ( $F (4, 62) = 1.5, p = .20$ ), marital status [ $\chi^2 [4, 62] = 9.9, p = .27$ ] or educational level ( $\chi^2 [4, 62] = 2.9, p = .56$ ). Contrary to expectation, age-of-onset ( $\chi^2 [4, 62] = 2.7, p = .95$ ) was comparable across subgroups.

Consistent with other research (see Brown et al., 2001), a high degree of comorbidity was observed across the sample. While these differences were not significant ( $\chi^2 [4, 62] = 6.1, p = .64$ ), Social anxiety was higher in the miscellaneous group (54%) and most of the participants with comorbid GAD were found in the hoarding subgroup (57%). Consistent with previous research (Carter, Pollock, Suvak & Paul, 2004), a high degree of comorbid depressive disorders was found, particularly in the hoarding subgroup. All participants in the current sample had a family history of depression, generalised anxiety or OCD.

### 5.2.2.4 Group comparisons of measures of depression and obsessionality

Between subgroup differences on depression, anxiety and obsessive–compulsive symptomatology measures were then evaluated using multivariate analysis. Table 13 displays the mean and standard deviations of subgroups across these measures. No significant differences emerged between groups on these measures ( $F (4, 62) = 1.4, p < .14$ ). The aggressive and miscellaneous groups tended to exhibit the most depressive symptoms, with the lowest depressive scores found in the contamination group. Participants in the hoarding subgroup tended to demonstrate less generalised anxiety (BAI) than other subgroups, but overall severity of obsessive compulsive

symptoms (YBOCS) was equally distributed ( $F(4, 62) = .79, p = .54 ns$ ). The findings regarding OC symptom severity remained constant when controlling for the levels of depression ( $F(4, 62) = 1.7, p = .15 ns$ ) and generalised anxiety ( $F(4, 62) = 1.5, p = .12 ns$ ).

**Table 11**YBOCS Scale Symptom Rating For Subgroups ( $n = 5$ )

Variable	Aggressive (A) ( $n = 17$ )		Symmetry (S) ( $n = 16$ )		Contamination (C) ( $n = 16$ )		Misc (M) ( $n = 11$ )		Hoarding (H) ( $n = 7$ )		$F(4, 62)$	Contrasts <sup>a</sup>
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
O, Aggressive	2.0	.00	.38	.5	.56	.51	.73	.65	.14	.38	37.8***	A>(S, C, M, H)
O, Contamination	.65	.49	.31	.48	2.0	.00	.27	.47	.29	.49	45.6***	C> (A, S, M, H)
O, Hoarding	.29	.47	.13	.34	.06	.25	.00	.00	2.0	.00	56.2***	H> (A, M); S>H>C
O, Miscellaneous	.24	.44	.13	.34	.00	.00	.45	.82	.00	.00	2.2 <i>ns</i>	
O, Religious	.00	.00	.13	.34	.19	.54	.45	.82	.00	.00	1.9 <i>ns</i>	
O, Sexual	.12	.33	.00	.00	.00	.00	1.4	.92	.00	.00	24.6***	M> (A, S, C, H)
O, Somatic	.24	.44	.06	.25	.25	.45	.18	.60	.00	.00	.82 <i>ns</i>	
O, Symmetry	.47	.62	2.0	.00	.63	.50	.36	.51	.43	.54	30.8***	S> (A, C, M, H)
C, Checking	1.82	.53	.94	.68	1.0	.52	1.18	.87	.43	.54	7.78***	(C=A)> (S, M, H)
C, Cleaning	.24	.44	.31	.48	1.88	.34	.45	.69	.29	.49	32.3***	C> (A, S, M, H)
C, Counting	.53	.72	.56	.81	.38	.62	.00	.00	.29	.49	1.6 <i>ns</i>	
C, Hoarding	.06	.24	.13	.34	.06	.25	.09	.30	2.0	.00	78.8***	H>(A, S, C, M)
C, Miscellaneous	.53	.62	.13	.34	.06	.25	.36	.67	.00	.00	3.1*	A>M
C, Ordering	.35	.49	1.56	.73	.31	.48	.36	.67	.43	.53	12.9***	S> (A, C, M, H)
C, Repeating	.53	.72	.38	.50	.31	.60	.55	.93	.14	.38	.64 <i>ns</i>	

Note. <sup>a</sup> Tukey's HSD,  $p < .05$ ; 1 = Harming; 2 = Symmetry; 3 = Contamination; 4 = Miscellaneous (sexual + religious + somatic obsessions and repeating + counting compulsions; 5 = Hoarding (5)). O before a category denotes 'obsessions' and C denotes to 'compulsions'. Symptom categories on the 15 YBOCS checklist sections were scored 0 (the participant did not endorse any symptoms), 1 (the participant endorsed at least one symptom but the category was not considered primary) or 2 (symptoms were endorsed and the category was considered a principal problem). \* Significance level  $p < 0.05$ ; \*\*\* Significance level  $p < 0.001$ .



**Table 12**

Demographic and Clinical Characteristics (%) Of OCD Subgroups

	<b>Aggressive (A)</b> ( <i>n</i> = 17)	<b>Symmetry (S)</b> ( <i>n</i> = 16)	<b>Contamination (C)</b> ( <i>n</i> = 16)	<b>Misc (M)</b> ( <i>n</i> = 11)	<b>Hoarding (H)</b> ( <i>n</i> = 7)	$\chi^2$ (4, 62)
Age: mean (SD)	37 (13)	39 (13)	34 (8)	34 (11)	45 (5)	1.5 <i>ns</i>
Female: male	9: 8	6: 10	8: 8	5: 6	0: 7	6.5 <i>ns</i>
Married: cohabitating: divorced	6: 9: 2	7: 6: 3	7: 8: 1	4: 5: 2	1: 2: 4	9.9 <i>ns</i>
Secondary: tertiary (years)	9: 8	11: 5	8: 8	8: 3	3: 4	2.9 <i>ns</i>
EOD: LOD: Postpartum	7: 10: 0	6: 9: 1	7: 8: 1	5: 5: 1	2: 4: 1	2.7 <i>ns</i>
Employed (%)	47%	31%	50%	27%	14%	4.1 <i>ns</i>
<i>Comorbid Axis I disorders</i> <sup>29</sup> (%)						
Social Phobia	29%	31%	12.5%	54%	29%	5.5 <i>ns</i>
Generalised Anxiety	18%	12.5%	6%	18%	28%	2.2 <i>ns</i>
Major Depressive Disorder	29%	31%	43%	27%	57%	2.6 <i>ns</i>
<i>Positive family history:</i> <sup>a</sup>						
OCD alone	5%	18%	25%	-	28%	6.1 <i>ns</i>
OCD and MDD	60%	44%	50%	55%	42%	
Anxiety and substance abuse	35%	38%	25%	45%	28%	

*Note.* EOD = early onset OCD; LOD = late onset OCD. YBOCS = Yale Brown Obsessive Compulsive Scale.

Miscellaneous category = sexual + religious + somatic obsessions and repeating + counting compulsions. .<sup>a</sup> DSM-IV-TR Axis I disorder

**Table 13**

Subgroup Differences on Measures of Depression, Anxiety and Obsessionality

Variable	Sample ( <i>n</i> = 67)		Aggressive (A) ( <i>n</i> = 17)		Symmetry (S) ( <i>n</i> = 16)		Contamination (C) ( <i>n</i> = 16)		Misc (M) ( <i>n</i> = 11)		Hoarding (H) ( <i>n</i> = 7)		<i>F</i> (4, 62)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
YBOCS: T	22.7	(7.6)	21.7	(7.9)	21.1	(7.7)	25.4	(8.4)	21.9	(6.9)	23.7	(6.0)	.79
YBOCS: O	11.3	(4.0)	11.5	(3.9)	10.1	(3.9)	12.5	(4.4)	10.5	(4.1)	11.7	(3.1)	.89
YBOCS: C	11.4	(4.0)	10.1	(4.3)	11.1	(4.3)	12.9	(4.1)	11.4	(3.3)	12.0	(2.9)	1.1
BAI	16.4	(12.4)	18.7	(12.7)	13.4	(10.3)	16.1	(11.6)	21.2	(17.1)	10.4	(7.2)	1.2
BDI	18.5	(14.3)	21.2	(15.4)	17.6	(12.8)	15.4	(13.6)	21.3	(15.1)	16.6	(17.5)	.47

*Note.* YBOCS = Yale Brown Obsessive Compulsive Scale. YBOCS: T = Total score; YBOCS: O = Obsessions score; YBOCS: C = Compulsions score. Miscellaneous category = sexual + religious + somatic obsessions and repeating + counting compulsions.

### 5.2.2.5 Subgroup differences on measures of cognition (III)

The five groups (Aggressive, Symmetry, Contamination, Miscellaneous and Hoarding) were compared with post hoc comparisons on the six OBQ subscales (Table 5). To protect against inflated Type I error, the subgroups were compared on all of the variables by means of a MANOVA. The result was significant;  $F(4, 62) = 2.2, p < .001$ . The univariate comparisons for each variable can be seen in Table 5. Accordingly, Type I error was adequately constrained, and so the post-hoc comparisons were conducted at the conventional  $p < .05$  level.

As seen in Table 14, the OCD subgroups varied substantially across the OBQ subscales (see Fig 5), with subgroups' characterisation on the six subscales (cognitive profiles) largely consistent with those reported by Calamari et al. (2004) and current literature. Intolerance of uncertainty beliefs were significantly higher in the contamination group ( $F(4, 62) = 3.3, p < .05$ .) and while not statistically significant, the symmetry subgroup was stronger on the perfectionism scale relative to the other subgroups. Marginally significant differences were found for the aggressive subgroup on the responsibility scale  $F(4, 62) = 2.2, p = .08$  and the miscellaneous group demonstrated the highest levels of control and importance of thoughts (TAF) beliefs. This finding is to be expected given the high preponderance of religious concerns in this group ( $n = 6$ ).

Similar to the symmetry group, high levels of perfectionism beliefs were found in those with predominantly hoarding concerns. Threat estimation was highest in the aggressive and contamination subgroups. Regression analyses, controlling for the levels of depression and anxiety, yielded similar results of the MANOVA ( $F(4, 62) = 2.4, p < .001$ ) with the Intolerance of Uncertainty subscale emerging as a strong predictor of contamination concerns  $R^2 = .33, F(4, 61) = 4.9, p < .01$ ). Perfectionism

and Responsibility subscales emerged as being marginally predictive of symmetry ( $R^2 = .08$ ) and aggressive concerns ( $R^2 = .07$ ).

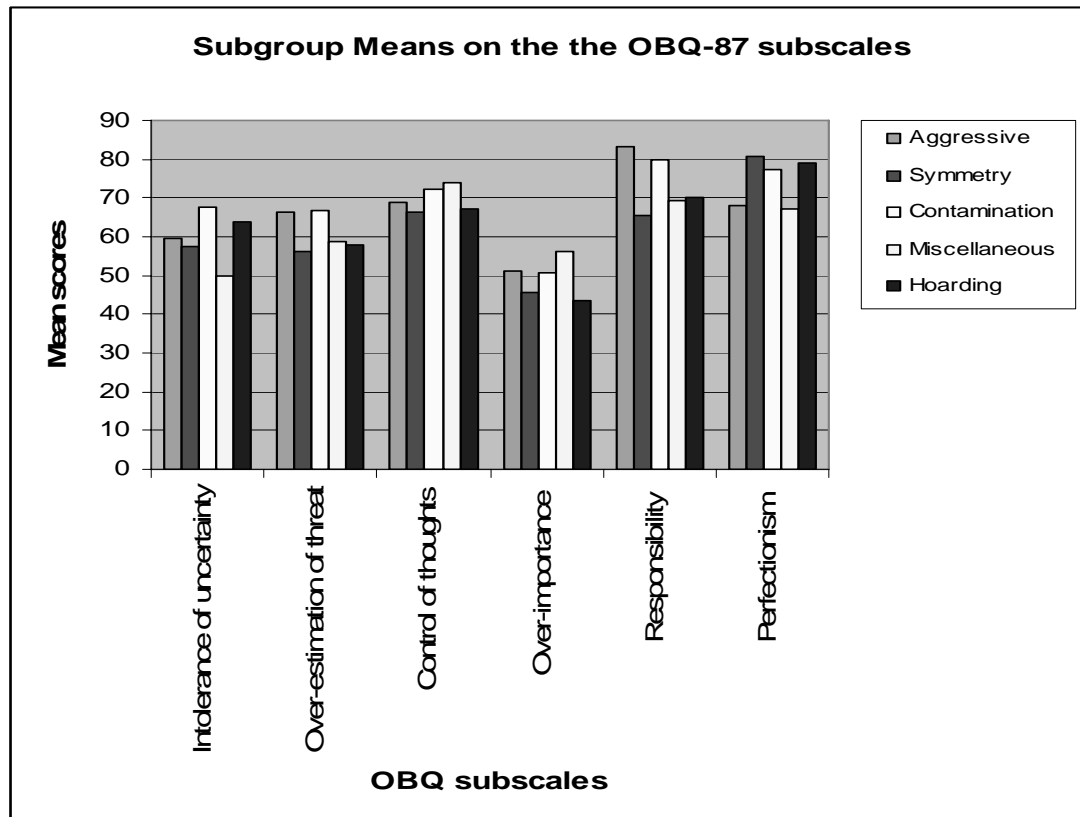


Figure 5: Mean Scores for the Six Obsessional Belief Questionnaire-87 Subscales for the Five Subgroup Taxonomy.

Correlational analysis (Table 15) was conducted to test for the relationship between symptom severity and cognitive belief (OBQ-87). The results suggest significantly strong correlations between the YBOCS total score and three belief domains (Intolerance of Uncertainty ( $r = .27, p < .05$ ), Threat-estimation ( $r = .27, p < .05$ ), and Control of Thoughts ( $r = .30, p < .001$ ) but not Responsibility, Perfectionism and Importance of Thoughts. As the OBQ subscales were moderately correlated with the BAI and BDI ( $r$ 's = .32 to .43,  $p < .001$ ), partial correlations were calculated. The correlations between symptom severity and subscales (Intolerance of Uncertainty, Threat-estimation and Control of thoughts) lost significance ( $r$ 's = .09 to .14,  $ns$ ) when these variables were controlled for.

**Table 14**

Between Subgroup Differences on Measures of Cognition

Variable	<b>Aggressive (A)</b> ( <i>n</i> = 17) Mean (SD)	<b>Symmetry (S)</b> ( <i>n</i> = 16) Mean (SD)	<b>Contamination (C)</b> ( <i>n</i> = 16) Mean (SD)	<b>Misc (M)</b> ( <i>n</i> = 11) Mean (SD)	<b>Hoarding (H)</b> ( <i>n</i> = 7) Mean (SD)	<i>F</i> (4, 62)	Contrasts <sup>a</sup>
OBQ 87: U-scale	59.5 (14.2)	57.6 (14.0)	67.6 (10.0)	49.9 (15.5)	63.7 (8.7)	3.3**	(C>A, S, M, H)
OBQ 87: T-scale	66.4 (19.0)	56.3 (22.3)	66.6 (17.6)	58.6 (20.7)	57.9 (13.0)	.44	
OBQ 87: C-scale	68.8 (13.8)	66.2 (19.1)	72.1 (12.4)	73.9 (14.6)	67.1 (9.8)	.63	
OBQ 87: I-scale	51.2 (17.9)	45.5 (19.3)	50.6 (20.3)	56.1 (20.8)	43.4 (10.3)	.75	
OBQ 87: R-scale	83.1 (15.2)	65.3 (25.6)	79.8 (16.8)	69.3 (22.7)	70.1 (17.9)	2.2	
OBQ 87: P-scale	67.9 (24.7)	80.8 (16.6)	77.4 (17.3)	67.2 (22.4)	79.2 (20.1)	1.4	
OBQ 87: Total	397 (89.6)	371 (104.9)	414 (70.1)	375 (90.1)	381 (63.9)	.61	
OBQ 44: RT	82.6 (16.8)	63.2 (28.9)	79.2 (20.9)	67.4 (24.1)	66.0 (18.0)	2.1, ( <i>p</i> = .08)	
OBQ 44: PC	73.8 (22.9)	83.3 (14.4)	84.1 (12.7)	69.9 (22.4)	84.4 (19.4)	1.7	
OBQ 44: ICT	44.9 (15.8)	40.2 (16.7)	43.8 (17.6)	51.8 (18.1)	39.8 (6.2)	.98	
OBQ 44: Total	201 (48.1)	186 (55)	207 (40.3)	189 (49.8)	190 (33.8)	.52	
III 31: C-scale	73.6 (21.1)	74.2 (30.4)	74.5 (22.1)	79.0 (25.0)	73.5 (16.1)	.11	
III 31: I-scale	46.5 (25.5)	43.0 (28.9)	46.6 (24.4)	44.0 (24.3)	44.9 (22.0)	.06	
III 31: R-scale	71.2 (19.8)	56.7 (35.4)	70.9 (23.3)	61.2 (31.1)	55.9 (25.7)	1.0	
III 31: Total	191 (61.1)	173 (89.7)	192 (63)	184 (71.4)	174 (52.1)	.21	

*Note.* OBQ = Obsessive Beliefs Questionnaire; III = Interpretation of Intrusions Questionnaire; OBQ: U-Scale = Intolerance of uncertainty; OBQ: T-Scale = Over-estimation of threat; OBQ: C-Scale = Over-control of thoughts; OBQ: I-Scale = Importance of thoughts; OBQ: R-Scale = Responsibility; OBQ: P-Scale = Perfectionism; OBQ-44: RT-Scale = Responsibility and over-estimate threat; OBQ 44: PC Scale = perfectionism and intolerance of uncertainty; OBQ 44: ICT-Scale = over-importance and over-control of thoughts; III 31: C-Scale = Over-control of thoughts; III 31: I-Scale = Importance of thoughts; ; III 31: R-Scale = Responsibility; \*\*significant at the .01 level (2-tailed);

Table 15

Correlation Matrix: Obsessive Compulsive Symptom Severity and OBQ-87

Variable	YBOCS-O	YBOCS-C	YBOCS-T
OBQ 87: U-scale	.25*	.29*	.27*
OBQ 87: T-scale	.23*	.29**	.27*
OBQ 87: C-scale	.26*	.31**	.30**
OBQ 87: I-scale	.14	.16	.15
OBQ 87: R-scale	.07	.15	.11
OBQ 87: P-scale	.12	.11	.12
OBQ 87: Total	.21*	.26*	.24*

\*correlation is significant at the .05 level (1-tailed); \*\*correlation is significant at the .01 level (1-tailed)

Subsequently, group differences were investigated on the three empirically derived subscales from the OBQ-44: *Responsibility/Threat estimation* (RT), *Perfectionism/Certainty* (PC) and *Importance/Control of thoughts* (IC). The subgroups were compared on the OBQ-44 variables by means of a MANOVA with significant results;  $F(4, 62) = 2.6, p < .01$ . As seen in Table 14, *post hoc* one-way ANOVA's revealed no statistically significant group differences on the OBQ-44 scales. To assess whether these findings were attributable to the influence of another variable, MANCOVA's were conducted with the BDI as covariate in the first analysis and the BAI in the second. In the first analysis, the removal of the BDI resulted in a significant group effect ( $F(4, 62) = 2.8, p < .001$ .) on the Perfectionism/Control scale ( $F(4, 62) = 2.8, p < .05$ ). Covarying for the BAI did not change the results.

Based on the OBQ-87; 44 and III results, the following conclusions can be drawn: (a) Responsibility/Threat beliefs were higher in the aggressive-checking and

contamination-cleaning subgroups; (b) Perfectionism/Certainty beliefs were higher in symmetry-ordering, contamination-washing and hoarding subgroups; and (c) Importance/Control beliefs were elevated in the miscellaneous subgroups. While not statistically significant, the group differences were in the predicted direction (see Fig. 6).

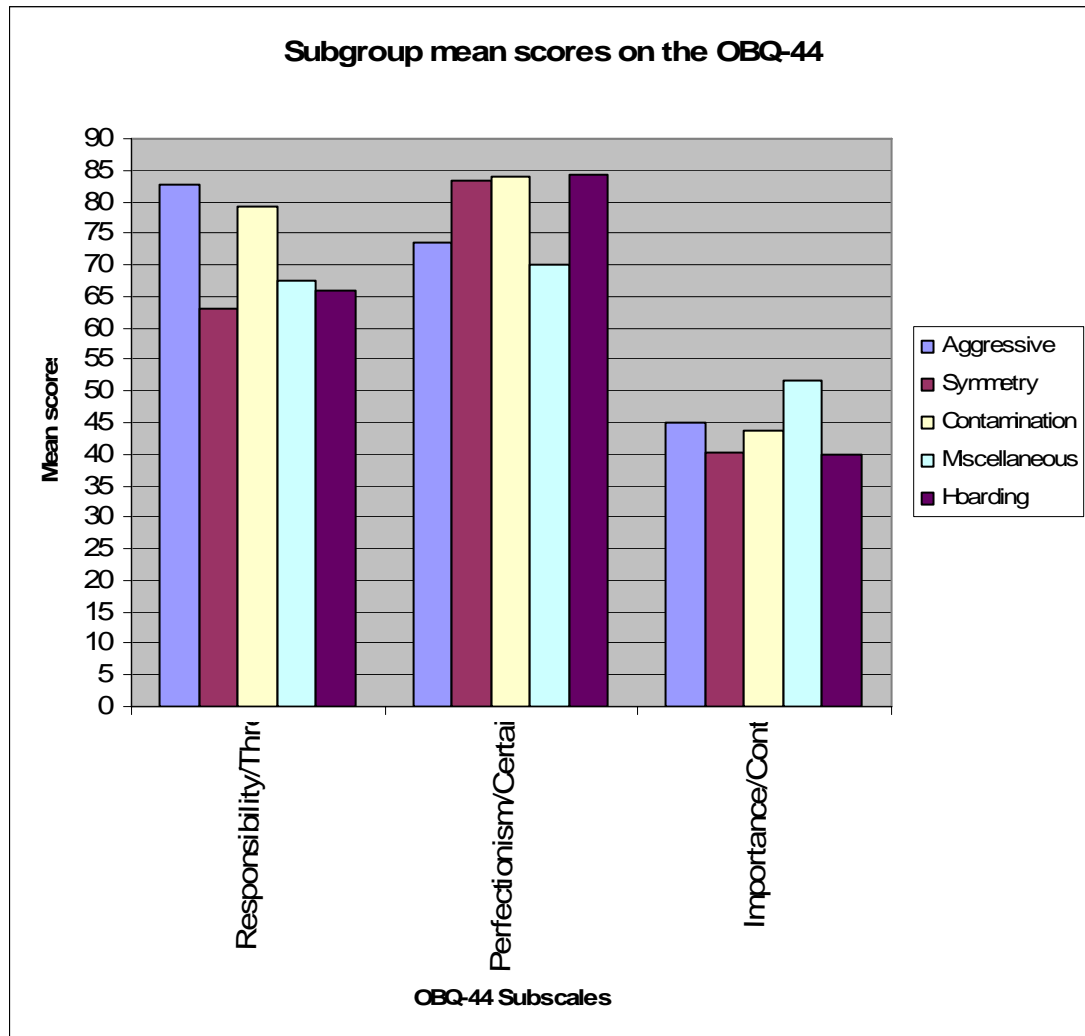


Figure 6: Cognitive Profiles of the Five OCD Subgroups on the Three Subscales of the OBQ-44

Multivariate analysis of subgroup differences on the III also revealed no significant differences  $F(4, 62) = 1.0, p = .41$ . This finding supports the OCCWG's (2001) earlier argument that the distinction between interpretations of thoughts and beliefs may be difficult for people to make using self-report questionnaires. The

results remained the same when controlling for depression  $F(4, 62) = 1.1, p = .33$  and anxiety  $F(4, 62) = 1.2, p = .31$ ).

### 5.2.3 Discussion

The present study investigated whether statistically derived subgroups of OCD were significantly differentiated on measures of cognition (OBQ and III). Overall, the hypothesis that all OCD subtypes would differ significantly on these measures was not supported as only one belief domain (intolerance of uncertainty) emerged as being statistically significant. Consistent with the only other study in this area (Calamari et al., 2004), few differences between subgroups on the OBQ and III were found. At first glance, these results tend to suggest that the OBQ beliefs are non-specific to any type of obsessional concern or compulsive behaviour. However, this conclusion may be premature, given the substantial within group variability (subgroup trends), and research showing a clear link between some dysfunctional beliefs and obsessive compulsive symptoms (refer Chapter 3). The following sections discuss the pattern of subgroup responding on the cognitive measures, and where possible draw comparisons from research showing that different cognitive models may apply to different subtypes of the disorder.

The five subgroup taxonomy (*aggressive obsessions–checking compulsions; contamination obsessions–cleaning compulsions; symmetry concerns–ordering/arranging compulsions; hoarding–hoarding; miscellaneous obsessions – miscellaneous compulsions*) was largely comparable to those studies using a cluster analytic approach to subtype OCD (Calamari et al., 2004; Calamari et al., 1999; Abramowitz et al., 2003a). The hoarding, symmetry, contamination and aggressive clusters were consistent with other studies using the YBOCS-checklist (Baer, 1994; Leckman et al., 1997; Hantouche & Lancrenon, 1996; Mataix-Cols, 1999; 2002; Summerfeldt et al., 1999). Our miscellaneous subgroup was similar to that found in



Calamari et al. (1999) 'obsessional subgroup', but was not reported in other studies as it was omitted from scoring (Baer, 1994; Leckman et al., 1997; Mataix-Cols, 1999). In other studies increased sample sizes (*Ns* 200-300) allowed for further delineation of the miscellaneous symptoms (see Calamari et al., 2004; Summerfeldt et al., 2004). These results suggest the five subgroups identified are relatively stable clusters of obsessive compulsive phenomena.

Since the publication of the OBQ and III in 2001, seven studies have used this measure to examine various aspects of OCD. Investigations have ranged from identifying OCD subgroups defined by differences in the strength of OBQ beliefs (Taylor et al., 2006); and the role of OBQ beliefs in Obsessive Compulsive Spectrum Disorders (Anholt et al., 2004). Several studies have examined the relationship between the OBQ beliefs in cognitive constructs like inferential confusion (Aardema et al., 2005); religiosity (Abramowitz et al., 2004); and cultural aspects (Sica et al., 2004). To the author's knowledge, the current investigation is only the second to examine the specificity of the OBQ beliefs in empirically derived subgroups of OCD using the YBOCS checklist. The following sections discuss the subgroup trends on the dependent variables (OBQ, III).

From a theoretical standpoint, the results are generally consistent with other studies that emerged while the current study was in progress (OCCWG, 2004; Taylor et al., 2005; Calamari et al., 2004; Calamari et al., *in press*) as the differences in means were in the predicted direction. The aggressive and contamination subgroups demonstrated the highest mean scores on measures of responsibility and threat estimation. These findings are consistent with contemporary cognitive models (Rachman, 1997, 1998; Salkovskis, 1985) and comparable to the OCCWG study (*n* = 410) showing the OBQ/Responsibility/Threat Estimations subscale to predict harming thoughts and contamination concerns. The result is also consistent with

Calamari et al (*in press*) study showing the contamination/harm subgroup to have the highest scores on the responsibility/threat belief domain.

Contrary to previous research (Thordarson & Shafran, 2002), the miscellaneous group demonstrated the strongest relationship with both the importance of thoughts subscale (OBQ-87) and the importance and control of thoughts (OBQ-44) belief domains rather than the harming subgroup. This result makes intuitive sense given the preponderance of religious and somatic obsessions in the miscellaneous group which have previously been linked to TAF, a component of importance of thoughts domain (see Rassin & Koster, 2003). The discrepancy in results may relate to sampling practices and/or assessment methods. However, another possibility could be that it is the themes (e.g., morality, standards, punishment and purity) underlying the aggressive and religious subgroups rather than thought content that bind these constructs with the importance of thoughts domain.

The contamination subgroup reported significantly stronger beliefs on the intolerance of uncertainty subscale compared to the other subgroups. This finding is unexpected since research has shown intolerance of uncertainty to significantly predict grooming and checking concerns (OCCWG, 2005). However, the results are consistent with the Sookman and Pinard (2002) study showing strong intolerance of uncertainty beliefs in participants with predominately washing concerns, and by extension contamination obsessions. It should also be noted that checking compulsions are often performed in response to contamination concerns (e.g., the need to check clothes for contaminants).

It is also possible that the discrepant results regarding the intolerance of uncertainty subscale relate to the OCCWG (2005) use of the Padua Inventory-Washington State University Revision (PI-R; Burns et al., 1996) over the YBOCS. Similar to the YBOCS, the PI-R assesses most forms of OCD and has comparable

psychometric qualities (see Antony, 2001 for review). However, the PI-R has certain restrictions in that some symptom categories (e.g., hoarding and ordering obsessions and compulsions, mental rituals and sexual intrusive thoughts) are not well covered (see Feske & Chambless, 2000).

Consistent with the OCCWG validation studies (stage three), there was minimal variability across subgroups on the control of thoughts subscale. As expected, perfectionism beliefs were higher in the symmetry and hoarding subgroups. The association between perfectionism and symmetry concerns is well documented (OCCWG, 2001; 2003) and some research has shown a link between perfectionism and hoarding (Frost & Gross, 1993). The results on this subscale also tended to cluster: high-perfectionism (symmetry, contamination, and hoarding) and low-perfectionism (aggressive and miscellaneous) with a ten point discrepancy between mean clusters. While there has been some debate as to the specificity of this construct in OCD, the results suggest that this domain is highly relevant in OCD, but may only be specific to certain types (e.g., those characterised by a need for exactness).

#### *Clinical implications*

The lack of significant findings between subgroups in the current study may relate to the effects of an 'OCD-low belief cluster' in the sample as considerable within-group variability was observed on the cognitive measures. Two recent studies by Taylor et al. (2006) and Calamari, Cohen, Rector, Szacun-Shimizu, Riemann and Norberg (*in press*) found that dysfunctional beliefs may not play a role in all cases of OCD. In these two large studies (*n*'s exceeding 300), the differences in the strength of OBQ-44 scores across participants (OCD, anxious, students, community controls) were cluster analysed to form two distinct clusters: high versus low scores on beliefs (high-OCD and low OCD). The results of both studies found that while half of the

OCD sample reported high levels of OBQ scores (OCD high), the other half reported comparable scores to their anxious (without OCD) counterparts (OCD low).

Evidently this raises the question as to whether the cognitive theory can explain the discrepancy in beliefs between individuals with similar symptomatology. Certainly, for many individuals elevations between symptom-based groups and dysfunctional beliefs were apparent (e.g., symmetry subgroup was over-represented in the PC domain); however, the within-group variance of the sample does suggest that these beliefs were not significant in all cases. As participants in the current study were matched on age, gender, education and evidenced similar symptomatology it could be that there are other important mediating variables which need to be included in the cognitive theory of OCD. Subsequently, research examining the impact of other variables (e.g., comorbidity) on current symptom-based subtypes of OCD may shed some light on this dilemma.

However, at this stage it seems premature to suggest that different models explain a different type of OCD (see Taylor et al., 2006) until more research has been conducted using different types of methodology. It may well be the case that the current cognitive theory is limited by the method of assessment (e.g., self-report). Recent studies have debated whether these appraisals and beliefs are accessible using paper-and-pencil self-report questionnaires given the demand characteristics, idiosyncratic interpretation (Tolin et al., 2006a; OCCWG, 2003) and accuracy of self-reports. Consistent with the current study, several other investigations have explored this issue by using factor or cluster analyses to assess the differences in beliefs and appraisals. However, given the complexity of the constructs and the implications for the cognitive theory perhaps a more ecological approach to this issue is required.

*Limitations and future directions*

Recent investigations have shown that samples in excess of 200 participants are required to detect stable subgroups of OCD (Calamari et al., 2004; Waller and Meehl, 1998) and as such a sample of 67 should be seen as a limitation. However, as the current study demonstrates, the lack of statistical significance is in some cases arbitrary as the subgroups pattern of responding was consistent with the literature. It is also important to note that while a sample size of 67 is comparatively small, it is proportionately quite large given the recruitment pool. The suggestion that extremely large samples are required to detect differences has other implications including confining research to countries where these numbers are readily accessible.

Likewise, the suggestion that extremely large samples are required to detect group differences does imply that these group differences may be so subtle to be perhaps rendered meaningless for treatment purposes. The reliance on large samples may potentially limit the growth of understanding, as important trans-cultural aspects of OCD may be lost (refer Chapter 3). It is also arguable whether the focus should be on statistical versus clinical significance given the theoretical underpinnings of the research question.

Another limitation may relate to our approach to subtyping. In cluster analysis, boundaries are drawn around individuals such as each subject is in one cluster (Baily, 1994). A categorical approach towards subtyping may be difficult as often individuals with OCD present with more than one primary obsessive complaint. The reliance on grouping based on relative dominance of symptoms may also be problematic as the discrete motivational and affective features that underlie symptoms may be overlooked. While a discussion on categorical versus dimensional approaches is beyond the scope of this thesis, the substantial within group variability suggests that this issue warrants some discussion (see Wood et al., 2004 for review on dimensionality of OBQ beliefs).

The issue at hand refers to whether an individual should be assigned to just one subtype. The difficulties with this approach can be seen in patients with multiple symptoms and/or complex symptomatology. For example, it is also unclear whether a person who repeatedly checks the bed for creases until it feels “just right” be classed within the same subtype as the individual who orders the bookshelf to protect his or her son from being contaminated. This example highlights the issue of whether subgroups should be based on the primary obsessional complaint or focus on what function the compulsive behaviour serves (e.g., motivation).

While seminal research by Taylor et al. (2006) and Calamari et al. (*in press*) has attempted to clarify this issue using cluster analysis on patient responses to measures of cognition (e.g., OBQ), another alternative is to adopt a more ecologically valid approach and assess whether the OCD subgroups differ from one another in terms of dysfunctional beliefs under experimental conditions. Experimental paradigms have the potential to clarify this issue by manipulating the beliefs and examining the effect of this manipulation across the subtypes. The final study of this dissertation extends on this research by employing experimental paradigms to test the validity of the OCD subtypes and dysfunctional beliefs.

## CHAPTER 6

### 6. Experimental paradigms: Cognitive profiles of OCD subgroups.

#### STUDY III:

##### 6.1 Introduction

As reviewed in Chapter 3, recent psychological models of obsessive–compulsive disorder (OCD) have emphasized the role of six cognitive beliefs in the acquisition, maintenance, and treatment of the disorder (OCCWG, 1997). The beliefs in question refer to: (1) inflated responsibility, (2) over-importance of thoughts, (3) excessive concern about the importance of controlling one's thoughts, (4) overestimation of threat, (5) intolerance of uncertainty and, (6) perfectionism. The OCCWG developed two measures to assess these cognitive constructs: the Obsessive Beliefs Questionnaire (OBQ-87) and Interpretations of Intrusions Inventory (III-31) (1997, 2001).

Initial testing of the OBQ-87 and III-31 scales showed good internal consistency, but the scales were found to be highly inter-correlated (see OCCWG, 2003). In an attempt to improve the empirical standing of these scales, the OBQ dimensions were reduced via factor analysis to three empirically based subscales (OBQ-44). Unfortunately, the high degree of overlap between scales remained. The high degree of overlap between the OBQ scales and III led many researchers to question whether these appraisals and beliefs were detectable using self-report questionnaire methods as most participants found these concepts confusing and difficult to make. Given these findings, it would appear that one of the key issues in obtaining support for these beliefs is one of research design.

Most of the research demonstrating the utility of these beliefs in certain symptom presentations is correlational (refer Chapter 3). This body of correlational research is restricted by its reliance on subjective accounts of appraisals and beliefs in

detecting group differences. These studies are limited insofar as the temporal relationship of variables can not be inferred. Thus it would appear that psychometric-based studies using correlational designs do not adequately address the problem that many individuals are unable to detect the difference between beliefs and appraisals (OCCWG, 2005). This strengthens the argument that another approach is required.

Several key researchers (see Rheume et al., 2000a; Ladouceur et al., 2000b; Riskind et al., 2002; Mancini et al., 2004; Coles et al., 2005) have started to employ experimental paradigms with promising results. Several studies (e.g., Lopatka and Rachman, 1995; Mancini et al., 2004; Shafran, 1997) have shown that direct and indirect manipulation of the OCCWG beliefs correspond to changes in OCD symptomatology (refer Chapter 3 for a full review of experimental paradigms). Given this evidence, the use of experiments may provide the means to explore the interaction between motivation for the behaviour (OCD subtype) and dysfunctional belief.

This approach would also afford the opportunity to examine the efficacy of subtyping based on overtly similar 'behaviours'. While most researchers agree on the five group taxonomy (refer study II), this grouping remains problematic as the 'classification behaviours' may serve entirely different purposes for each individual (Taylor et al., 2006). For example, compulsive washing is variously motivated by the prevention of *harm* associated from dirt and germs and/or an attempt to remove evil (Calamari et al., 2004), efforts to avert illness (Rachman, 1994), or to achieve a sense of completeness or perfection (Tallis, 1996). This leads to the diagnostic dilemma as to whether this individual should be subtyped as (a) contamination; (b) contamination/harming (see Taylor et al., 2006); (c) religious; (d) symmetry/order; or (e) miscellaneous. The use of experimental paradigms provides the opportunity to assess whether the behaviour (e.g., the basis of the subtype) matches the motivation,



as participants' rationales for these beliefs will be evoked under experimental conditions.

Research incorporating experimental paradigms to examine the six beliefs proposed by the OCCWG is relatively sparse and tends to rely on non-clinical cohorts. To date, only three studies have used experimental modification of cognitive biases in *OCD patients* (van den Hout & Kindt, 2004; Fisher & Wells, 2005; Hartl & Frost, 1999), but no study has experimentally manipulated all six beliefs in empirically derived OCD subtypes. To this end, the experimental measures used in the current study were derived from research protocols of similar investigations into other anxiety disorders (e.g., Generalized Anxiety Disorder). This type of study may have important clinical and theoretical implications as identification of subtype-specific dysfunctional beliefs has the potential to increase the efficacy of cognitive therapy, as more specific treatment protocols using the relevant beliefs can be developed.

It is also important to note that the author recognizes that considerable overlap exists across the six cognitive domains (OCCWG, 1997); however, for the purpose of the current study the domains are conceptualized as distinct constructs. Secondly, the author concedes that given the rather ambitious task of manipulating all six beliefs in clinical participants, the sample size in this study is relatively small.

## 6.2 Study III

There is a long tradition for the use of experimental manipulations in clinical research, and within that tradition, the purpose of the present investigation was twofold. Firstly, to elucidate the relationship between the cognitive domains proposed by the OCCWG in OCD, and to assess whether these cognitive variables are more applicable to certain symptom-based subtypes of OCD rather than OCD as a

homogenous disorder. Secondly, the current study sought to provide further empirical support for the utility of experimental approaches in clinical OCD research.

### *6.2.1 Method*

#### *6.2.1.1 Participants*

Twenty individuals fulfilling DSM-IV-TR criteria for OCD (see section 6.2) were recruited for this study. These individuals were recruited via a database established during the course of the second study ( $n = 67$ ). Based on the results obtained in the prior study, individuals were recruited from the following priori groups: Group 1 (contamination;  $n = 4$ ), Group 2 (aggressive,  $n = 6$ ), Group 3 (hoarding,  $n = 4$ ), and Group 4 (symmetry,  $n = 6$ ). Once identified, these participants were contacted by the primary investigator (PI). As six months had past since the last study, the PI assessed each participant for the presence of active OCD symptomatology using the YBOCS-severity checklist as a criterion check during a telephone conversation. Most of the participants were receiving psychiatric medication for OCD and related disorders but met full DSM-IV-TR criteria for OCD. Likewise, those participants involved in treatment at the time of testing were not excluded provided they remained symptomatic. Participants received a ten dollar food voucher for participation.

#### *6.2.1.2 Inclusion Criteria*

Participants were contacted if they met the following inclusion criterion: (a) prior agreement to be contacted for a follow-up study; (b) reported strong cognitive tendencies on the OBQ and III; (c) belonged to a particular symptom-based subgroup; and (d) were assessed by the PI as demonstrating current OCD symptomatology (YBOCS-severity scores). One participant was excluded from analysis because they

presented with symptoms consistent with the diagnosis of schizophrenia during the testing procedure.

### *6.2.1.3 Measures*

#### *6.2.1.3.1 Pre-experiment measures*

When participants arrived at the University of Canterbury, they were given a consent form (refer Appendix I) and information sheet (refer Appendix J) detailing participant requirements, expectations and information. Following this, participants completed two psychometric tests: The Obsessive Beliefs Questionnaire (OBQ; OCCWG, 1997) and the Yale Brown Obsessive Compulsive Scale (YBOCS; Goodman, 1989). The psychometric properties of both scales have been reported in earlier section and will not be repeated (see section 6.2).

#### *6.2.1.3.2 Measures used during the study*

##### Visual Analogue Scale (VAS)

The Visual Analogue Scale (VAS; see Appendix K) was used to measure participants' subjective units of distress (SUD) before and after each experiment. The VAS consisted of an A3 sized picture of a thermometer with 0-100 (intermediate points marked off in tens) written vertically up the left of the page and the sentence "*How anxious do you feel right now?*" at the top of the page. The bottom of the thermometer displayed a 0 (representing no anxiety), in the middle was 50 (representing moderate anxiety) and at the top 100 (representing severe anxiety). Twelve ratings (two/each/task) were obtained per participant.

##### Agreement Scale (AS).

The agreement scale (AS; see Appendix L) was developed to standardise participants responses to a series of post-tasks questions. The AS required participants to indicate their general level of agreement with specific statements on a on a 7-point

rating scale, ranging from (1) *'disagree very much'* to (4) *'neutral'* to (7) *'agree very much'*. After each question, participants were required to choose their general level of agreement by pointing to a number on the AS. The AS was displayed on an A3 sized picture to the right of each participant on a stand. Participant responses on this scale were calculated by summing across their respective items.

#### Task specific questions

Participants were asked a set of questions (between 6 and 8) following each task (see Appendix M – R). Each set of questions was developed to capture a specific belief construct (similar to the OBQ–87 subscales). For example in the case of uncertainty beliefs, one of the questions posed was *“how strongly do you agree that you have made the correct decision on this task”*. Participants then used the AS to rate how strongly they believed they had made the correct decision (0-100).

#### 6.2.1.3.3 Experimental measures

##### Probabilistic Inference Task (PIT)

The probabilistic inference task (PIT) assesses doubt over decisions (cf. Rheaume et al., 2000a; Garety, Hemsley and Wessely, 1991). This task was modified to elicit high levels of uncertainty in participants with OCD. The materials included two opaque bags each containing 70 marbles (blue and green). The first bag (bag A) contained 40 blue marbles and 30 green marbles and the second, (bag B) 30 blue marbles and 40 green marbles. A small blue cloth bag was also provided for counting purposes. The task was chosen because it presents a high level of ambiguity due to the fact that it requires a difficult decision to be made. This task was timed using a stop watch and measured using six task-specific questions (see Appendix M). Pre-and-post levels of anxiety were obtained using the VAS.

In this task, participants were told *“as you can see, I have two bags in front of me each containing 70 marbles. However, one bag contains 30 blue marbles and 40*

*green marbles and the other, has 40 green marbles and 30 blue marbles (participant given a bag). Your job is to choose which one of the bags I have given you, is the one with more blue marbles or the one with more green marbles. You can take out as many marbles as you want before making your decision but this task will be timed. I am also going to give you this third bag which you can use to count. However, once you place the marbles in this bag you are not allowed to take them out again. (SUD rating then taken). The total number of marbles picked, time taken to make the decision and method for determining decision is noted. Participants are then informed: “Now, keeping in mind the task you have just completed, please use this scale (AS) below to answer the following seven questions (see Appendix L by choosing the number that best describes how you are currently thinking.” A final SUD rating was then obtained and participants were not allowed to proceed onto the next task unless the reading was 10 or less.*

#### Sentence Paradigm

This experiment was based on Rachman et al. (1996) and measured thought-action fusion (TAF). However in contrast to earlier studies, the current study included two additional sentences (TAF-Likelihood-Self and TAF-Morality) to assess all components of TAF. In this task, participants were required to write three sentences: (sentence 1) “I hope that (name of loved one) will soon be in a car accident in the next 24 hours” (TAF-Likelihood-others); (sentence 2) “I hope that in the next 24 hours (insert your name) is in a car accident” (TAF-Likelihood-self); and (sentence 3) “(insert name) has bad thoughts and therefore (insert name) is a bad person” (TAF-Morality).

After each sentence, participants were asked several sentence-specific questions (see Appendix N). Pre-and-post anxiety ratings (SUD) were obtained using the VAS. If during the experiment, the participant refused to write any of the sentences owing to anxiety (SUD exceeding 100) they were asked to think of a less

severe accident or an accident involving a more distant relation. If writing the sentence did not evoke a SUD rating of 50 or more on the Verbal Analogue Scale, participants were asked to think of a more severe accident or an accident involving a closer relative. Participants were informed that the person/relative must be alive as several participants attempted to choose dead relatives to alleviate their anxiety. SUD ratings were returned to baseline between each sentence.

Prior to the first sentence, participants were given the following instructions *“picture a loved one (living person). Do you have that person in your mind? Now, keeping that person in your head, I would like you to write out the following sentence on this piece of paper, inserting the name of the person in the blank (participant was handed an A4 piece of paper to write sentence 1 (TAF-Likelihood-others). After copying the sentence with the named friend or relative inserted in the blank, participants were asked to “close your eyes and think about the situation for a few seconds (place the sentence directly in front of them and obtain SUD rating). “Now remembering the task you have just completed, please use this scale (AS) to answer the following five questions (see Appendix N, section 1) by choosing the number that best describes how you are currently thinking.*

Prior to the second sentence, participants were told *“Now I would like you to do the same, but this time I would like you to write your name in the following sentence on this piece of paper (participant handed an A4 piece of paper to write sentence 2 (TAF-Likelihood-self). After copying the sentence with their name inserted in the blank, participants were asked to “close your eyes and think about the situation for a few seconds (place the sentence directly in front of them and obtain SUD rating). “Now remembering the task you have just completed, please use this scale (AS) to answer the following three questions (see Appendix N, section 2) by choosing the number that best describes how you are currently thinking”.*

In the third sentence, participants were informed *“Once again, I would like you to follow the same procedure as before, but this time I would like you to write the following sentence on this piece of paper”* paper (participant handed an A4 piece of paper to write sentence 3 (TAF-Morality). After copying the sentence with their name inserted in the blank, participants were asked to *“close your eyes and think about the situation for a few seconds* (place the sentence directly in front of them and obtain SUD rating). *“Now remembering the task you have just completed, please use this scale (AS) to answer the following six questions* (see Appendix N, section 3) *by choosing the number that best describes how you are currently thinking.”*

Following completion of this task, participants were told *“Most participants feel bad about writing these sentences, and might therefore feel the need to somehow make it right, for themselves and/or for the person whose name was filled in. Do you need to do anything to neutralise?”* (Participants were given the three sentences to destroy or take home). A further SUD rating of 10 or less was required before participants could proceed to the next task.

#### Letter Sequencing Task (LST)

This experiment was based on Rhéaume et al. (2000a) and measured levels of self-focused perfectionism in individuals with OCD. This task involved a five page booklet (see Appendix K). The first page contains the instructions, followed by the four trials, one trial per page. In each trial, a series of approximately 200 printed letters ('Times' style, 14 pts) is presented to the participant. A different target letter is written at the top of each page. The participant must mark the target letters while reading the series from left to right, one line at a time. Each trial must be completed within a limited period of time. Consequently, when participants are signalled by the

experimenter<sup>30</sup>, participants' must immediately turn the page and begin the next trial. The presence of markers allows standardization of the execution of the task by inducing the same level of pressure for each participant. This task was timed using a stop watch and reactions were measured using six task-specific questions (see Appendix O). Pre-and-post levels of anxiety were obtained using the VAS.

Prior to the task, participants were given the following instructions *“as you can see, there is an A4 booklet in front you. The booklet contains four pages with 200 printed letters per page. As you can see there is a different target letter (F, S, K, M) written at the top of each page. What I would like you to do is circle the target letter as many times as it appears in the series of distracting letters. You must mark the target letters while reading the series from **left to right, one line at a time**. Each page must be completed within a set period of time. I will give the signal to move onto the next page. When I give this signal, you must immediately turn to the next page and begin finding the new target letter”*. Then the SUD rating was taken via the VAS.

In order to increase participants' anxiety, the experimenter walked behind participants with a clip board pretending to mark their work. The time taken to complete each page (minutes/ seconds) as well as total number correct was measured. Participants were also asked what was more important (a) following the instructions; (b) achieving the quickest time; and (c) having the most correct. Following completion of the task, participants were required to *“keep in mind the task you have just completed and answer the following eight questions (see Appendix O) by choosing the number that best describes how you are currently thinking on this scale (AS).”* A further SUD rating of 10 or less was required before participants could proceed to the next task.

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<sup>30</sup> (determined by a marker only visible by the experimenter)



### Verbal Recordings

This task, based on Salkovskis et al.'s (1997) research whereby the perceived level of responsibility for one's thoughts and actions. The materials included a timing device sounding at thirty second intervals and seven task-specific questions (see Appendix P). Pre-and-post levels of anxiety were obtained using the VAS. The experiment included three phases. In the first phase, participants were given the following instructions "*the purpose of this next exercise is to investigate the nature of obsessive thinking. What I would like you to do is describe your most disturbing obsession to me*" (experimenter writes the obsessive thought down) and the experiment begins.

#### Phase 1: (low responsibility)

Participants are instructed "*for the next 2 minutes, I want you to think about these thoughts intensely (playing it over and over in you mind) - without doing any kind of mental or behavioural compulsions. Throughout the 2 minutes you will hear a beeping sound (at 30, 60, 90 and seconds). When you hear this sound, I want you to say this obsession aloud - still without doing any compulsive behaviour. However, after you say the obsession, I want you to immediately transfer all responsibility for any negative outcomes that may occur as a result of not performing the ritual to me (examiner) e.g, say I blame ...*". That way, if anything bad happens as a result of you not neutralising the obsession, it will be my fault and not yours.

*Remember, it is vitally important that you don't attempt to reduce the anxiety through any type of compulsive activity (e.g., counting) as it will invalidate the results. After you have said the thought, I will be asking for ratings of how uncomfortable it was to say the thought aloud (SUD rating).* Participants were asked whether they needed to perform any neutralising behaviours before moving onto the second phase. A SUD rating of 10 or less was required before participants could proceed to the next phase.

### Phase 2. (High responsibility)

Participants are given the following instructions *“I’m going to ask you to do exactly the same as before; I still do not want you to perform any compulsive behaviours. However this time when you say the obsession, I want you to just ‘sit with the anxiety’. In other words, I want you to take responsibility for the occurrence of this thought without doing any compulsive behaviour. I realise that this is uncomfortable, but it is only for a short time (2 minutes). I will be asking for ratings of how uncomfortable the thought makes you every now and then using the same card as before.* Participant responses were measured at 0, 30, 60, 90 and 120 seconds followed by the question *“And you are going to take responsibility for that?”* Participants were asked whether they needed to perform any neutralising behaviours and then instructed to *“answer the following seven questions (see Appendix P) by choosing the number on the scale (AS) that best describes how you are currently thinking.”* A SUD rating of 10 or less was required before participants could proceed to the next task.

### Behavioural Avoidance Test (BAT)

The BAT was based on Jones and Menzies’ (1998) research and examines the role of threat estimates in OCD. This experiment is designed to assess the effects of experimental manipulation of perceived threat in a BAT. The materials included a large open-topped garbage bin containing a three kilogram bag of potting soil, 150 millilitres of baby oil, 250 millilitres of dishwashing liquid, one A4 size plastic bag of leaves, shredded plastic, 150 gram bag of cotton wool, netting, five medium soft toys covered in synthetic feathers, 50 plastic pearls, six small cloth-covered balls filled with cotton, 500 gram bag of parrot mix, 15 reams of shredded paper, 2 scouring cloths cut into small pieces, and two litres of water. These substances were chosen due to the perceived textural similarities with other materials (e.g., raw meat). The

contents of the garbage bin were replenished every three days. Additional materials included a 30 centimetre ruler, stop watch, and sink. Pre-and-post levels of anxiety were obtained using the VAS. The procedure in this study had three phases (pre-BAT; BAT; post-BAT).

#### Pre-Behavioural Avoidance Test

Participants were informed *“The bin in front of you contains potting soil, animal hair, food scraps and raw meat. In a moment I am going to ask you some questions about this container. As there are no right or wrong answers, I would like you to answer these questions as quickly as possible without thinking too much about the question”* (participants were not informed, at this point, that they would later be asked to actually place their hands in the stimulus). Participants were asked the following three questions: (a) How anxious would you feel if your hands were placed in the rubbish bin? (SUD rating); (b) How long could you tolerate putting your hands in the rubbish bin = \_\_\_\_\_minutes \_\_\_\_\_ seconds?; and (c) I’d like you to move the chair as close to the rubbish bin as you are comfortable with (\_\_\_\_\_cm). (SUD rating recorded).

#### Behavioural Avoidance Test

Participants were informed *“I would like you to place your hands in the container up to your wrists and keep them there for \_\_\_\_\_ (time identified in pre-condition) minutes. During this time I am going to ask you some questions about this experience. Again, there are no right or wrong answers. Each question is designed to be answered quickly and is not meant to be thought about too much. If at some point during the task you feel completely unable to keep your hands in the bin (maximum 2 minutes) you may remove them”* (SUD rating). If participants were unable to place their hands in the container, they were asked to sit as close to the container as they

could and then close their eyes. The researcher then instructed participants that an unknown slippery object would be placed in their hands.

The researcher then instructed participants to remove any jewellery and directed them to the bin. With their hands in the container (forearm level), ratings from all participants were obtained for each of the following variables using a 0 (“not at all possible”) to 100 (“certain to occur”) scale<sup>31</sup>: *How certain are you of becoming ill or catching a disease from this experiment; The illness will be severe and life threatening; Bacteria will get through my skin and infect my blood stream; Even though I know this experiment is designed to be safe, I could get ill from this task; I will suffer as a result of doing this task.* The BAT was terminated either 1) when the participant could no longer tolerate hand immersion or 2) when they had completed the 2 min task.

#### Post-Behavioural Avoidance Test

Immediately following the BAT, participants were told they could wash their hands. The following variables were measured: (a) duration of hand immersion (minutes/ seconds); (b) discrepancy between *estimated* versus *actual* hand immersion (minutes/seconds); and (c) time spent washing (minutes/ seconds). Participants were not aware that the duration of time spent washing was being recorded. A SUD rating of 10 or less was required before participants could proceed to the next task.

#### Focussed Breathing Exercise

This task was a modified version of the Ruscio and Borkovec (2004) ‘worry induction task’ and was developed to assess the paradoxical effects of attempts to control one’s intrusive thoughts. The materials included an automated timing device set to sound at 30-second intervals and an A4 size booklet containing 15-pages (see

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<sup>31</sup> Participants were informed to stare straight ahead at the 0-100 scale 0 (*not at all possible*) to 100 (*certain to occur*) and to avoid looking into the bin until after the task.

Appendix R). With the exception of page 9 and the title page, each page contained the following typed sentence centred at the top “*what were you doing at the time the beep sounded*” (Times Roman 16 font). Participants were then required to choose from the following three options (i) completely focussed on my breathing; (ii) distracted by an obsessive thought; and (iii) Other (e.g., distracted by something else). A SUD rating were required on each page (e.g., “*how anxious do you feel right now?*”). As mentioned, page nine in the booklet differed from the others as participants were required to write down four of their most distressing intrusive thoughts and/or urges.

The exercise comprised three phases. Prior to the first phase, participants were given a questionnaire packet face down. They were asked not to turn the pages over until instructed to do so. Participants were then given the following instructions; “*We are going to begin with what we call the focused breathing exercise. During this task, I am going to ask you to close your eyes for a few minutes and focus all of your attention exclusively on your breathing. While you are engaged in this task, you will periodically hear a beeping sound (participants shown device). Each time you hear the signal, please turn over the next available sheet in front of you and indicate whether, at the time of the signal, you were focused on your breathing; distracted by obsessive thoughts or “other.” Please circle one response, put the sheet aside, then close your eyes and concentrate all of your attention again on your breathing. We’ll be doing this focused breathing exercise several times during this task. Do you have any questions?*”

Participants were then given a practice round of focused breathing to make sure the procedure was clear. Following this, participants were told “*in order to minimize distractions during the exercise, I (examiner) will not say anything from this point until the end of the task. So remember, each time you hear the signal, open your*

*eyes, turn to the next available sheet to make a rating, then close your eyes and focus on your breathing until the next signal.”* Phase 1 began and participants were signalled six times (at 20 second intervals). In phase 2 (OCD Exercise), participants were given the following instructions *“In the next phase of this exercise, I am going to ask you to select several of your most upsetting intrusive thoughts (not the ones we used in previous tasks), then spend several minutes ruminating about them as intensely as you can and continue until I ask you to stop<sup>32</sup> (in the way you normally do). Please take a moment to choose the obsessions you are most worried about. When you have selected them, write them down in your booklet (page 9). Now close your eyes and think about these thoughts until I tell you to stop (one minute time limit).*

In the third phase (distraction exercise), participants were told they were going to repeat the focused breathing exercise *“Each time you hear the signal, turn over the next sheet and make a rating, then close your eyes and concentrate all of your attention on your breathing again. Now, please close your eyes and focus all of your attention exclusively on your breathing.”* Participants were signalled six times (at 20 second intervals). To ensure that all participants engaged in the task for the same length of time, the tape on which the signal was recorded was paused after each signal, then restarted after all participants had made a rating and had closed their eyes again. Following completion of the task, participants were required to answer the seven task-specific questions (see Appendix Q) using the AS scale. Pre-during-post anxiety ratings were measured using the aforementioned booklet.

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<sup>32</sup> Borkovec & Ruscio (2004) demonstrated in pilot testing that a 5-minute period was long enough to elicit the worries and anxiety associated with a given topic, but not so long as to allow anxiety to decline.

#### *6.2.1.4 Procedure*

Prior to the study, participants were telephoned and given a suitable time for testing and verbal directions to the Psychology Department at the University of Canterbury, and informed that testing would be for two and one half hours. Participants were met by the primary examiner and escorted to the testing room where they were seated at a large table opposite the primary examiner. Following this, each participant was given a consent form, information sheet and demographic form to complete. Participants completed the following psychometric tests: The Obsessive Beliefs Questionnaire (OBQ; OCCWG, 1997) and the Yale Brown Obsessive Compulsive Scale (YBOCS; Goodman, 1989) prior to the experiment.

Participants were informed that the purpose of the experiment was to investigate obsessive thoughts through six different tasks. The six tasks were administered in the following order: Probabilistic Inference Task (PIT), Sentence Paradigm, Letter Sequencing Task; Verbal Recordings; Behavioural Avoidance; and the Focussed Breathing Exercise. To ensure consistency, manipulation checks (SUD ratings) were performed throughout the study. All experimental material (e.g., garbage bin) was hidden until required. All participants were debriefed following the experiment.

#### *6.2.2 Statistical analysis*

The experiment involves both between groups and within-subject repeated measures elements. The relationship between demographic characteristics and the four subgroups were examined by means of chi-square tests. Following this, between groups (OCD type) differences on baseline measures (OBQ-87, OBQ-44 and YBOCS) were examined using one-way between-subjects multivariate analysis of variance (MANOVA). To examine group differences under experimental conditions, one-way analysis of variance (ANOVA's) were conducted on all subgroups with

*Wilks'* lambda used as the overall test of significance ( $p < .05$ ). If statistically significant, subgroup differences were examined with post-hoc HSD Tukey tests using a  $p$  value of .05. Results were analysed using the Statistical Package for the Social Sciences-Windows version 12 (SPSS-12).

### 6.2.3 Results

#### 6.2.3.1 Sample Characteristics

The sample included 20 adults (4 males and 16 females) who met criteria for DSM-IV-TR OCD. The mean age (standard deviation) of the sample was 45 years (11) and all participants were New Zealand European. The subgroups were not significantly different in terms of age of onset of OCD<sup>33</sup>, with 60 percent reporting late onset OCD (LOD) and 40 percent early onset OCD (EOD). The majority of the sample was either employed (40%) or looking after children (20%) with only 20 percent being unemployed. All participants had attained a secondary level education (40% 1-4 years; 15% 5-6 years; 5% technical) with 40% achieving tertiary level qualifications. The marital status of participants included: single (35%), divorced (30%), married (25%) and cohabitating (10%).

Three quarters of the sample were receiving selective serotonin reuptake inhibitors (SSRI) antidepressant medication and 60 percent of participants had a positive family history of a psychological disorder. The sample varied in terms of symptom severity, but all scores were within the clinical ranges. A one-way analysis of variance revealed no statistically significant differences in age ( $F(3, 16) = .23, ns$ ) or gender differences across the four groups ( $\chi^2 [3] = .34, ns$ ). Table 16 displays the

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<sup>33</sup> In the present study, early onset OCD (EOD) was defined by symptom development before the age of 15 years (Hemmings et al., 2004) and development of clinically *significant distress* (Cavallini et al., 2002) not onset of OCD *symptomatology* (Rosario-Campos et al., 2001).



chi-square analysis of the demographic and clinical characteristics of the four subgroups.

#### 6.2.3.2 *Pre-experimental measures*

The four subgroups' were compared on the baseline measures (YBOCS and OBQ) using multivariate analysis (MANOVA). No significant differences emerged between groups on measures of symptom severity ( $F(3, 16) = 1.2, ns$ ) or cognition ( $F(3, 16) = 1.4, ns$ ). Table 17 displays the means, standard deviations, univariate comparisons (ANOVA) for each subgroup on the OBQ measures. The subgroups' patterns of responding were consistent with the previous study.

#### 6.2.3.3 *Main analysis*

##### 6.2.3.3.1 *Manipulation check*

Ratings of anxiety when the experimental task was presented indicate the manipulation had the desired effect in increasing participants' anxiety (see Fig. 7). Mean scores and standard deviations for each task are shown in Appendix S. One-way analysis of variance of anxiety ratings found there was no significant effect of group before presentation of each task, i.e. at baseline in anxiety ( $F(3, 16) = .61, p = .87, ns$ ).

Multivariate analysis of subgroup differences during the experimental phase of each task indicated one significant result in the BAT. The contamination subgroup evidenced significantly higher anxiety during the BAT compared to the aggressive ( $p < .01$ ) and symmetry ( $p < .05$ ) subgroups. No significant group differences in anxiety were found in the five remaining tasks.

**Table 16**  
**Demographic and Clinical Characteristics OCD Subgroups**

	<b>Aggressive (A)</b> (n = 6)	<b>Symmetry (S)</b> (n = 6)	<b>Contamination (C)</b> (n = 4)	<b>Hoarding (H)</b> (n = 4)	$\chi^2$ (3, 16)
<i>Demographic variables</i>					
Age: mean (SD)	46.5 (7.2)	41.8 (17.4)	44.5 (9.5)	47.2 (6.9)	.23 ns
Male: female	1: 5	1: 5	2: 2	0: 4	.34 ns
Married: cohabitating: divorced	3: 1: 2	1: 1: 4	0: 1: 3	1: 0: 3	.25 ns
Secondary: tertiary: trade (years)	4: 2:0	4: 2:0	1: 3:0	2: 1:1	.35 ns
EOD: LOD:	4: 2	2: 4	0: 4	2: 2	.19 ns
Salary: unemployed: home	3: 1:2	3: 1:2	2: 2:0	4: 0:0	.35 ns
<i>Comorbid Axis I disorders (%)</i>					
Panic Disorder	5%	-	-	-	.48 ns
Social Phobia	5%	15%	-	5%	.31 ns
Generalised Anxiety Disorder	15%	-	5%	5%	.26 ns
Acute Stress Disorder	-	-	-	5%	.24 ns
Major Depressive Disorder	10%	-	5%	10%	.31 ns
Major Depressive Episode	5%	-	-	5%	.49 ns
Trichotillomania	-	-	-	5%	.24 ns
<i>Positive family history: <sup>a</sup></i>					
OCD and MDD	5%	10%	5%	5%	.53 ns
Anxiety NOS and MDD	15%	5%	5%	10%	
No history	10%	15%	10%	5%	

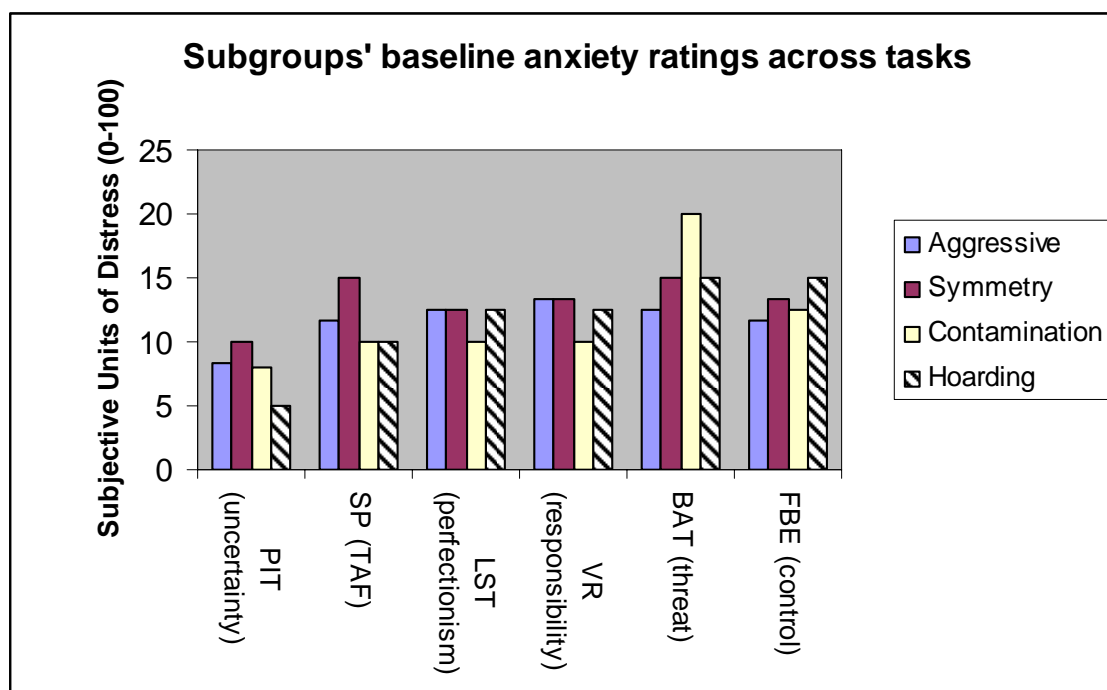
*Note.* EOD =/ early onset OCD; LOD = late onset OCD. YBOCS = Yale Brown Obsessive Compulsive Scale. <sup>a</sup> DSM-IV-TR Axis I disorder; MDD = Major Depressive Disorder; Anxiety NOS = Anxiety not otherwise specified.

**Table 17**

Subgroup Scores on Baseline Measures of Cognition

Variable	Sample (n = 20)		Aggressive (A) (n = 6)		Symmetry (S) (n = 6)		Contamination (C) (n = 4)		Hoarding (H) (n = 4)		<i>F</i> (3, 16)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
YBOCS: T	17.5	(7.2)	13.5	(3.8)	19.7	(7.6)	15.5	(6.6)	22.0	(9.5)	1.5 <i>ns</i>
YBOCS: O	8.8	(3.7)	7.5	(2.2)	9.7	(4.3)	7.5	(3.3)	10.8	(4.5)	.90 <i>ns</i>
YBOCS: C	8.7	(3.9)	6.0	(2.0)	10.0	(4.1)	8.0	(3.3)	11.3	(4.8)	2.1 <i>ns</i>
OBQ 87: U-scale	65.8	(12.0)	61.2	(8.9)	65.3	(13.2)	73.0	(4.9)	66.3	(18.8)	.75 <i>ns</i>
OBQ 87: T-scale	63.6	(22.1)	71.3	(17.1)	54.0	(22.5)	71.3	(19.7)	58.8	(30.8)	.82 <i>ns</i>
OBQ 87: C-scale	77.8	(10.7)	72.8	(13.1)	76.5	(11.4)	85.3	(6.2)	79.5	(6.9)	1.2 <i>ns</i>
OBQ 87: I-scale	54.1	(15.4)	60.8	(16.5)	46.8	(15.6)	54.5	(9.7)	54.5	(18.5)	.81 <i>ns</i>
OBQ 87: R-scale	83.7	(23.0)	94.7	(10.4)	71.8	(28.3)	85.0	(18.2)	83.8	(31.3)	.99 <i>ns</i>
OBQ 87: P-scale	73.9	(27.9)	66.3	(25.6)	90.8	(14.0)	51.0	(39.3)	82.5	(21.9)	2.3 <i>ns</i>
OBQ 87: Total	418.8	(72.3)	427.2	(80.5)	405.3	(76.1)	420.0	(19.3)	425.2	(108)	.09 <i>ns</i>
OBQ 44: RT	80.6	(24.6)	91.5	(14.2)	69.0	(25.8)	84.0	(23.2)	78.0	(36.6)	.86 <i>ns</i>
OBQ 44: PC	80.7	(24.1)	73.2	(25.0)	96.0	(10.5)	62.5	(30.6)	87.3	(30.0)	2.2 <i>ns</i>
OBQ 44: ICT	46.9	(12.9)	51.3	(16.0)	42.0	(11.6)	47.8	(10.9)	46.5	(14.1)	.49 <i>ns</i>
OBQ 44: Total	208.1	(42.3)	216.0	(48.3)	207.0	(41.2)	194.2	(14.7)	211.7	(63.3)	.19 <i>ns</i>

*Note.* YBOCS = Yale Brown Obsessive Compulsive Scale. YBOCS: T = Total score; YBOCS: O = Obsessions score; YBOCS: C = Compulsions score. OBQ = Obsessive Beliefs Questionnaire; OBQ: U-Scale = Intolerance of uncertainty; OBQ: T-Scale = Over-estimation of threat; OBQ: C-Scale = Over-control of thoughts; OBQ: I-Scale = Importance of thoughts; OBQ: R-Scale = Responsibility; OBQ: P-Scale = Perfectionism; OBQ-44: RT-Scale = Responsibility and over-estimate threat; OBQ 44: PC Scale = perfectionism and intolerance of uncertainty; OBQ 44: ICT-Scale = over-importance and over-control of thoughts; \*\*significant at the .01 level (2-tailed).



**Figure 7. Manipulation check**

#### 6.2.3.4 Intolerance of uncertainty (Probability Inference Task; PIT)

A one-way analysis of variance (ANOVA) of task variables revealed no significant group effects in either time taken to complete the task ( $F(3, 16) = 1.2, ns$ ), anxiety during the task ( $F(3, 16) = .59, ns$ ), or post-task questions ( $F(3, 16) = .16, ns$ ). However, there was a non-significant trend for the contamination ( $m = 65$ ) and hoarding subgroups ( $m = 62.5$ ) to report higher anxiety during exposure to the task. This finding is consistent with the psychometric measures (OBQ-87) which showed these two groups to have the highest levels of uncertainty. The task-specific characteristics are shown in Table 18.

**Table 18**

## Intolerance of Uncertainty Task

	<b>Harming</b> ( <i>n</i> = 6)		<b>Symmetry</b> ( <i>n</i> = 6)		<b>Contamination</b> ( <i>n</i> = 4)		<b>Hoarding</b> ( <i>n</i> = 4)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Pre-measure</i>								
OBQ 44- PC Scale	73.2	(25.0)	96.0	(10.5)	62.5	(30.6)	87.3	(30.0)
OBQ 87- U-Scale	61.2	(8.9)	65.3	(13.2)	73.0	(4.9)	66.3	(18.8)
<i>Mean anxiety</i>								
During	50.0	(28.9)	48.3	(23.2)	65.0	(25.2)	62.5	(15.0)
<i>Time to complete</i>								
Task (min/sec)	1.05	(1.1)	1.30	(.66)	.49	(.39)	1.05	(1.2)
<i>Post-Task Questions</i>								
Total	24.8	(9.1)	23.5	(7.4)	26.2	(10.9)	22.2	(7.4)

OBQ (Obsessive Compulsive Beliefs Questionnaire); PC-Scale (perfectionism and intolerance of uncertainty); U-Scale (Intolerance of Uncertainty subscale). Sum of seven questions (refer Appendix N).

#### 6.2.4 Thought-Action Fusion (Sentence Paradigm; SP)

As seen in Table 19, multivariate analysis demonstrated a marginally significant group<sup>34</sup> effect for TAF-total scores ( $F(3, 16) = 2.7, p < .07$ ). Post hoc analyses revealed the hoarding subgroup ( $m = 73$ ) to evidence significantly higher TAF scores than the contamination group ( $m = 37$ ). High levels of anxiety were observed across groups, the exception being the contamination group. Despite this, no significant differences in anxiety were found ( $F(3, 16) = .58, ns$ ). Most participants found the task difficult, particularly TAF-LO with 50 percent of the entire sample ( $n = 20$ ) unable to write the TAF-LO sentence. All participants requested the sentence (paper) be destroyed (e.g., 'did not want to tempt fate').

<sup>34</sup> For the purpose of the current study an alpha of  $p < .1$  will be referred to as marginally significant as it is highly likely these results would be significant if the sample size was increased. Significant results are determined by the traditional alpha cut-off of  $p < .05$ .

#### 6.2.4.1 Thought-Action Fusion-Likelihood-Other

Chi-square tests revealed significant group differences ( $\chi^2 [3, 16] = 8.3, p < .05$ ), with none of the hoarding group able to write the TAF sentence when it relates to others. A one-way ANOVA demonstrated marginally significant group effects for TAF-LO ( $F(3, 16) = 2.7, p < .08$ ). Post hoc analyses showed the aggressive subgroup ( $m = 26; SD = 9$ ) to evidence higher scores compared to the contamination subgroup ( $m = 12; SD = 12$ ). The contamination subgroup also reported 30 percent less anxiety during the TAF-LO task compared to the other subgroups. While not statistically significant, this finding is clinically meaningful as the contamination subgroup reported comparable anxiety ratings on TAF-M and LS. Significant correlation was found between the OBQ subscale and TAF-LO questions ( $r = .85, p < .001$ ).

#### 6.2.4.2 Thought-Action Fusion-Likelihood-Self and Morality

No significance differences emerged between those able to write TAF-LS sentences. A one-way ANOVA demonstrated significant group differences on TAF-LS, ( $F(3, 16) = 3.3, p < .05$ ). Post hoc *Tukey HSD* tests revealed that the symmetry subgroup ( $m = 10; SD = 5$ ) evidenced significantly higher TAF-LS scores compared to the contamination ( $m = 3; SD = 0$ ) subgroup. This trend continued with the hoarding subgroup ( $m = 10; SD = 5$ ) reporting marginally higher ( $F(3, 16) = 3.3, p < .08$ ) scores than the contamination subgroups. A significant correlation was found between the OBQ subscale and TAF-LS questions ( $r = .85, p < .001$ ). No significance differences emerged between those able to write TAF-LS sentence. A one-way ANOVA revealed no significance group differences relating to TAF-M.

**Table 19**

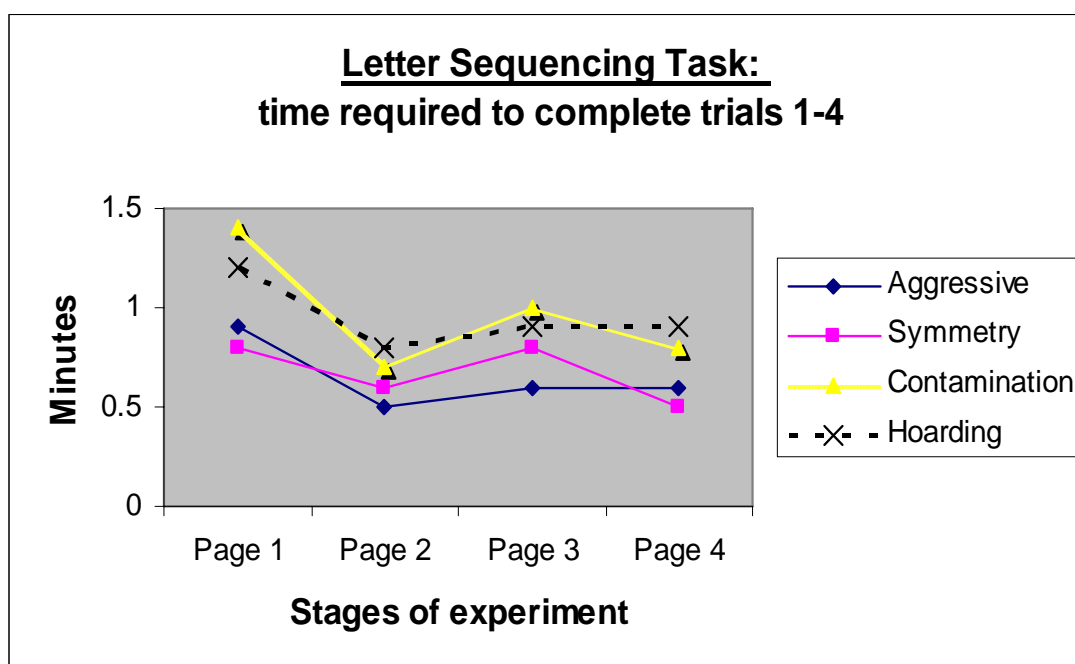
## Thought-Action Fusion Task

Variable	Aggressive (A) (n = 6)		Symmetry (S) (n = 6)		Contamination (C) (n = 4)		Hoarding (H) (n = 4)		F (3, 16)	Contrasts <sup>a</sup>
<i>Complete: not complete</i>										
TAF-LO (%)	33 : 67		83 : 17		75 : 25		0 : 100 *			H > (A, S, C)
TAF-LS (%)	83 : 17		100 : 0		100 : 0		50 : 50			
TAF-M	67 : 33		100 : 0		100 : 0		100 : 0			
<i>Pre-measure</i>										
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
OBQ 44- ICT Scale	51.3	(16.0)	42.0	(11.6)	47.8	(10.9)	46.5	(14.1)	.48	<i>ns</i>
OBQ 87-I-Scale	60.8	(16.5)	46.8	(15.6)	54.5	(9.7)	54.5	(18.5)	.80	<i>ns</i>
<i>Anxiety</i>										
TAF-LO	80.0	(31.6)	81.6	(22.2)	48.7	(34.7)	85.0	(5.7)	1.7	<i>ns</i>
TAF-LS	36.6	(34.4)	38.6	(28.0)	32.5	(26.3)	48.7	(27.8)	.22	<i>ns</i>
TAF-M	39.1	(37.2)	38.3	(20.4)	30.0	(23.1)	32.5	(20.6)	.13	<i>ns</i>
<i>Post-task Questions</i>										
TAF-LO <sup>b</sup>	26.1	(8.7)	23.1	(8.1)	11.5	(11.6)	27.2	(7.6)	2.6 <sup>†</sup>	A > C
TAF-LS <sup>c</sup>	9.0	(4.1)	10.1	(4.9)	3.0	(0.0)	10.2	(3.5)	3.2 *	S > C; H > C <sup>†</sup>
TAF-M <sup>d</sup>	31.1	(11.2)	29.8	(9.3)	22.2	(13.1)	35.0	(4.6)	1.1	<i>ns</i>
TAF Total	66.3	(21.7)	63.1	(16.9)	36.7	(24.2)	72.5	(11.7)	2.7 <sup>†</sup>	H > C

Note. <sup>a</sup> Tukey's HSD,  $p < .05$ ; OBQ (Obsessive Compulsive Beliefs Questionnaire); I-Scale (Importance of Thoughts subscale); OBQ 44- ICT Scale (Importance of Thoughts and Control subscale); TAF-LO (Thought-Action Fusion-Likelihood-Others); TAF-LS (Thought-Action Fusion-Likelihood-Self); TAF-M (Thought-Action Fusion-Morality);<sup>b</sup> Sum of five questions (refer appendix N); <sup>c</sup> Sum of three questions (refer appendix N); <sup>d</sup> Sum of six questions (refer appendix N) <sup>†</sup> trend ( $p < .1$ ); \* Significance level  $p < .05$ .

### 6.2.5 Perfectionism (Letter Sequencing Task; LST)

Task-specific characteristics and anxiety ratings are shown in Table 20. A one-way ANOVA demonstrated significant group differences in anxiety during the task, ( $F(3, 16) = 4.1, p < .05$ ). Tukey's post hoc analysis revealed the symmetry subgroup to exhibit significantly higher anxiety than the aggressive group. There was also a non-significant trend for the hoarding subgroup to demonstrate higher mean anxiety (45) than the contamination (30) and aggressive groups (23). No significant time differences emerged, but as seen in Figure 8 the contamination and hoarding subgroups consistently required more time to complete each trial.



**Figure 8 Subgroups Time Across Trials**

There was a small negative correlation between time and anxiety ( $r = -.11, ns$ ) and the correlation between time and number of correct scores was not significant ( $r = .23 ns$ ). A one-way ANOVA demonstrated significant group differences on overall post-task questions, ( $F(3, 16) = 3.2, p < .05$ ). Post hoc *Tukey HSD* tests revealed that the symmetry subgroup's score was significantly higher than the contamination group overall and on items measuring competitiveness, perfectionism and high standards.



**Table 20**

## Perfectionism Task

Variable	Aggressive (A) ( <i>n</i> = 6)		Symmetry (S) ( <i>n</i> = 6)		Contamination (C) ( <i>n</i> = 4)		Hoarding (H) ( <i>n</i> = 4)		<i>F</i> (3, 16)	Contrasts <sup>a</sup>
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
<i>Pre-measure</i>										
OBQ P-Scale	66.3	(25.6)	90.8	(14.0)	51.0	(39.3)	82.5	(21.9)	2.3	<i>ns</i>
OBQ 87-PC-Scale	73.2	(25.0)	96.0	(10.5)	62.5	(30.6)	87.3	(30.0)	2.2	<i>ns</i>
<i>Anxiety</i>										
During	22.5	(10.8)	60.0	(21.9)	30.0	(18.2)	45.0	(26.4)	4.1*	S > A
<i>Time</i>										
Total	2.56	(1.1)	2.56	(.58)	4.24	(1.55)	4.12	(1.50)	1.7	<i>ns</i>
Correct (%)	56/62	(3.4)	55/62	(4.3)	58/62	(1.3)	58/62	(2.5)	.83	<i>ns</i>
<i>Post-task questions</i>										
(1) Importance	6	(.9)	6.3	(.5)	6.0	(.8)	6.0	(.8)	.20	<i>ns</i>
(2) Competition	5	(2.4)	5	(1.8)	1.3	(1.3)	2.8	(2.2)	3.4 *	S > C
(3) Mistakes	4.3	(2.0)	6.2	(.98)	3.0	(2.3)	4.8	(2.6)	2.2	<i>ns</i>
(4) Time	4.7	(2.6)	6.2	(.75)	4.8	(2.6)	7.0	(0.0)	1.7	<i>ns</i>
(5) Confidence	3.3	(2.3)	3.5	(1.8)	4.5	(1.9)	1.8	(.50)	1.6	<i>ns</i>
(6) Perfectionism	2.3	(2.0)	5.5	(1.9)	1.3	(.50)	2.5	(1.9)	5.8 **	S > A, C <sup>†</sup>
(7) Catastrophe	2.2	(1.9)	5.0	(2.1)	2.3	(1.9)	2.5	(2.4)	2.4	<i>ns</i>
(8) Standards	4.7	(2.3)	6.5	(.55)	3.3	(2.6)	6.0	(1.2)	3.1 *	S > C
<b>Total score</b>	<b>32.1</b>	<b>(12.4)</b>	<b>44.1</b>	<b>(4.6)</b>	<b>26.2</b>	<b>(8.8)</b>	<b>33.2</b>	<b>(9.7)</b>	<b>3.2 *</b>	<b>S &gt; C</b>

*Note.* <sup>a</sup> Tukey's HSD, *p* < .05; <sup>†</sup> trend (*p* < .1); OBQ (Obsessive Compulsive Beliefs Questionnaire); P-Scale (Perfectionism subscale); PC Scale = perfectionism and intolerance of uncertainty (1) It is important to me that I complete this task to the best of my abilities; (2) Being the highest scoring participant on this task is very important to me; (3) It doesn't matter what the task is, it is important to make no mistakes; (4) I would have liked to have more time to complete this task; (5) I will be surprised if I failed this task; (6) I will be upset if I made even one mistake on this task; (7) One mistake is as bad as failing completely; (8) High standards of achievement are important to me; \* Significance level *p* < .05.

### 6.2.5.1 Inflated Responsibility (Verbal Recordings; VR)

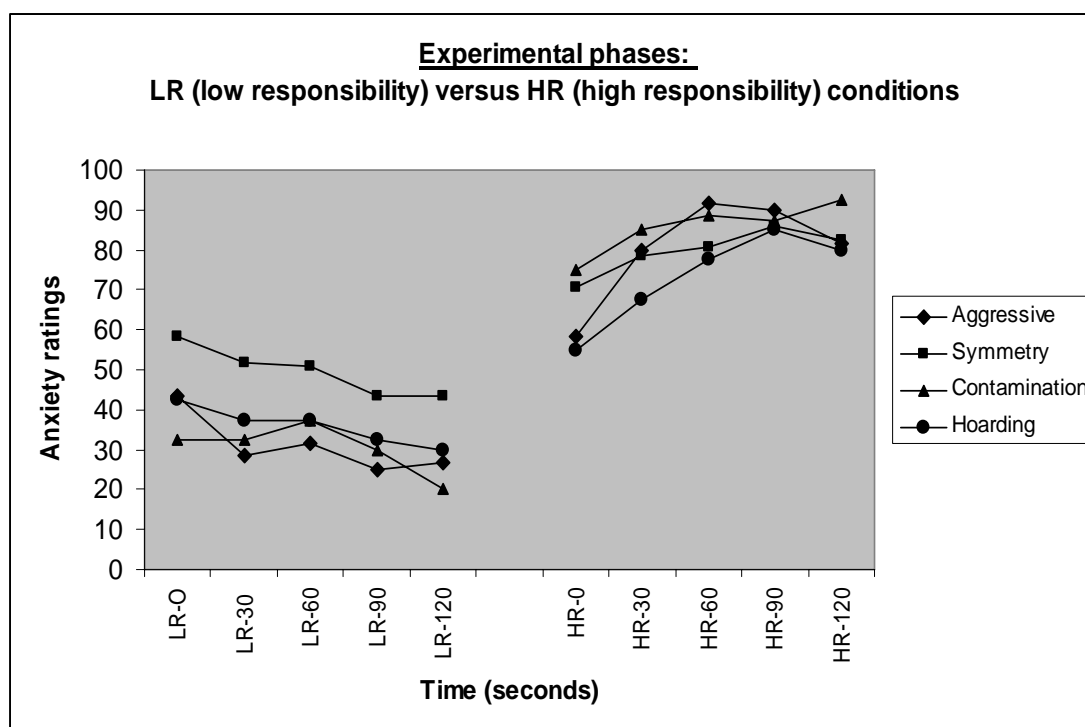
Table 21 displays the task characteristics and anxiety ratings across responsibility conditions. A one-way ANOVA of anxiety ratings (SUD) revealed marginally significant group differences in during the task, ( $F(3, 16) = .29, p < .07$ ). Tukey's post hoc analysis showed the symmetry subgroup to be significantly more anxious in the final phase (120 seconds) of the low responsibility (LR) condition than the contamination subgroup. As seen in Figure 9, there was a general trend for the symmetry subgroup to report higher anxiety during the LR condition. Contrary to expectation, no statistically significant group differences were found in the high responsibility (HR) condition, ( $F(3, 16) = 1.1, ns$ ) or post-task questions, ( $F(3, 16) = .29, ns$ ).

**Table 21**

#### Inflated Responsibility Task

	<b>Aggressive</b>		<b>Symmetry</b>		<b>Contamination</b>		<b>Hoarding</b>	
	<i>(n = 6)</i>		<i>(n = 6)</i>		<i>(n = 4)</i>		<i>(n = 4)</i>	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Pre-measure</i>								
OBQ R-Scale	94.7	(10.4)	71.8	(28.3)	85.0	(18.2)	83.8	(31.3)
OBQ-RT	91.5	(14.2)	69.0	(25.8)	84.0	(23.2)	78.0	(36.6)
<i>Low Responsibility: (SUD 0 - 100)</i>								
Baseline	43.3	(38.2)	58.3	(19.4)	32.5	(35.9)	42.5	(27.5)
After 30 sec	28.3	(17.2)	51.6	(9.8)	32.5	(22.1)	37.5	(20.6)
After 60 sec	31.6	(18.3)	50.8	(10.2)	37.5	(20.6)	37.5	(12.5)
After 90 sec	25.0	(15.0)	43.3	(10.3)	30.0	(14.1)	32.5	(12.5)
After 120 sec	26.6	(17.5)	43.3	(10.3)	20.0	(14.1)	30.0	(8.1)
<i>High Responsibility: (SUD 0 - 100)</i>								
Baseline	58.3	(20.4)	70.8	(9.1)	75.0	(31.0)	55.0	(31.0)
After 30 sec	80.0	(6.3)	78.3	(7.5)	85.0	(19.1)	67.5	(23.6)
After 60 sec	91.6	(7.5)	80.8	(8.0)	88.7	(13.1)	77.5	(17.0)
After 90 sec	90.0	(20.0)	85.8	(8.0)	87.5	(9.5)	85.0	(17.3)
After 120 sec	81.6	(30.6)	82.5	(10.8)	92.5	(9.5)	80.0	(14.1)
<i>Post-task questions</i>								
(8) Total score	43.1	(5.9)	42.1	(6.2)	44.0	(4.6)	39.0	(14.7)

OBQ (Obsessive Compulsive Beliefs Questionnaire); R-Scale (Inflated Responsibility subscale). SUD (Subjective units of distress)



**Figure 9: Anxiety Ratings during the HR and LR Conditions.**

#### 6.2.5.2 Threat Estimation (Behavioural Avoidance Test; BAT)

Task-specific characteristics are shown in Table 22. Participants' baseline levels of anxiety were measured prior to being informed they were to complete the BAT. A one-way ANOVA demonstrated a significant main effect of Group by pre-BAT anxiety, ( $F(3, 16) = 3.3, p < .05$ ). *Tukey's* post hoc analysis revealed significantly higher anxiety in the contamination subgroup compared to the aggressive subgroup in the imaginary scenario. The second variable included in pre-BAT analysis was participants' willingness to approach and touch the outside of the contaminated stimulus. While the contamination subgroup showed the most reluctance, no significant differences emerged between those able to approach the contaminated stimulus ( $\chi^2(3, 16) = 7.1, ns$ ). The final variable assessed in pre-BAT

analysis was participant's willingness to place their hands in the pseudo contaminant (maximum 2 minutes). Univariate analysis of variance revealed a significant group effect ( $F(3, 16) = 3.4, p < .05$ ), with post hoc analysis showing the symmetry group to have the highest rate of compliance (83%), and the contamination group the lowest (no compliance).

During the experimental condition, exposure to the actual contaminant (rubbish bin) led to a significant upsurge of anxiety, ( $F(3, 16) = 3.6, p < .05$ ). Post hoc analysis showed the contamination subgroup to experience significantly more anxiety compared to the aggressive group. There were significant group differences in participants' willingness to submerge their hands in the rubbish bin, ( $F(3, 16) = 3.4, p < .05$ ). Post hoc analysis revealed the symmetry subgroup to have the highest rate of compliance with the request, with the contamination subgroup the lowest compliance.

Multivariate analysis of variance found a significant group effect for post-task questions ( $F(3, 16) = 3.0, p < .01$ ) with *Tukey's* post hoc analysis demonstrating a clear difference between the participants in the contamination group compared to the other subgroups. A series of one-way ANOVA's revealed significant Group by Question interactions ( $p < .01$ ) relating to all five questions (refer Table 7). There was also a positive correlation between question (total) by anxiety ( $r = .79, p < .01$ ) meaning that high anxiety was associated with high overall scorers.

Combined analysis of the total score demonstrated a significant group effect ( $F(3, 16) = 9.3, p < .001$ ). Post hoc analysis demonstrated that the contamination subgroup evidenced significantly higher scores compared to the other three subgroups. There was a non-significant trend for the aggressive subgroup to be higher than the symmetry subgroup, and the hoarding subgroup to have the lowest scores, particularly items measuring threat. This finding is also consistent with the subgroups' responses to the OBQ-87 prior to the experiment.

**Table 22**

## Over-estimation of Threat Task (BAT)

Variable	Aggressive (A) ( <i>n</i> = 6)		Symmetry (S) ( <i>n</i> = 6)		Contamination (C) ( <i>n</i> = 4)		Hoarding (H) ( <i>n</i> = 4)		<i>F</i> (3, 16)	Contrasts <sup>a</sup>	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
<i>Pre-measure</i>											
OBQ T-Scale	71.3	(17.1)	54.0	(22.5)	71.3	(19.7)	58.8	(30.8)	.82	<i>ns</i>	
OBQ-RT	91.5	(14.2)	69.0	(25.8)	84.0	(23.2)	78.0	(36.6)	.85	<i>ns</i>	
<i>Pseudo BAT</i> <sup>a</sup>											
(i) Anxiety	35.0	(35.6)	45.0	(32.0)	90.0	(11.5)	50.0	(16.3)	3.2	*	C > A
(ii) No touch: touch	1: 5		1: 5		3: 1		0: 4		7.1,	( <i>p</i> < .06)	
<i>BAT</i> <sup>b</sup>											
Anxiety	35.8	(35.2)	50.0	(37.4)	97.5	(5.0)	50.0	(20.0)	3.5	*	C > A
Insitu: imagined	5: 1		5: 1		1: 3		4: 0		7.1,	( <i>p</i> < .06)	
Insitu (min/sec)	1.36	(.99)	1.67	(.82)	.13	(.25)	1.53	(.95)	3.0	*	C < S
Washing (mins) <sup>c</sup>	.19	(.14)	.27	.12	<i>unable</i>		.22	.11	4.6	**	C < S
<i>Post task questions</i>											
(1) Illness	18.3	(31.2)	16.8	(24.0)	92.5	(9.5)	22.5	(22.1)	9.7	***	C > A, S, H
(2) Life	21.6	(39.2)	21.0	(30.5)	87.5	(15.0)	0	(0.0)	7.2	**	C > A, S, H
(3) Bacteria	25.8	(38.2)	16.8	(19.4)	90.0	(11.5)	10	(14.1)	8.8	***	C > A, S, H
(4) Estimate	21.6	(39.2)	16.8	(22.3)	85.0	(19.1)	7.5	(9.5)	7.1	**	C > A, S, H
(5) Threat	20.8	(39.0)	13.5	(17.3)	95.0	(10.0)	5.0	(5.7)	12.0	***	C > A, S, H
<b>Total</b>	<b>21.6</b>	<b>(36.9)</b>	<b>17.0</b>	<b>(22.3)</b>	<b>90.0</b>	<b>(11.6)</b>	<b>9.0</b>	<b>(10.1)</b>	<b>9.3</b>	<b>***</b>	<b>C &gt; A, S, H</b>

*Note.* a Tukey's HSD, *p* < .05; OBQ (Obsessive Compulsive Beliefs Questionnaire); T-Scale (Over-estimation of threat subscale); <sup>a</sup> Participants were unaware they were required to place their hands in the contaminant. (i) How anxious would you feel if your hands were placed in the container; (ii) I'd like you to move the chair as close to the rubbish bin as you are comfortable with (cm). BAT (Behavioural Avoidance Test); <sup>ii</sup> Participants instructed to place hands in contaminant. (1) How certain are you of becoming ill or catching a disease from this experiment; (2) the illness will be severe and life threatening; (3) Bacteria will get through my skin and infect my blood stream; (4) Even though I know this experiment is designed to be safe, I could get ill from this task; (5) I will suffer as a result of doing this task; c Participants were timed while they washed their hands. \* Significance level *p* < .05; \*\* Significance level *p* < .01. \*\*\* Significance level *p* < .001

### 6.2.5.3 Controllability of Thoughts (*Focussed Breathing Exercise; FBE*)

Task-specific characteristics are shown in Table 23. Multivariate analysis of variance of task variables found there was no significant group effect in anxiety ratings pre-task ( $F(3, 16) = 1.5, ns$ ), anxiety during the task ( $F(3, 16) = .89, ns$ ), or post-task ( $F(3, 16) = 1.3, ns$ ). No significant group differences were found for post-task questions ( $F(3, 16) = 1.1, ns$ ). However, clinically significant group differences were obtained for both the controllability of intrusive thoughts and anxiety in the post task conditions (distraction phase).

As seen in Figure 10a, exposure to the intrusive thought led to an increase in anxiety ( $m = 56.2$ ), particularly in the contamination subgroup ( $SUD = 72.5$ ). Following exposure, most groups' anxiety decreased to moderate levels ( $SUD < 50$ ) within 4 time trials (60 seconds). The exception to this was the hoarding subgroup who maintained clinically significant levels of anxiety ( $SUD > 60$ ) across all time trials. This finding was interesting as the hoarding subgroup was the only one to exhibit a pattern of increasing anxiety over time trials, as opposed to the expected decreases over time. This pattern was also found in the controllability of thoughts, as the hoarding subgroup required more time to settle and reported less control (see Figure 4a).

The analyses of results showed that during the post-exposure phase, all subgroups experienced great difficulty controlling their intrusive thoughts in the first two trials (40 seconds). As seen in Figure 10b, after the first two trials most subgroups ( $n = 3$ ) were able to control the intrusive thoughts and focus on the task (e.g., breathing). Consistent with the previous section, the hoarding subgroup demonstrated the greatest degree of difficulty controlling their intrusive thoughts.

**Table 23**

Controllability of Thoughts Task (SUD Ratings)

	<b>Aggressive</b> ( <i>n</i> = 6)		<b>Symmetry</b> ( <i>n</i> = 6)		<b>Contamination</b> ( <i>n</i> = 4)		<b>Hoarding</b> ( <i>n</i> = 4)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Pre-measure</i>								
OBQ C-Scale	72.8	(13.1)	76.5	(11.4)	85.3	(6.2)	79.5	(6.9)
OBQ PC-Scale	73.2	(25.0)	96.0	(10.5)	62.5	(30.6)	87.3	(30.0)
<i>Relaxation task: (SUD ratings 0-100)</i>								
Baseline	15.0	(13.7)	10.0	(6.3)	16.2	(9.4)	7.5	(5.0)
After 20 sec	13.3	(15.0)	30.8	(21.0)	37.5	(22.1)	15.0	(17.3)
After 40 sec	13.3	(15.0)	32.5	(22.3)	35.0	(23.8)	11.2	(13.1)
After 60 sec	11.6	(13.2)	33.0	(22.5)	32.5	(26.3)	17.5	(17.0)
After 80 sec	10.0	(12.6)	31.6	(15.7)	35.0	(19.1)	17.0	(17.3)
After 100 sec	11.6	(14.7)	29.1	(16.2)	31.2	(16.5)	11.2	(13.1)
<i>OCD Exercise: (SUD ratings 0-100)</i>								
After 60 sec	78.3	(16.0)	70.0	(10.9)	77.5	(17.0)	62.5	(23.6)
<i>Anxiety post-task: (SUD ratings 0-100)</i>								
Baseline	46.6	(23.3)	60.8	(22.8)	72.5	(9.5)	47.5	(23.6)
After 20 sec	40.0	(22.8)	44.1	(30.4)	71.2	(14.3)	56.2	(24.9)
After 40 sec	18.3	(17.2)	40.0	(29.6)	55.0	(30.0)	52.5	(25.0)
After 60 sec	18.3	(13.2)	36.6	(32.0)	50.0	(29.4)	57.5	(26.3)
After 80 sec	14.1	(14.2)	30.0	(31.6)	50.0	(29.4)	55.0	(27.3)
After 100 sec	14.1	(11.1)	27.5	(30.6)	47.5	(29.8)	55.0	(30.0)
<i>Post-task questions</i>								
<b>Total score</b>	<b>38.5</b>	<b>(9.1)</b>	<b>36.1</b>	<b>(7.4)</b>	<b>37.7</b>	<b>(5.7)</b>	<b>33.7</b>	<b>(2.2)</b>

OBQ (Obsessive Compulsive Beliefs Questionnaire); C-Scale (Controllability of Thoughts subscale); FBE (Focussed Breathing Exercise); DT (Distraction Task);

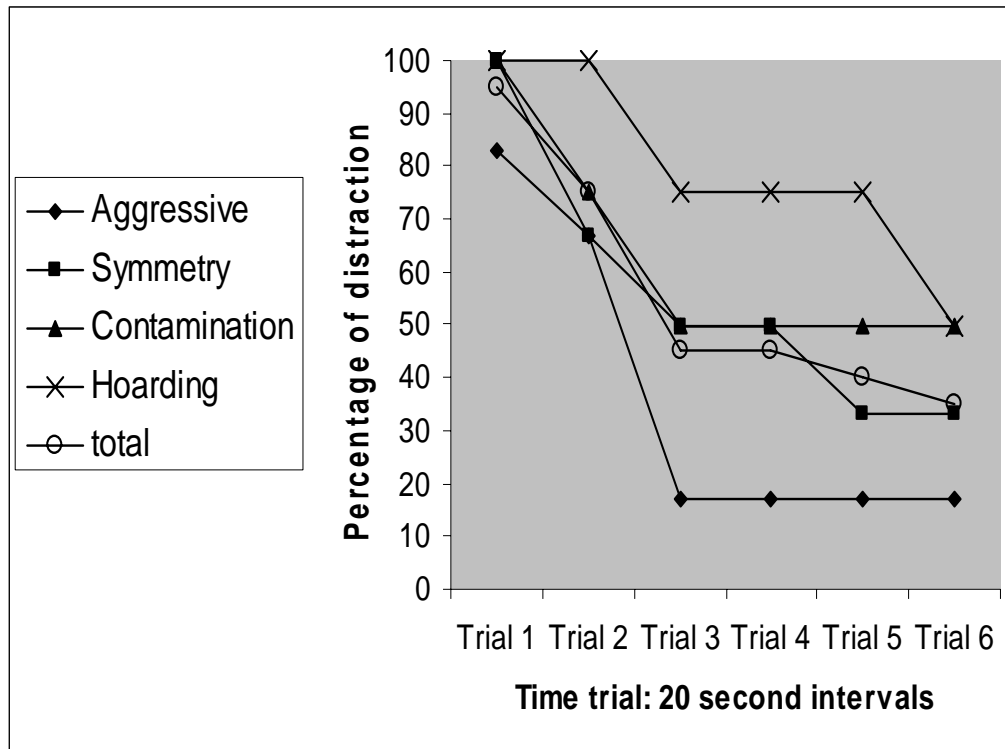


Figure 10b: Subgroups' Percentage of Control Post Provocation

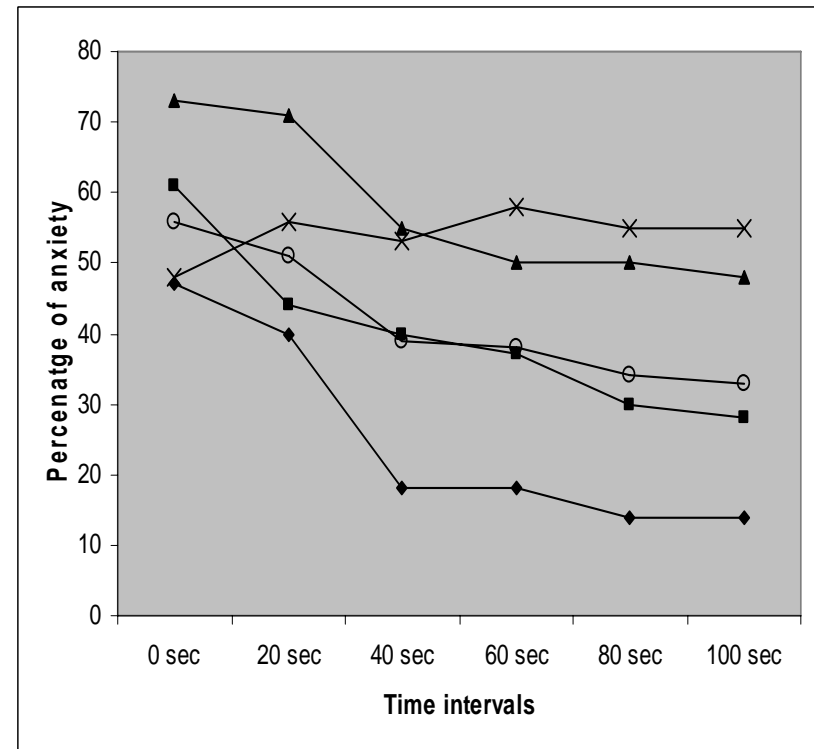


Figure 10a: Subgroups' Anxiety Levels during the Distractibility Task



### 6.2.6 Discussion

The purpose of this study was to test the strength of association between some symptom presentations of OCD and certain cognitive beliefs by manipulating these beliefs across the experimental groups. The results of the study are mixed, with some support found for the relationship between cognitive belief and OCD symptom-based subtype. The study also supports the efficacy of experimental paradigms in detecting the OBQ beliefs and appraisals over self-report measures. Contrary to previous findings on the OBQ and III, the results of the current study found significant group differences on three (TAF, perfectionism, and over-estimation of threat) of the six tasks. The present study does provide evidence that some obsessional beliefs are to some degree associated with particular symptom subtypes. These findings are discussed in the subsequent sections.

#### *Intolerance of uncertainty*

The current study did not support earlier research (e.g., Salkovskis & Forrester, 2002) showing intolerance of uncertainty to be an important construct in OCD. In contrast to the second study where the contamination subgroup reported significantly stronger beliefs on the intolerance of uncertainty subscale, the current study found no significant group differences. While the lack of statistical significance was disappointing, there were some interesting clinical observations. The contamination subgroup evidenced the highest mean total score on post-task questions and highest anxiety during task exposure. Participants in this subgroup also tended to become more anxious (SUD >80) during the probability interference task.

Post-task, many participants reported 'guessing' the number of marbles to avoid feelings of anxiety associated with uncertainty about their decision. The finding that some participants guessed the number of marbles in the bag is consistent with

research showing intolerance of uncertainty to be associated with hasty decision making (Furnham, 1994; Rassin & Muris, 2005). The effect (tendency to hurry their decisions) was also seen in the perfectionism task where participants quickly scanned each page to reach the end of the booklet as quickly as possible.

Also consistent with the second study was the finding of high anxiety during task exposure for the hoarding subgroup. This finding makes intuitive sense as both the symmetry and hoarding subgroups appear to be motivated by a need for exactness. This finding is consistent with Tolin et al. (2003) who found that in addition to checking rituals, repeating rituals were associated with intolerance of uncertainty. These researchers hypothesized that individuals with checking concerns are motivated by urges other than harm, including the impulse to do repeat the action(s) until it is performed “just right” (see Summerfeldt, 2004 for review) as well as an inability to tolerate uncertainty leading to repetition of the action (Tolin et al., 2003). Further, Wu and Watson (2005) argue that the emphasis on avoiding making a mistake or committing errors might link compulsive checkers and hoarders through strong feeling of doubt and resultant indecisiveness.

However, it was also unclear whether our experiment was tapping into intolerance of uncertainty beliefs or a mistrust of memory, as many participants who performed poorly on this task described a pathological doubting of their memory. For example, Mark, a young participant with aggressive obsessions, described how he used to compulsively collect newspapers in order to remind himself that he was not in the area that a particular crime or accident occurred. Grace, an elderly participant described having to blink six times each time she checked an object in the house “to be sure that she would remember checking”. Olivia, another participant with

symmetry concerns reported that she repetitively writes sentences to herself, like “the house is locked” (20 times), because she “needs to know she locked the house”.

While it is recognised that an inability to tolerate uncertainty could explain these behaviours, so too could a mistrust of memory, or deficits in executive functioning. It will be important for future studies to include neuropsychological tests like the Wisconsin Card Sorting Tests (WCST) or Category B of the Trail Making Test (TMT; see reviews by Greisberg & McKay, 2003; Savage, 1998) to better isolate whether these subgroups demonstrate neuropsychological difficulties outside of these belief domains. Additionally, as this is the first time intolerance of uncertainty beliefs have been manipulated in OCD subtypes, further replication studies are required to validate these findings.

#### *Thought-Action Fusion*

This thesis demonstrated high levels of TAF beliefs across all subgroups, particularly in the miscellaneous groups. The current study found comparable findings, with the exception being the contamination and hoarding subgroups. The contamination group showed significantly lower scores on TAF statements and evidenced less anxiety during task exposure. In an interesting contrast, the hoarding subgroup, who did not strongly endorse the TAF items (OBQ measure) in study two, demonstrated the highest TAF total beliefs and appeared to have the most difficulty with this task (e.g., unable to complete TAF-sentences). This finding supports previous research by Rassin et al. (2001a) showing TAF to be a highly accessible cognitive bias, especially under experimental conditions.

TAF appeared to be particularly tied to superstitious beliefs or magical thinking. For example, in the task which required participants write a sentence about a loved one being in a car accident, the vast majority of participants refused to

participate because “it tempted fate” or “made it more likely to happen”. This type of magical thinking was also seen in certain compulsions. For example, one individual said that he could not touch red because it was like blood, green was unlucky and white meant death or bodily fluids. Marie, a participant with high TAF levels stated that if she sees something red or white (e.g. substance, clothing), she has to cover it with sellotape because these colours represent blood and bodily fluids. She stated that covering these colours meant she could not be contaminated.

Other participants with high levels of TAF described ordering compulsions. Denis stated that he could not leave the house until all his appliances were facing north. He reported that if they were not facing north, something bad would happen. Julie, a participant with predominantly religious obsessions, stated that if she did not immediately say “no” (aloud) when she experienced an immoral thought, she would be punished by God. Patrick, a participant with predominantly religious obsessions, stated that when he experienced obsessions against God, he felt compelled to punish himself for occurrence of the thought by standing on one leg until he could no longer stand the pain. Other times, Patrick would feel compelled to redeem himself in the eyes of the Lord by holding his breath, tensing his muscle’s or standing on cracks. The reports are again very reminiscent of Rachman (1997) contention that TAF plays a central role in these types of obsessions because these obsessions reflect important themes of all moral systems.

The majority of cases that involved high TAF beliefs or magical thinking were miscellaneous obsessions and compulsions like swallowing, spitting, certain words and/or clapping. In more complex cases, body posturing was employed as seen in the following written excerpt “If I don’t think, or do things a certain way, my whole life from now will be wrong. My body will feel “wrong”, as though it (body) has been put

together wrongly. I control my thoughts by holding my body in a certain way (stand on toes for a certain amount of time). By holding my body in a certain way, I hold the thoughts in place". In other cases, the strong presence of magical thinking or rituals reflected schizotypal traits. John, a participant concerned with being poisoned by mercury, began to think he could see this chemical everywhere (e.g. glasses, plates). He began wearing gloves everywhere and was unable to use any appliances because he feared he would poison himself. This fear became so bad he was hospitalised. The above mentioned examples support previous research of schizotypal traits in OCD (Lee, Cogle & Telch, 2003 *in press*; Roth & Baribeau, 2000) or a schizotypy subtype of OCD (Sobin, Blundell, Weiller, Gavignon, Haiman & Karayiorgou, 2000) in atypical subtypes (e.g., religious and somatic obsessions).

The results of this task support the role of TAF in some types of OCD, but not contamination obsessions. However, this finding may not apply to all cases as several participants within the contamination subgroup evidenced high levels of TAF. In these incidences, the contamination obsessions and compulsions tended to be quite unusual and evidence strong magical thinking. For example, Noelle was given \$5000 US by her ex-husband following dissolution of her marriage. She hid this money in a large book at her parent's house. After some time, she went back to her parents to retrieve the money. However, over the time the book and the money had gathered dust. As a result, Noelle burnt the \$5000 in her parents log burner as it was contaminated.

On questioning, Noelle reported that she did not have a choice because anything she bought with the money would be contaminated 'by-proxy'. Noelle could not give the money away for the same reasons. She stated that 'dust' had the same feeling associated with it as human faeces and the most efficient method for removing

contamination is fire. Noelle also admitted to burning her clothes and jewellery, and at the time of assessment had reduced her living environment to four items. Lynden was another participant who demonstrated contamination obsessions with high levels of TAF. Lynden feared that he would be contaminated by bald men, and stated that if he saw a bald man, he had to immediately clean himself otherwise he would 'be contaminated with baldness'. At one stage, Lynden's fear of bald men became so severe he barricaded himself in his room for several weeks. As seen, the common denominator underlying cases with high TAF appears to be a strong presence of magical thinking and superstition.

### *Perfectionism*

The current study supports research (Slade & Owens, 1998; Hewitt & Flett, 1991; Frost & Steketee, 1993; Zohar, Goldman, Calamary & Mashiah, 2005) showing a link between perfectionism (e.g. concern over mistakes, doubts about actions, parental expectations and criticism, and socially prescribed perfectionism) and OCD. The OBQ total scores assessing perfectionism were congruent with responses on the experimental task assessing the same construct. In the second study, the OBQ perfectionism subscale was marginally predictive of symmetry concerns. The current study supports this finding as the symmetry subgroup was significantly differentiated on anxiety and post-task measures. The current study extends the previous findings and is consistent with research (Frost & Gross, 1993; Frost et al., 2002; De Silva & Rachman, 1998) showing a strong relationship between perfectionism and hoarding subgroup membership.

Within the sample, there appeared to be two distinct and contrasting approaches to completing this task. The first type, as discussed in the intolerance of uncertainty section, tends to guess the number of 'target letters' per page. This action

is performed in an attempt to complete the cancellation test (four page booklet with each page displaying a new target letter) as quickly as possible, because each page appeared to increase their anxiety. The second type is consistent with Rhéaume et al. (2002) research showing those high in perfectionism to take longer to mark target letters. Rhéaume et al. reported that some participants would slow down in order to maximize their chances of making no errors on the task and tended to be less effective during this task because of a search for absolute perfection.

Those with predominantly symmetry and aggressive concerns tended to characterise the former (rapid) group. Individuals in the contamination and hoarding subgroups tended to be in the latter (slow) group. Participants in the second group were perseverative and consistently required more time to complete the task. Often these participants would become so fixated on *following the instructions* (e.g., ‘left to right, one line after the other) that they forgot about identifying the target letters. These individuals almost appeared to be just moving their finger across the line and displayed obsessional slowness. When asked about this behaviour, the most common explanation was that it was “extremely important to follow the instructions” and they were “worried they would do it incorrectly and invalidate the results and ruin the test”. However, given that the symmetry subgroup recorded the highest scores and the quickest time, whereas the hoarding subgroup reported the slowest time, but the second highest score, future research is needed to elucidate whether this pattern of responding is important to the understanding perfectionism in OCD.

*Perfectionism, symmetry and “not just right experiences” (NJREs)*

Recent investigations have focussed on what is termed “not just right experiences” (NJRE; Coles et al., 2003; Leckman, Walker, Goodman, Paul & Cohen, 1995). The NJREs refer to compulsions aimed at reducing sensations of things not

being just right, feelings of incompleteness, or feelings of imperfection (e.g., compulsively ordering a bookshelf if he/she feels right; or having all belonging surrounding them to 'feel right'). NJREs have been frequently discussed in relation to OCD (Leckman, Walker, Goodman, Pauls, & Cohen, 1994; Rasmussen & Eisen, 1992). Frost et al. (2002) suggested that these NJREs may constitute a type of 'sensory perfectionism' whereby ordering, symmetry and arranging compulsions are attempts to somehow 'perfect' one's experiences.

In Cole et al.'s (2005) study, 50 undergraduate students participated individually in the laboratory experiment. Each participant was brought into a small office in which some parts of the room were arranged to be unlikely to elicit NJREs whereas other parts were arranged to be more likely to elicit NJREs. The experimental stimuli were a dishevelled bookshelf, a neatly arranged bookshelf, a dirty sink, a chair missing one armrest, a dishevelled and dirty area rug, a desk with one drawer slightly ajar and another drawer missing the handle, a corkboard with a crooked poster and disarrayed paperclips tacked onto it, and a plain paper recycle bin with small pieces of paper on the floor around it and a plastic bag inside.

Participants were asked to focus their attention on each of the eight areas of the room and to record (1) their discomfort (rated from 0 to 100, with higher ratings indicating more discomfort), (2) the extent to which they wanted to do something about that part of the room, like change, rearrange, or move things (from 0 to 100, with higher ratings indicating stronger urges), and (3) whether they were having thoughts that something bad might happen (i.e., a feared consequences, as described above). The order of presentation of the eight stimuli was counterbalanced across participants. After responding to all eight experimental stimuli, each participant completed the battery of self-report measures. The results of this study showed that



NJREs may represent a specific form of perfectionism that has a unique relationship to OC features. It is possible that the *sensory* or *affective* NJRE associated with both subtypes are the mediating variable in perfectionist beliefs.

Clinical observations during the current study supported the relationship between NJRE's, symmetry and perfectionist beliefs. For example, several participants reported that unless they entered a building with their left side they would experience anxiety with an estimated SUD of 100. Many of these participants were unable to articulate the feared consequences of this obsession, except to say that "it just doesn't feel right". Pastel, an elderly participant with predominantly symmetry concerns, described maintaining an 'inner equilibrium' in her brain through the strict ordering of her environment. Pastel stated that disruption to this environment resulted in her feeling 'that both sides of her brain were unbalanced'. A different participant, Henry, stated that his preoccupation with 'doing things correctly' meant that everything, even doing the dishes, had to be repeated eight times or "until, it felt right". Sonja, a young participant, was preoccupied with preventing "her left foot from touching the floor when she was sitting". If her foot did touch the floor, her anxiety would exceed a SUD of 100 and she would feel compelled to perform posturing compulsions. She could not explain why it was important that her left foot did not touch the ground, except to say "it did not feel right".

NJRE's and perfectionism beliefs were also evident in many compulsions. These compulsions tended to be atypical and included touching, tapping, rubbing and posturing compulsions which had to be performed a certain number of times<sup>35</sup> until it "felt right". Doreen, a middle aged woman stated that she would check the door knob

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<sup>35</sup> This would usually occur up to a predetermined odd or even number. The compulsions tended to be in sets of 3, 5 or 9 with a delay of in-between each set.

five times, but if it did not feel right, she would continue to the next odd number, but never an even number. This same individual also discussed having to always leave or enter a room with her left foot. If when walking through the door she did not feel right, she would rock back and forth until she did. Another participant, Francis described a similar problem but reported that he always had to 'turn right'. When asked what would happen if he did not turn right, Francis simply stated that he "would not feel balanced".

As seen, the NJREs and symmetry concerns appear particularly related when discussing the "ordering of the body and mind". A participant called 'Scott' provided the following description "My life is set into boundaries. I have to leave my home with my left foot, leave work with my left foot.....everything also has to be in even numbers. If I am about to go through a door I check my watch. If it is 12.47 I have to wait until 12.48. If I am at the supermarket and the cost is \$37.30, I will have to buy something to increase the cost to \$38.00". Like the above mentioned participants, Scott appeared less concerned with the "what ifs" or inflated responsibility beliefs about harm befalling others, and more concerned with a need for exactness. It would be extremely beneficial for future research to examine the role of NJRE, symmetry and perfectionism in OCD.

### *Responsibility*

The aggressive and contamination subgroups demonstrated the highest mean scores on measures of responsibility (OBQ-87; OBQ-44) in the second study. The current study supports research showing a non-specific relationship between responsibility and OCD symptomatology (Tolin et al., 2003, 2005) as no significant differences emerged between groups. The symmetry subgroup reported higher levels of anxiety in the LR condition, but during the HR condition, the groups' anxiety

levels were comparable across time trials. However, the current sample may not be representative as some participants within the 'aggressive' or 'contamination' subgroups reported obsessions about their possessions or environments being harmed or contaminated, rather than themselves. These participants did experience an inflated sense of responsibility, but only for their possessions, outside of those with predominantly hoarding concerns.

For example, a participant called Aaron stated that his most feared obsession was that he would damage his furniture and clothes by rubbing petrol or urinating on them. Interestingly, his twin sister Tracey, also involved in the study, described a preoccupation with protecting her possessions. She stated that her worst obsession was that her possessions (DVD player, sofa) would be damaged by a burglar. This participant stated that if she had a choice, she would prefer to be physically hurt, rather than someone "doing things to her stuff". This participant used to spend up to three hours setting traps and arranging objects in her house so she would know if someone had entered her house. Aaron and Tracey equally reported an excessive amount of responsibility for the protection of these objects, which as in research by Frost and Hartl (1996), appeared to have obtained human-like status. This finding may explain why previous research has found a correlation between aggressive, contamination and responsibility beliefs, but the current study did not. Clearly, further research between the symbiosis of responsibility and variants of compulsive behaviour is required.

#### *Over-estimation of threat*

The results of the BAT (over-estimation of threat) demonstrated significant group differences between participants in the contamination group compared to the other subgroups on most task variables. This finding was expected and is consistent

with the results obtained in the second study regarding the contamination subgroup, but not the aggressive subgroup. While the OBQ scores in the current study show both contamination and aggressive subgroups to have high levels on the threat subscale, the task variables clearly show the contamination subgroup to report highest levels. This finding may relate to the content of the task which did tap into contamination concerns.

#### *Importance of controlling ones thoughts*

In the second study, there were no clear group differences on the control of thoughts domain. While the contamination subgroup was slightly higher on the pre-experimental measure (OBQ-C-Scale), no significant group differences were found in the current study. The subgroups reported similar levels of anxiety and comparable total scores which would appear to confirm these findings. However, this result might be premature as there were large differences between groups in both distractibility and the time *course* of anxiety. Whereas most groups' anxiety levels decreased after a minute, the hoarding subgroup remained unchanged. This finding is important as pre-experimental analysis found no significant group differences in terms of symptom severity.

The hoarding subgroup also demonstrated the strongest degree of difficulty controlling their intrusive thoughts. In three of the five time trials, the hoarding group reported at least 20 percent more difficulty in controlling their thoughts compared to the other groups. This result tends to suggest that compared to other types of OCD, individuals with predominantly hoarding concerns may have greater difficulty attending to the task at hand because of the distracting effects of their intrusive thoughts. However, it is still unclear whether the hoarding group's slow recovery is due to strong beliefs in the importance of controlling their thoughts, which has the

rebound effect of increasing the strength of these intrusive thoughts or neuropsychological impairments (e.g., executive functioning).

The hypothesis that the OCCWG beliefs would differ according to predominant symptom subtype was investigated using experimental paradigms. The pre-experimental measures (OBQ self-reports) were consistent with the findings of the second study, but some of the experimental tasks showed a different pattern of results. Three of the six profiles established in the earlier study remained constant: perfectionism and symmetry; over-estimation of threat and contamination; TAF and hoarding concerns, but other profiles were not supported. As seen, the findings support research by Taylor et al. (2006) suggesting that some individuals with OCD do not show elevated dysfunctional beliefs and different models may apply to different types of the disorder.

#### *Limitations*

There are several strengths and limitations of this experiment. In terms of strengths, the study included multiple comparison groups and experimental paradigms. The experimental paradigms used an idiographic approach (participants wrote in the events of personal concern to them, rather than rating a pre-established list of events) which made these tasks personally salient and increased the ecological validity (Woods et al., 2000). These tasks proved highly successful in activating many of these beliefs as statistically significant findings were found in very small samples. The type of methodology also allowed a more thorough examination of the empirically derived OCD subgroups. Although all participants identified their primary concern as the named subgroup, the large standard deviations within each group on task measures suggests the focus of inquiry should be on the motivational or affective features that underlie the obsessive symptomatology. While small  $n$  studies facilitate

more in-depth case analysis (see Wilson & Chambless, 2005), larger studies are also needed for corroboration of this issue.

The present study may have been limited by the environment in which participants completed these tasks. While every effort was made to control for extraneous variables in the experiment (e.g., presence of experimenter, the use of covert neutralisation, standardised questions), these variables may have influenced participant responding. For example, several participants in the TAF task attempted to name relatives who were deceased rather than living relatives, as a way to reduce their anxiety. In other tasks like the BAT, participants attempted to designate a 'safe hand or finger' to avoid experiencing anxiety. Other participants were observed tapping, touching and rubbing in numerical sequence (secondary compulsions) to decrease anxiety during tasks. Another limitation may have been the post-task questions which were modelled on items in the OBQ-87. These questions (refer appendix) were context-specific, and as such, the factor structure of the items may have been influenced by the modification.

It is also possible that some interactions between the task and participant precluded accurate results, particularly in the inflated responsibility task. Consistent with Rachman's early observations, many participants admitted to transferring responsibility to the primary investigator during task exposure, when instructed not to, in order to decrease their anxiety. Consistent with Riskind et al. (2002) who found that manipulations of responsibility may be limited in their ecological validity as participants may not have related their sense of responsibility to the task at hand in the same way as they might in a real life situation, some participants who despite trying very hard, could not transfer the responsibility to the investigator because "it is always my responsibility". This effect was non-specific and seemed idiosyncratic to subtype.

## CHAPTER 7

### 7. GENERAL DISCUSSION

#### 7.1 Introduction

This series of studies sought to determine the relationship between a number of cognitive beliefs and appraisal processes and obsessive-compulsive symptoms. The first study investigated the relationship between TAF and inflated responsibility beliefs across individuals diagnosed with OCD (OCD), an anxiety disorder other than OCD (AC), and a non-anxious control group (NAC). It was hypothesized that the OCD group would evidence significantly higher inflated responsibility and TAF scores compared to the AC and NAC groups. Based on previous research, it was further predicted that significant correlations between TAF and inflated responsibility beliefs would emerge. The assessment methods included self-report questionnaires tapping into TAF and inflated responsibility constructs.

The results of study 1 demonstrated that inflated responsibility beliefs, while present in other anxiety disorders, were significantly higher in participants with OCD even after controlling for depressed mood and TAF levels. Contrary to expectation, no group differences were observed between the OCD and anxious groups on measures of TAF. Lastly, the results partially supported the hypothesis that TAF serves to inflate responsibility appraisals in that depression mediates the relationship between TAF and responsibility, with both variables independently correlated with measures of obsessionality. It can be concluded that TAF plays a role in inflated responsibility beliefs, but does not appear to be crucial for the development of such beliefs.

In accord with our hypothesis, the first study found evidence to support Salkovskis' cognitive theory (1985, 1989) and the central role of inflated responsibility beliefs in OCD. The results of this study are largely consistent with

previous research showing inflated responsibility beliefs to be significantly higher in individuals with OCD (Steketee et al., 1998; Bouchard et al., 1999), and predictive of obsessive compulsive symptoms (Freeston et al., 1992; Rheaume et al., 1995) and where inconsistent (Tolin et al., 2006a; Rheaume et al., 1992; Frost et al., 1994; Rachman et al., 1995; Emmelkamp & Aardema 1999; Wilson & Chambless, 1999) probably reflect differences in the conceptualizations of responsibility, measures utilized and/or sampling practices.

The second hypothesis, that TAF is specific to OCD was not supported. These results are consistent with research (Hazlett-Stevens et al., 2002; Muris et al., 2001; Shafran et al., 1996; Abramowitz et al., 2003; Rassin et al. 2001c) showing TAF to be an easily activated cognitive bias in all anxiety disorders, but not other research showing a more specific relationship (e.g. Rachman, 1993; Rachman et al., 1995; Shafran et al., 1996; Coles et al., 2001). The discrepancy in findings may be related to choice of mediating variable, with recent research showing TAF to be related to obsessive-compulsive symptomatology via the relationship to magical ideation (Einstein & Menzies, 2004), rather than inflated responsibility beliefs. It is also possible that in some cases of OCD, TAF is very prominent and does play an important role, and in other cases it may not be present at all.

In contrast to the majority of research (Clark et al., 2000; Clark, 2004; Shafran et al., 1996; Abramowitz et al., 2003; Rassin et al. 2001a and Rassin et al., 2001b) showing TAF-Likelihood to be strongly associated with obsessionality, the first study found more support for the role of TAF-Morality, than TAF-Likelihood in OCD. The difference in results may be explained in terms of negative affect. There is some research suggesting that TAF-Morality is strongly correlated with depression, and TAF-likelihood associated more with anxiety (Abramowitz et al. 2003; Coles et al.,



2001, Rassin & Koster, 2003). It is likely that TAF-morality was elevated in the first study because of the high degree of comorbid depressive disorders. In addition to negative affect, and in line with other studies (Rassin & Koster, 2003; Yorulmaz et al., 2004; Sica et al., 2002), it could also be argued that TAF-Morality was elevated because it is related to some latent structure embedded in the fabric of New Zealand culture (e.g. religiosity, urbanisation).

Rachman (1997, 2003) proposed that TAF, in combination with inflated responsibility beliefs, may be especially important in OCD because they serve to increase the misinterpretation of significance of the unwanted thoughts. However, the first study found the relationship between TAF and inflated responsibility beliefs to be highly dependant on the presence of negative affect. This finding is consistent with research (Abramowitz et al., 2003, Muris et al., 2001, Rassin et al., 2001b; Rassin et al., 2001a) showing significant correlations between TAF and depression, but inconsistent with research (Gwilliam et al., 2004, Rachman et al., 1996; Shafran et al., 1996; Freeston et al., 1996; Rassin et al. 1999; Smari & Holmsteinsson, 2001) demonstrating moderate positive correlations between measures of responsibility and TAF. It is possible that the lack of a statistically significant relationship between TAF and inflated responsibility beliefs relates to the elevated presence of TAF-moral, as opposed to TAF-likelihood, which has been shown to be more closely related to responsibility (Berle & Starcevic, 2005). Thus, when the present results are added to those of previous studies, a pattern emerges suggesting that inflated responsibility beliefs may have a more robust relationship with OCD than TAF beliefs, which appear to act as a general vulnerability factor occurring along a continuum of anxiety disorders (Rassin et al., 1999; Ferrier & Brewin, 2005), rather than specific to OCD (Rachman et al., 1995).

Prior to the second study, there was no consensus about the extent to which maladaptive beliefs proposed by the OCCWG (2001) underlie the different symptom-based subtypes of OCD. This question was examined by investigating whether the six OCCWG beliefs were significantly associated with one or more empirically derived OCD subtypes. In line with previous research, it was predicted that the six OCCWG belief domains were significantly associated with one or more empirically derived OCD subtypes. Scores on the YBOCS-SC were cluster analysed to form five stable groups: (i) aggressive obsessions–checking compulsions; (ii) contamination obsessions–cleaning compulsions; (iii) symmetry concerns–ordering/arranging compulsions; (iv) hoarding obsessions–hoarding compulsions; and (v) miscellaneous obsessions –miscellaneous compulsions. These subgroups were then compared on the OCCWG self-report questionnaires (e.g. OBQ-87, OBQ-44, and the III) as well as measures of generalised anxiety and depression.

The results found a significant interaction between the contamination subgroup and the OBQ-87 intolerance of uncertainty subscale, even when controlling for the levels of depression and anxiety. No other significant group differences on either the long (87-item) or shortened version (44-item) of the OBQ or III were found. Despite the fact these differences failed to reach statistical significance, they were in the predicted direction. Responsibility and threat estimation beliefs were higher in the aggressive-checking and contamination-cleaning subgroups. Perfectionism beliefs were higher in symmetry-ordering and hoarding subgroup.

Intolerance of uncertainty, while significantly higher in the contamination subgroup, was also elevated in the hoarding subgroup. The highest levels of both the importance of thoughts and control beliefs were found in the miscellaneous subgroups (includes religious, somatic and idiosyncratic concerns). Three of the belief domains

(intolerance of uncertainty, threat-estimation and control of thoughts) appeared strongly correlated with obsessive severity, as opposed to responsibility, perfectionism and importance of thoughts which were not. Unfortunately, the correlation lost significance when controlling for depression and generalised anxiety.

The results are broadly consistent with research that emerged while the current study was in progress (Taylor et al. 2006; Calamari et al. 2004; Calamari et al. *in press*). These results regarding uncertainty beliefs are in line with Sookman and Pinard (2002) who found strong uncertainty beliefs in participants with predominately washing concerns, and by extension contamination obsessions. However, these results are not consistent with research by the OCCWG (2005) showing this domain to significantly predict grooming and checking concerns. It is also possible that the discrepant results relate to assessment measures as the OCCWG (2005) used the Padua Inventory-Washington State University Revision (PI-R; Burns et al., 1996) over the YBOCS. It may also be the case that those with predominantly contamination/washing concerns are characterised by memory deficits as evident in the excessive doubting, rather than uncertainty or indecisiveness (see Hartl et al., 2001, 2004).

The lack of significant findings for responsibility was surprising, given the results of the first study and the central role of this construct in many contemporary cognitive models (e.g., Salkovskis, 1985, 1989). However, consistent with other research (Rachman, 1997, 1998; Salkovskis, 1985; Tolin et al., 2006a), responsibility/threat estimation were most strongly linked to harming thoughts, and where not consistent (Tolin et al., 2003b) the difference probably relates to methodological issues in subtyping (e.g. categorical versus dimensional).

Perfectionism beliefs were higher in symmetry-ordering (Tolin et al., 2003b) and hoarding subgroups (Frost & Gross, 1993; Frost & Hartl, 1996; Frost et al., 2002; Steketee et al., 2003). As seen, this finding was expected, and is in accord with research (OCCWG, 2005) showing perfectionism to be significantly predicted by ordering. These subgroups are most likely bound to perfectionism beliefs through what Coles et al. (2005) terms ‘not just right experiences’ (NJREs). The NJRE’s refer to compulsions aimed at reducing feelings of something not being just right or sensations of incompleteness (e.g., ordering and collecting). The preoccupation with arranging objects “exactly the right way”, (Radomsky & Rachman, 2004a) characterized both symmetry and hoarding subgroups.

The finding that importance of thoughts and control beliefs were the highest in the miscellaneous subgroups is consistent with Einstein and Menzies (2004) who showed individuals with atypical OCD symptoms to be particularly prone to magical ideation (MI). MI is reported to share a close relationship with TAF, a variant of this importance of thoughts domain. The most common miscellaneous symptom in the current sample was religious obsessions, which has also been shown to correlate with control of thoughts (Abramowitz et al., 2004).

While the lack of significant group differences may reflect differences in assessment, sample characteristics or statistical procedure, the results could also be explained by a lack of distinction between the OBQ beliefs. Recently, Faull, Joseph, Meaden and Lawrence (2004) found that the summed obsessive belief score was significantly correlated with all OCD subtypes, even when covarying for depression and anxiety. In order to address whether the type of methodology used in the second study precluded accurate results (e.g., self-report and response bias), the final study of

this thesis employed experimental paradigms to test the validity of the OCD subtypes and dysfunctional beliefs.

In essence, this study was conducted to assess whether the second study was limited by the method of assessment (e.g. self-report). This study was the first of its kind to evaluate the cognitive correlates of OCD subtypes using experimental methods. Twenty of the highest scoring participants from the second study were selected to form the following priori groups: Group 1 (contamination;  $n = 4$ ), Group 2 (aggressive,  $n = 6$ ), Group 3 (hoarding,  $n = 4$ ), and Group 4 (symmetry,  $n = 6$ ). Baseline scores were obtained using self-report questionnaires. Following this, participants took part in six experimental cognitive tasks (e.g. BAT) designed to reflect one of the six OCCWG beliefs.

The results found no significant group differences at baseline in either symptom severity or cognition prior to the experiment. The study found strong support for the use of experimental paradigms over self-report measures as several significant interactions between cognitive beliefs and OCD symptom-based subtype were found. These cognitive profiles identified included TAF and hoarding concerns; perfectionism and symmetry obsessions; and over-estimation of threat and contamination obsessions and compulsions. The following sections discuss these results in more detail and where applicable, compare these findings to the second study.

Contrary to the second study, no significant group effects were found for intolerance of uncertainty beliefs. These findings reflect the confusing state of research on intolerance of uncertainty, with some studies considering uncertainty a core feature in OCD (Guidano & Liotti 1983; OCCWG, 1997; Reed 1985), and others showing this domain is not unique to OCD (Holoway et al., 2006; Ladouceur et al.,

1999). While there is increasing interest in the role of uncertainty in other psychological disorders, like anorexia nervosa (Vitousek & Manke, 1994; Vitousek, 1996), it is important not to underestimate the role of this belief construct in OCD. It is possible that the discrepancy in results relate to methodological and sampling issues rather than the incremental value of this belief to understanding OCD.

TAF was shown to be most applicable to hoarding and aggressive subtypes. The hoarding subgroup evidenced significantly higher overall TAF scores compared to those in the contamination group. The contamination subgroup was consistently the lowest scoring group on all measures of TAF, with these differences being significant. Unfortunately, the lack of a miscellaneous group meant the findings could not be contrasted with those of the second study. However, the current study's findings regarding hoarding concerns are in contrast to the previous study which found the hoarding subgroup displayed the lowest scores on the importance of thoughts domain. As the current study found the opposite, it could be argued that TAF is an important construct in hoarding concerns, whereas the parent domain, importance of thoughts, plays less of a role. It also suggests an affiliation with MI and a tendency towards superstition.

The symmetry subgroup exhibited significantly higher anxiety than the aggressive group during the perfectionism task and exhibited significantly higher scores on items measuring competitiveness, perfectionism and high standards than the contamination group. These findings are largely consistent with those of the second study. Previously, perfectionism was thought to be relevant, but not exclusive to OCD (OCCWG, 1997; Clark, 2004), however, the current results suggest that when the emphasis is on 'the necessity to do things without a mistake' (OCCWG, 1997), perfectionism appears more specific to OCD than other beliefs, like inflated

responsibility. These findings are consistent with research (Frost, Novara & Rheaume, 2002) showing concern over mistakes to be more specific to OCD, than global perfectionism.

Perfectionism beliefs were also strong in compulsive hoarding. This finding is consistent with Kyrios et al. (2002) suggestion that “some objects are seen as having intrinsic value or meaning, although they do not have any particular use or emotional meaning attached to them, e.g. “they are too perfect to throw away” (p.269). While the symmetry and hoarding subgroups were elevated in this domain, it is likely that the symmetry group was responding to the “concern about order” aspect of perfectionism, whereas the hoarding subgroup may be responding to the ‘concerns about making perfect decisions’ (Frost & Gross, 1993).

The first study found inflated responsibility to be significantly higher in an OCD sample, compared to anxious and non-clinical counterparts. The subsequent two studies did not find responsibility beliefs to be specific to OCD symptomology. Like perfectionism beliefs, one explanation for these findings may lie in the definition. Taylor (2002) has argued that some subtypes of responsibility (e.g. responsibility for actions committed) may be specifically related to OCD, whereas other components may be non-specific. It is possible that Salkovskis (1992) original definition is too broad, and only the ‘beliefs concerning consequences of omissions’ (Wroe et al., 2000) is applicable to OCD. Farrell (2004) demonstrated that inflated responsibility beliefs were significantly higher in adolescents and adults with OCD, compared to children. This finding is also consistent with Taylor’s hypothesis as it is possible that some aspects of responsibility beliefs are intrinsically linked with maturation (e.g. responsibility for actions committed) and vary across development.

These results regarding the over-estimation of threat are consistent with the previous study showing strong links to contamination thoughts. It was surprising that the hoarding subgroup did not have highly elevated scores given their predilection to perceive the environment as extremely dangerous and their fear of uncertainty (Sookman and Pinard, 2002; OCCWG, 1997). This finding may have been affected by the very small number of individuals with hoarding concerns. No statistically significant group differences were found for controllability of thoughts. This finding is consistent with the second study which found minimal variability across subgroups on the control of thoughts subscale.

One interesting finding on this task was the observation that the hoarding subgroup required more time to settle after exposure to distressing stimuli and reported less control over their thoughts. At this stage, it is unclear which extraneous variable (e.g. perseverative behaviour, memory deficits, learning ability or increased difficulty controlling their thoughts) impacted on the hoarding group's performance on this task. However, a clear group difference was that the hoarding group was predominantly ego-syntonic, whereas the other subgroups tended to be ego-dystonic. Purdon (1999) argues that thoughts that are more ego syntonic give rise to less active resistance because obsessions or compulsions are viewed as consistent with the self and do not require active resistance. As this task was specifically developed to assess the strength of resistance/control subgroups had over the thought, it would follow that hoarding group would require more time to return to baseline as this was a relatively new skill.

The case of compulsive hoarding does deserve special mention. Based on this series of studies, hoarding does appear to be a distinct disorder separate from OCD.



This statement is supported by clinical observations<sup>36</sup> throughout the studies and other research consistently identifying hoarding as a separate factor in statistical analysis (Baer, 1994; Calamari et al., 1999; Leckman et al., 1997; Summerfeldt et al., 1997). The ineffectiveness of traditional psychological therapies and pharmacotherapy (Mataix-Cols, et al., 1999) coupled with clinical differences increases the support for conceptualising hoarding as distinct from OCD (Black et al., 1998). It will be interestingly to observe whether the revisions of the DSM continue to formulate compulsive hoarding in reference to OCD (reference hoarding to OCPD), OCPD (reference hoarding to OCPD) or a distinct disorder (Reference hoarding to OCPD), especially since the ICD has recently included hoarding as a spectrum disorder.

Previous research has shown that over-importance of thoughts; importance of controlling one's thoughts; perfectionism; inflated responsibility; overestimation of threat and intolerance for uncertainty are relevant constructs in OCD. The series of studies support this argument, but as per study I, stress that it is likely these beliefs are evident in other anxiety disorders. Previous research suggests that these six dysfunctional beliefs and appraisals may be specific to thought content or subgroup. This hypothesis is only partially supported, with only four of these beliefs linked to symptoms: TAF and hoarding concerns; perfectionism and symmetry obsessions; over-estimation of threat and intolerance of uncertainty and contamination obsessions and compulsions. Similar to Anholt et al (2006), these results suggest that dysfunctional beliefs have no discriminative power with respect to OCD and the direct relationship between types of obsessive compulsive symptoms and specific dysfunctional beliefs appears questionable. Therefore, one can doubt the specificity of

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<sup>36</sup> Compulsive hoarders tended to be female, older mean age, alcohol or depressive comorbidity, not working, unmarried or divorced, longer duration of illness, more severe symptomology and ego-syntonic obsessions.

cognitive theory of OCD to explain specific obsessive compulsive behaviour. At this stage it would be premature to claim these beliefs as symptom-specific as these associations were not consistently seen throughout and appeared dependent on the type of methodology (e.g. self-report versus experimental). Furthermore, these studies marked the first of its kind to examine these beliefs under experimental conditions and replications are required to validate these findings.

## 7.2 Limitations

The present study has some methodological limitations, notably the small sample sizes which influenced the power of the study. The second limitation refers to the use of the OCCWG measure, which demonstrates considerable overlap between subscales. One of the most significant limitations of these studies relates to the conceptualisation of these dysfunctional beliefs as unitary constructs (e.g. OBQ-87), when in reality, these beliefs are interactive, multidimensional and overlapping (Clark, 2002a). Riskind et al. (2002) have argued that few studies have isolated belief domains, either experimentally or by correlational analysis and relatively little is known about the validity of defining these beliefs singularly. Another limitation relates to the use of experimental paradigms. While every effort was made to base the tasks on sound empirical research, some of the task characteristics did appear to be more biased towards certain subgroups. The most obvious of which was the over-estimation of the threat task which may have been biased towards those with predominantly contamination concerns. Other limitations include the use of a mostly female clinical population, especially in the final experiment. Replication with predominantly male individuals with OCD will be required before conclusions can be generalised to both males and females. Additionally, it should also be acknowledged that the findings may have been influenced by the high presence of depression and

comorbid anxiety disorders. Lastly, the sampling method may have allowed for a selection bias as all participants were seeking treatment.

### 7.3 Implications of the research

The present findings have a number of important theoretical and clinical implications for the treatment of OCD. These results provide partial support for the cognitive theory of OCD, but recognise that this theory cannot account for why there is often a discrepancy in beliefs between individuals with similar symptomatology, and/or why some of the OCCWG cognitive domains seem applicable and others do not. The results of this research support emerging research (Taylor et al., 2006; Calamari, *in press*) demonstrating that there may be two groups of individuals: one in which these beliefs play a causal role (high belief), and one in which these beliefs are not required (low belief). A critical issue for future research is why these beliefs do not appear to play a causal role in the symptom development of some forms of OCD. The identification of OCD-specific dysfunctional beliefs and appraisals may prove extremely useful in the prevention of OCD as these beliefs can be addressed earlier in life.

These results have the potential to be clinically very useful for therapeutic intervention. As demonstrated, therapy with a strong cognitive component may not be appropriate for all cases of OCD as dysfunctional cognitions did not appear to play a central role for all OCD groups. Conversely, in cases where these beliefs were highly activated, CBT specifically targeting the beliefs in question may increase response rates. This may be especially important for those with predominantly hoarding concerns, a group fraught with poor response rates to psychological and pharmacological treatments (Black et al. 1998). A treatment protocol targeting beliefs and assumptions about perfectionism, as well as thought control may improve the

treatment for hoarders. Consistent with the unification models, it is also likely that these cognitions function in other disorders. While this hypothesis requires further testing, these six dysfunctional cognitions may form part of a standard treatment protocol used in the future to challenge unrealistic appraisals in a number of mood and anxiety disorders.

#### 7.4 Directions for future research

It would be useful if future research improved upon the limitations of this study, and conceptualize these studies as exploratory, and place an emphasis on replication. Firstly, there is a strong need for research in this area to move away from a reliance on non-clinical cohorts as often this limits the generalizability of findings. Secondly, given that one of the central issues is belief specificity, it is necessary to cross validate these findings with other psychiatric samples. This issue is extremely important given that the mainstay of the cognitive theory is the specificity of these beliefs to OCD. Thirdly, it would be extremely advantageous to continue experimenting with alternative methodologies as the majority of research in this area is correlational and the direction of causality cannot be determined.

Fourthly, an interesting area for future research would be to continue work on why these beliefs are applicable to some types of OCD, but not others. This question may in part be answered by investigating the differences in the acquisition of these dysfunctional beliefs. For example, it would be interesting to compare individuals with postpartum onset OCD who report inflated responsibility beliefs with those with EOD also reporting inflated responsibility beliefs. Fifthly, it would be extremely beneficial to replicate this study subtyping OCD based on dimensions, represented on a continuum of *harm avoidant* and *prevention of distress* (relation to Hollander OCSD), rather than the predominant theme. Recent literature suggests that patients

with harm avoidant compulsions demonstrate better treatment response than patients whose only feared consequence is the prevention of distress (Coles et al. 2005). Currently, it is unknown whether symptom-based subtypes cluster along certain dimensions, and further, whether this would change the associations with the OCCWG beliefs.

Lastly, further research in this area should also continue to focus on other beliefs that may be uniquely related to OCD. The concept of NJREs or self-blame which were very common in the current studies and warrant investigation. The importance and the need to remember information was another belief which remained constant throughout the study, particularly in the hoarding subgroup. It will be important for future research to evaluate this issue with large clinical samples, comparison psychiatric groups and non-clinical controls. It would also be beneficial to evaluate the relationship of these beliefs to other emotional disorders.

To conclude, the studies presented in this thesis demonstrated novel empirical evidence to illustrate that while the cognitive theory of OCD can explain some types of OCD, other models are needed to detect clinically meaningful distinctions between subtypes. Furthermore, these studies demonstrated the effectiveness of experimental paradigms in the assessment of cognitive beliefs and appraisals as these beliefs were highly accessible under experimental conditions. Finally, the application of a core dimensional approach to conceptualising OCD, specifically evaluating the differing motivations on a continuum of threat cues may provide both theoretical and clinical advancement.

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## 9. APPENDICES

### 9.1 Appendix A: Study I Volunteer Information Sheet

#### Volunteer Information Sheet

Date:

**Title of Research Project:**

*Evaluating how people with Anxiety Disorders think, and how these thinking styles contribute to their behavior.*

**Principal Investigator:**

Emily O'Leary, BA (Hons)  
Clinical Psychology Student  
Phone: 03-3512420

**Research Supervisors**

Julia Rucklidge, Ph.D., C.Psych Lecturer  
and Registered Psychologist at the  
University of Canterbury  
Phone: 364-2987-7959

Neville Blampied, M.Sc. (Auck), F.N.Z.Ps.S  
Lecturer at the University of Canterbury  
Phone: 03-3667001 ext 6199

**Purpose of the Research**

The purpose of the study is to investigate the relationship between Thought-Action Fusion (TAF) and exaggerated responsibility (ER) in Obsessive Compulsive Disorder (OCD). TAF refers to the tendency to assume incorrect causal relationships between ones own thoughts and the outside world. Whereas, ER refers to the tendency for individuals with anxiety disorders to experience an overwhelming sense of responsibility regarding their thoughts or actions.

Some researchers believe that TAF and ER are more related to OCD, whereas others believe that TAF and ER feature in all anxiety disorders. The motivation for conducting this study is two fold. Firstly, the aim of this study is to clarify the relationship of TAF and ER in OCD and in other anxiety disorders. We will compare responses of **forty** people from the ADU with a matched group of **twenty** people without any anxiety disorder. Secondly, this study is for the qualification of a Masters of Arts which is a requirement in the Clinical Psychology program.

**Description of the Research**

Prior to the commencement of the study, the principal investigator will contact you by phone to arrange a suitable testing time. If you agree to participate, you will be asked to complete five questionnaires over an estimated one-hour period. The administration of these questionnaires will be at the Anxiety Disorders Unit or the Department of Psychology at the University of Canterbury. This is not a treatment study, and as such participants are required for a one session only.

On arrival, you will be given an opportunity to ask any questions and then you will be asked to sign a consent form (Form C) giving your permission to be involved in the study. Participation is voluntary and declining to participate will not affect your health care in any way. You will then be asked to fill out an information sheet (Form D) which involves general health questions. Once this is completed, you will then be given five questionnaires relating to anxiety and mood. There is no interviewing component to this meeting as all questionnaires involve paper-pencil tests.

You do not have to answer any questions you don't want to and you may withdraw from the study at any time without giving a reason. If you are tired, you may request a break at any time throughout the testing. If throughout the study there are indications that you may benefit from further assessment, we may suggest you see your GP or another appropriate person. The Human Ethics Committee at the University of Canterbury and the Canterbury Ethics Committee have reviewed and approved this study.

**Potential Harms (Injury, Discomforts or Inconvenience):**

There are no known harms associated with participation in this study.

**Potential Benefits**

Participation in this study will be of no direct benefit to you. The results of this study may contribute to the greater understanding of people with anxiety disorders. It is hoped that the information gathered from this study will develop and provide an impetus for further investigation into the complex phenomena of anxiety.

**Confidentiality**

Participants can feel assured that all information obtained from this study will be kept in a confidential file which will be kept locked at all times. All information will be kept as group data. Therefore, all forms will be coded and names removed such that you cannot be individually identified. Confidentiality will be respected and no information that could identify a participant will be released or published. In cases where we are concerned about the safety of a participant or the safety of others, confidentiality may need to be breached to ensure their safety.

If you would like, we can send you a summary of the conclusions of the study once the analysis is completed. Please note that there will be some delay before all the work is done and this report can be sent out. Publication of the results will be in the form of a Masters Degree thesis to be submitted to the University of Canterbury. It may also be submitted for publication in a scientific journal.

**Future Participation**

Depending on the results of this first study, we may wish to contact you at a later date, probably next year, to invite you to participate in a second phase of this study. Please indicate on the consent form if you are willing to be contacted for this second phase.

**Participation:**

Participation in this study is entirely voluntary (my choice). Participants can withdraw from the study at any time without giving any reasons. If you have any queries or concerns regarding your rights as a participant in the study, you may wish

to contact a Health and Disability services Consumer Advocate, telephone 377 7501 in Christchurch or 0800 377 766 outside Christchurch. You can also contact Emily O'Leary, principal investigator, 03-3512420, should you have any questions or concerns about this research.

Thank-you for your time

Emily O'Leary, BA (Hons)  
**Principal Investigator**  
364-29-87-3400

## 9.2 Appendix B: Study I consent form

**CONSENT FORM****Title of Research project:**

*Evaluating how people with Anxiety Disorders think, and how these thinking styles contribute to their behavior.*

**Principal Investigator**

Emily Marie McHugh O’Leary  
University of Canterbury  
Department of Psychology  
Phone: 03-3512420 (home)  
364-2987-3400 (work)

**Research Supervisors**

Julia Rucklidge, Ph.D., C.Psych Lecturer  
and Registered Psychologist at the  
University of Canterbury  
Phone: 364-2987-7959

Neville Blampied, M.Sc. (Auck),  
F.N.Z.Ps.S  
Lecturer at the University of Canterbury  
Phone: 364-2987- 6199

“You have been invited to be in this study because you have OCD or another anxiety disorder, and you are being treated at the Anxiety disorders Unit. Those participants who are invited to participate but do not have an anxiety disorder will serve as the comparison group”

**Consent**

I have read and I understand the information sheet dated \_\_\_\_\_ for  
volunteers taking part in the study designed to investigate responsibility attitudes and  
obsessive thinking in young adults. I have had the opportunity to discuss this study  
with the primary investigator (Emily O’Leary). I am satisfied with the answers that I  
have been given. I understand that taking part in this study is voluntary (my choice)  
and that I may withdraw from the study at any time without giving any reasons. I  
understand that my responses or decision to continue participating in this study will in  
no way affect my future health care. I understand that my participation in this study is  
confidential and that no material, which could identify me individually, will be used  
in any reports in this study. I know whom to contact if I have any questions about this  
study.

I consent to being contacted in the future should there be a further phase of this study.  
I understand that I am able to choose whether to participate in a future phase or not:

YES:                      NO:

I wish to receive a summary of the results of the study:

YES:                      NO:

I give consent for the primary investigator (Emily O'Leary) to have access to my assessment information gathered by the Anxiety Disorders Unit. I understand that this information will be used solely for the purposes of this study and will be kept in the strictest confidence.

YES: NO:

**ADU Volunteers Only**

I also give consent for my information, if useful, to be given to the Anxiety Disorders Unit:

YES: NO:

I hereby consent to participate:

YES: NO:

Name of Volunteer  
(please print)

Emily O'Leary  
(Principal Investigator)

Signature  
Date:

Signature  
Date:

## 9.3 Appendix C: Study I exclusion/inclusion sheet

**Participant Details**

The information obtained will be used for the purpose of a study into obsessional thinking. Read each question carefully and answer the questions to the best of your abilities. There are no right or wrong answers the questions below. The information gathered is kept **strictly confidential**. Do you have any questions?

- 1) Name: \_\_\_\_\_
- 2) Sex: \_\_\_\_\_
- 3) Age: \_\_\_\_\_
- 4) Ethnicity: \_\_\_\_\_
- 5) Have you in the past been diagnosed with a psychiatric disorder? YES: \_\_\_\_\_  
NO: \_\_\_\_\_  
(a) Specify diagnosis \_\_\_\_\_ Year \_\_\_\_\_
- 6) Do you currently have a psychiatric diagnosis (es)? YES: \_\_\_\_\_ NO: \_\_\_\_\_  
(If you answered no, please continue to Question .8.)
- 7) Circle the appropriate diagnosis(es):
  - a. OCD YES: \_\_\_\_\_ NO: \_\_\_\_\_
  - b. Social Phobia YES: \_\_\_\_\_ NO: \_\_\_\_\_
  - c. Specific Phobia YES: \_\_\_\_\_ NO: \_\_\_\_\_
  - d. Agoraphobia YES: \_\_\_\_\_ NO: \_\_\_\_\_
  - e. Generalised Anxiety Disorder YES: \_\_\_\_\_ NO: \_\_\_\_\_
  - f. Anxiety Disorder Not Otherwise Specified YES: \_\_\_\_\_ NO: \_\_\_\_\_
  - g. Depression YES: \_\_\_\_\_ NO: \_\_\_\_\_
  - h. Other \_\_\_\_\_
- 8) Are you currently on any medications? YES: \_\_\_\_\_ NO: \_\_\_\_\_  
a) Please specify medication \_\_\_\_\_

9) Have you ever experienced a head injury? YES: NO

(If you answered no, please continue to Question. 12.)

10) Did you lose consciousness? YES: NO:

11) How long were you unconscious? \_\_\_\_\_

12) Please circle how much of the following you would intake on average day:

Coffee	0	2 -4 cups	4-6 cups	6-8 cups	8-10 cups				
Cigarettes	0	5	10	15	20	25	30	35	40
Alcohol	0	2-4 glasses	4-6	6-8	8-10				

Thank-you for your participation.

Emily O'Leary

Principal Investigator



## 9.4 Appendix D: Study II: Initial sheet

**Initial intake form**

Assessment date:

Date of Birth:

(Please circle the word that best describes you current situation)

**SEX:** Male Female

**MARITAL STATUS:** Never married Married Separated  
Widow Cohabiting

**EDUCATIONAL LEVEL:** (highest level achieved)

Primary 1-4 years high school  
Trade 5-6 years high school  
Bachelor Degree Post Graduate

**OCCUPATION:** Student Wage/salary  
Unemployed Home responsibilities  
Retired or not working by choice.

**BENEFIT:** No Yes Specify \_\_\_\_\_

**ETHNICITY:** NZ European Asian Maori  
Pacific Islander European Other

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## 9.5 Appendix E: Study II: written description

**Title of Research:**

Investigating the different thinking styles in people with various types of Obsessive-Compulsive Disorder (OCD)

**Principal Investigator:**

Emily O’Leary, BA (Hons)  
Clinical & PhD student  
University of Canterbury  
Department of Psychology  
Phone: 027 623 9857

**Research Supervisors**

Julia Rucklidge, Ph.D., C.Psych Senior  
Lecturer and Registered Psychologist at  
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Department of Psychology  
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Neville Blampied, M.Sc. (Auck),  
Psychology Lecturer  
University of Canterbury  
Department of Psychology  
Phone: 03-3667001 ext 6199

“You are invited to take part in a study which looks at the differences between people with OCD. You do not have to decide now whether to participate, and it is your right to choose whether you want to be involved in this study”

## Participant information

*What theory is this Study based on?*

This study is based on the cognitive theory of OCD which believes that people with OCD have “incorrect” or “dysfunctional cognitions”. The word ‘cognitions’ is a broad term, but for the purposes of this study it refers to activities like thinking or beliefs. The cognitive theory of OCD, basically states that the difference between “every-day thoughts’ and “obsessions” is that the belief systems underlying obsessions are different. This theory suggests that people with OCD tend to view intrusive thoughts (obsessions) as being highly important which results in the interpretation that the thought is dangerous. Consequently, people with OCD tend to spend a lot of time analyzing whether their thought(s) are true and taking actions (compulsions) to decrease the anxiety.

*What are the aims of the study?*

The aim of this study is to assess the thinking differences in people with various forms or ‘subtypes’ of OCD. I (primary examiner) will discuss any concerns you may have regarding the study prior to assessment.

*Why have I been chosen?*

*You Have Been Invited To Participate In This Study Because You Have Been Diagnosed With OCD By Your GP/Clinical Psychologist.*

*Why are you doing this study?*

*This Study Is A Requirement Of A PhD (Doctorate Of Philosophy).*

*What will I have to do?*

This is not a treatment study, and as such you will be required for one session only. If you agree to participate you can expect the following:

1. The primary examiner (Emily O'Leary) will contact you to arrange a time for testing at the Anxiety Disorders Unit. On the day of your appointment you will first be given an opportunity to ask any questions about the study.
2. You will then be asked to sign the consent form giving your permission to be involved in the study.
3. Following this, the primary examiner will ask you questions relating to OCD in an interview.
4. You do not have to answer all the questions, and you may stop the interview at any time.
5. On average it may take 60-70 minutes to complete the session.

*What if I change my mind?*

You do not have to answer any questions you do not want to and you may withdraw from the study at any time without giving a reason. If you are tired, you may request a break at any time throughout the testing.

*Are there any potential harms?*

In the performance of the tasks and application of the procedures there are no known harms or risks associated with involvement in this study. However, in the event that you do become distressed because of your involvement in the study, you have the opportunity to discuss these concerns with the primary examiner and/or a senior clinical psychologist. Participation in this study will be stopped should any harmful effects appear, or if your GP/psychologist feels it is not in your best interest to continue. If you have any queries or concerns regarding your rights as a participant in the study, you may wish to contact a Health and Disability services Consumer Advocate, telephone 377 7501 in Christchurch or 0800 377 766 outside Christchurch.

*What are the benefits of the study?*

Participation in this study will be of no direct benefit to you. The results of this study may contribute to the greater understanding of people with anxiety disorders. It is hoped that the information gathered from this study will develop and provide an impetus for further investigation into the complex phenomena of anxiety. However, in appreciation for your participation you will receive a ten dollar petrol voucher.

*Is it confidential?*

Participants can feel assured that all information obtained from this study will be kept in the strictest of confidence. No material which could personally identify you will be used in any reports on this study. All information will be kept locked in a secure office at the University of Canterbury at all times, with access granted to only the principal researcher and the identified supervisors. Once converted all identifiable information will either be stored in a secure location at the University of Canterbury

(cc: Department of Psychology policy) or destroyed. The only exception to confidentiality is if we (principal researcher and supervisors), become concerned about the safety of a participant or the safety of others, confidentiality may need to be breached to ensure the safety of all parties involved.

*Will the results be published?*

The results of this project will be published in the form of a Doctorate of Philosophy submitted to the University of Canterbury and may also be submitted for publication in a scientific journal. However, you are assured of the complete confidentiality of the data gathered in this investigation. The following steps will be taken to ensure confidentiality and anonymity: All information/data obtained from this study will be quickly converted into numerical codes with individual names removed (*means that no information that could identify you will be released or published without your consent*).

If you would like, we can send you a summary of the conclusions of the study once the analysis is completed. Please note that there will be some delay before all the work is done and this report can be sent out (*please indicate your preference on the consent form*).

*Do I have to participate in another study?*

Please indicate on the consent form whether we may contact you at a later date, probably in one to two months, to invite you to participate in a follow-up study. Remember, you are under no obligation to consent to being contacted in the future. Participation is entirely voluntary (my choice).

**Statement of Approval**

This study has received ethical approval from the Human Ethics Committee at the University of Canterbury and the Canterbury Ethics Committee. This project is being conducted as a requirement for the degree of Doctorate of Philosophy at the University of Canterbury by Emily O'Leary (principal researcher) under the supervision of Dr Julia Rucklidge & Mr. Neville Blampied. If you have any concerns regarding participation in this project they will be pleased to discuss these with you.

Thank-you for your time

Emily O'Leary, BA (Hons)  
**Principal Investigator**  
364-29-87-3400

Julia Rucklidge, Ph.D., C Psych.  
**Primary Supervisor**  
364-2987-7959  
Neville Blampied, MA  
**Supervisor**  
364-2987-6199

## 9.6 Appendix F: Study II consent form

**CONSENT FORM:**

<b><u>REQUEST FOR INTERPRETER</u></b>			
English	I wish to have an interpreter.	Yes	No
Maori	E hiahia ana ki tetahi kaiwhakamaori/kaiwhaka pakeha korero.	Ae	Kao
Somoan	Out e mana'o ia I ai se fa'amatala upu.	Ioe	Leai
Tongan	Oku ou fiema'u ha fakatonulea.	Io	Ikai
Cook Island	Ka inangaro au i tetai tangata uri reo.	Ae	Kare
Niuean	Fia manako au ke fakaaoga e taha tagata fakahokohoko kupu.	E	Nakai
	Other languages to be added following consultation with relevant communities		

**Principal Investigator**

Emily Marie McHugh O'Leary  
 University of Canterbury  
 Department of Psychology  
 Phone: 03-3512420 (home)  
 027 623 9857 (a/h)

**Research Supervisors**

Julia Rucklidge, Ph.D., C.Psych Lecturer  
 and Registered Psychologist at the  
 University of Canterbury  
 Phone: 364-2987-7959

Neville Blampied, M.Sc. (Auck),  
 F.N.Z.Ps.S  
 Lecturer at the University of Canterbury  
 Phone: 364-2987- 6199

“You have been invited to participate in this study because you have been diagnosed with OCD. Please read the following information carefully”:

I have read and I understand the information sheet dated \_\_\_\_\_ for volunteers taking part in the study designed to investigate the different types of thinking styles associated with OCD. I have had the opportunity to discuss this

study with the primary investigator (Emily O’Leary). I am satisfied with the answers that I have been given. I have had the opportunity to use whanau support or a friend to help me ask questions and understand the study. I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time, including withdrawal of any information I have provided. I understand that I can discontinue participation without having to give a reason, and that this will in no way affect my future or continuing health care. I understand that my participation in this study is confidential and that no material which could identify me will be used in any reports in this study. I have had time to consider whether to take part. I know whom to contact if I have any questions about this study.

**Please complete the following:**

- |  |     |    |
|--|-----|----|
| 1) I agree to an approved auditor appointed by the University of Canterbury Ethics Committee, or the regulatory authority or their approved representative, and approved by the Canterbury District Health Board Ethics Committee reviewing my relevant medical records for the sole purpose of checking the accuracy of the information recorded for the study. The reason for including an approved auditor is so an independent person can make sure the study complies with New Zealand or international Good Clinical Research Practice requirements. | YES | NO |
| 2) I agree to the primary investigator (Emily O’Leary) having access to my <u>assessment information</u>   | YES | NO |
| 3) I consent to the interview being audiotape  | YES | NO |
| 4) I wish to receive a summary of the results of the study – <i>(please be advised that there may be a significant delay between the data collection and publication of the results)</i>   | YES | NO |
| 5) Although I do not wish to receive a summary of results, I would like the primary researcher to discuss the outcomes of the study with me.   | YES | NO |
| 6) I agree to my GP or other current provider being informed of my participation in this study/the results of my participation in this study.  | YES | NO |
| 7) I understand that all information obtained will be used solely for the purposes of this study and will be kept in the strictest confidence.   | YES | NO |
| 8) I consent to being contacted in the future for a follow-up study.   | YES | NO |
| 9) I consent to the publication of the results of this study with the understanding that anonymity will be preserved. Publication of these results may be in either  |     |    |

a (i) thesis (PhD); (ii) conference presentations (paper or poster); (iii) presentations to support groups; and/or (iv) journal publications.

YES

NO

I \_\_\_\_\_ (print full name) have read and understood the description of the above-named project. On this basis I agree to participate as a subject in this study.

Date \_\_\_\_\_

Signature \_\_\_\_\_

---

Primary Investigator: Emily O'Leary (*contact details on first page*)

Project explained by: \_\_\_\_\_

Project role: Doctorate of Philosophy

Signature \_\_\_\_\_

Date \_\_\_\_\_

Primary Supervisor: Dr Julia Rucklidge (*contact details on first page*)

Secondary Supervisor: Mr. Neville Blampied

## 9.7 Appendix G: Study II sample characteristics (n = 67)

<b>Demographics</b>					
Age in years: <i>M (SD)</i>	38 (11.7)				
Male: Female	29: 69				
<b>DSM-IV OCD Onset, <i>n (%)</i></b>					
EOD	27 (40)	LOD	36 (54)	Post pardem	4 (6)
<b>Education, <i>n (%)</i></b>					
Secondary:		Tertiary/University:			
1 – 4 years:	20 (30)	1 – 3 years:	23 (34)		
5 – 6 years:	19 (28)	4 – 7 years:	3 (5)	Vocational	2 (3)
<b>Employment, <i>n (%)</i></b>					
Employed:	37 (55)	Home:	10 (15)	Unemployed	14 (21)
Other:	6 (9)				
<b>Relationship status (%)</b>					
Married	12 (18)	Divorced:	10 (15)	Cohabiting	18 (27)
Single:	27 (40)				
<b>Familial History, <i>n (%)</i></b>					
Positive Family History (%)	50 (75)	MDD & OCD:	8 (12)	OCD	2 (3)
MDD & anxiety:	17 (25)	MDD	17 (25)	Other:	6 (9)
<b>DSM-IV Comorbidity, <i>n (%)</i></b>					
PD	2 (4.5)	PTSD	5 (7.5)	MDD	24 (46)
SP	21 (30; <i>n</i> = 7, % MDE)	GAD	10 (15)	SpecP	5 (8)

*Note.* MDD (Major Depressive Disorder); MDE (Major Depressive Episode); SP (Social Phobia); (SpecP (Specific Phobia); PTSD (Post-traumatic Stress Disorder); GAD (Generalised Anxiety Disorder).



## 9.8 Appendix H: Comparison of means with Calamari 2004 study

	<b>Aggressive (A)</b>		<b>Symmetry (S)</b>		<b>Contamination (C)</b>		<b>Misc (M)<sup>B</sup></b>		<b>Hoarding (H)</b>	
	M (SD)	M2 <sup>a</sup> (SD)	M (SD)	M2 <sup>a</sup> (SD)	M (SD)	M2 <sup>a</sup> (SD)	M (SD)	M2 <sup>a</sup> (SD)	M (SD)	M2 <sup>a</sup> (SD)
	<i>n</i> = 17	<i>n</i> = 20	<i>n</i> = 16	<i>n</i> = 19	<i>n</i> = 16	<i>n</i> = 24	<i>n</i> = 11	<i>n</i> = 20	<i>n</i> = 7	<i>n</i> = 14
O, A	2.0 (.00)	<b>1.65 (.59)</b>	.38 (.5)	<b>1.11 (.66)</b>	.56 (.51)	<b>.96 (.80)</b>	.73 (.65)	<b>1.0 (.80)</b>	.14 (.38)	<b>.07 (.27)</b>
O, C	.65 (.49)	<b>.35 (.49)</b>	.31 (.48)	<b>1.16 (.50)</b>	2.0 (.00)	<b>1.92 (.41)</b>	.27 (.47)	<b>.45 (.63)</b>	.29 (.49)	<b>1.0 (.96)</b>
O, H	.29 (.47)	<b>.30 (.47)</b>	.13 (.34)	<b>.79 (.54)</b>	.06 (.25)	<b>.29 (.46)</b>	.00 (.00)	<b>.21 (.41)</b>	2.0 (.00)	<b>1.79 (.43)</b>
O, M	.24 (.44)	<b>.20 (.41)</b>	.13 (.34)	<b>1.32 (.48)</b>	.00 (.00)	<b>.63 (.58)</b>	.45 (.82)	<b>1.48 (.57)</b>	.00 (.00)	<b>.64 (.74)</b>
O, R	.00 (.00)	<b>.50 (.69)</b>	.13 (.34)	<b>.42 (.51)</b>	.19 (.54)	<b>.21 (.41)</b>	.45 (.82)	<b>.59 (.68)</b>	.00 (.00)	<b>.14 (.36)</b>
O, Sx	.12 (.33)	<b>.10 (.31)</b>	.00 (.00)	<b>.53 (.61)</b>	.00 (.00)	<b>.29 (.55)</b>	1.4 (.92)	<b>.41 (.62)</b>	.00 (.00)	<b>.07 (.27)</b>
O, So	.24 (.44)	<b>.05 (.22)</b>	.06 (.25)	<b>1.42 (.51)</b>	.25 (.45)	<b>.50 (.66)</b>	.18 (.60)	<b>.31 (.54)</b>	.00 (.00)	<b>.14 (.36)</b>
O, Sy	.47 (.62)	<b>.80 (.77)</b>	2.0 (.00)	<b>1.21 (.79)</b>	.63 (.50)	<b>.42 (.58)</b>	.36 (.51)	<b>.52 (.63)</b>	.43 (.54)	<b>.50 (.65)</b>
C, Ch	1.82 (.53)	<b>1.60 (.75)</b>	.94 (.68)	<b>1.79 (.42)</b>	1.0 (.52)	<b>.92 (.78)</b>	1.18 (.87)	<b>1.0 (.85)</b>	.43 (.54)	<b>.57 (.65)</b>
C, Cl	.24 (.44)	<b>.25 (.44)</b>	.31 (.48)	<b>1.16 (.50)</b>	1.88 (.34)	<b>1.92 (.28)</b>	.45 (.69)	<b>.28 (.45)</b>	.29 (.49)	<b>1.29 (.83)</b>
C, Co	.53 (.72)	<b>.25 (.55)</b>	.56 (.81)	<b>.53 (.51)</b>	.38 (.62)	<b>.54 (.72)</b>	.00 (.00)	<b>.38 (.62)</b>	.29 (.49)	<b>.21 (.43)</b>
C, H	.06 (.24)	<b>.10 (.31)</b>	.13 (.34)	<b>.58 (.61)</b>	.06 (.25)	<b>.17 (.38)</b>	.09 (.30)	<b>.17 (.38)</b>	2.0 (.00)	<b>1.17 (.47)</b>
C, M	.53 (.62)	<b>.35 (.49)</b>	.13 (.34)	<b>1.0 (.47)</b>	.06 (.25)	<b>.58 (.50)</b>	.36 (.67)	<b>1.38 (.68)</b>	.00 (.00)	<b>.43 (.51)</b>
C, O	.35 (.49)	<b>.40 (.50)</b>	1.56 (.73)	<b>.79 (.63)</b>	.31 (.48)	<b>.29 (.46)</b>	.36 (.67)	<b>.38 (.49)</b>	.43 (.53)	<b>.57 (.51)</b>
C, R	.53 (.72)	<b>.45 (.60)</b>	.38 (.50)	<b>.95 (.75)</b>	.31 (.60)	<b>.63 (.58)</b>	.55 (.93)	<b>.93 (.75)</b>	.14 (.38)	<b>.79 (.70)</b>

Note: <sup>a</sup>M2 = Scores in bold represent mean scores obtained in Calamari et al (1999) study. O before a category denotes 'obsessions' and C denotes to 'compulsions'. Symptom categories on the 15 YBOCS checklist sections were scored 0 (the participant did not endorse any symptoms), 1 (the participant endorsed at least one symptom but the category was not considered primary) or 2 (symptoms were endorsed and the category was considered a principal problem). <sup>B</sup>Classed as 'obsessionals' in 1999 study. O, A = aggressive obsessions; O, C = contamination obsessions; O, H = hoarding obsessions; O, M = miscellaneous obsessions; O, R = religious obsessions; O, Sx = sexual obsessions; O, So = somatic obsessions, O, Sy = symmetry obsessions; C, Ch = checking compulsions; C, Cl = cleaning compulsions; C, Co = counting compulsions; C, H = hoarding compulsions; C, M = miscellaneous compulsions; C, O = ordering compulsions; C, R = repeating compulsions.

## 9.8 Appendix I: Study III Consent form

**CONSENT FORM:**

<p><i>Title of Research:</i> An Investigation into the Relationship between Meta-cognitive beliefs and Obsessive Compulsive Disorder (OCD) Subtypes: Part II</p>
--

<b><u>REQUEST FOR INTERPRETER</u></b>			
English	I wish to have an interpreter.	Yes	No
Maori	E hiahia ana ki tetahi kaiwhakamaori/kaiwhaka pakeha korero.	Ae	Kao
Somoan	Out e mana'o ia I ai se fa'amatala upu.	Ioe	Leai
Tongan	Oku ou fiema'u ha fakatonulea.	Io	Ikai
Cook Island	Ka inangaro au i tetai tangata uri reo.	Ae	Kare
Niuean	Fia manako au ke fakaaoga e taha tagata fakahokohoko kupu.	E	Nakai
	Other languages to be added following consultation with relevant communities		

**Principal Investigator**

Emily Marie McHugh O'Leary  
Clinical Psychology and PhD student  
Department of Psychology  
University of Canterbury  
Phone: 03-3512420 (home)  
027 623 9857 (a/h)

**Research Supervisors**

Julia Rucklidge, Ph.D., C.  
Senior Lecturer in Clinical Psychology  
Department of Psychology  
University of Canterbury  
Phone: 364-2987-7959

Neville Blampied M.Sc. F.N.Z.Ps.S  
Associate Professor  
Department of Psychology  
University of Canterbury  
Phone: 364-2987- 6199

“You have been selected for the second phase of the study because you have a specific subtype of OCD. Please read the following information carefully”:

I have read and I understand the information sheet dated \_\_\_\_\_ which explains that the purpose of this part of the study is to repeat and extend the earlier studies of OCD in which I participated. I have had the opportunity to discuss this study with the primary investigator (Emily O'Leary). I am satisfied with the answers that I have been given. I have had the opportunity to use whanau support or a friend to help me ask questions and understand the study. I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time, including withdrawal of any information I have provided. I understand that I can discontinue participation without having to give a reason, and that this will in no way affect my future or continuing health care. I understand that my participation in this study is confidential and that no material which could identify me will be used in any reports in this study. I have had time to consider whether to take part. I know whom to contact if I have any questions about this study.

**Please complete the following:**

10) I agree to an approved auditor appointed by the University of Canterbury Ethics Committee, or the regulatory authority or their approved representative, and approved by the Canterbury District Health Board Ethics Committee reviewing my relevant medical records for the sole purpose of checking the accuracy of the information recorded for the study. The reason for including an approved auditor is so an independent person can make sure the study complies with New Zealand or international Good Clinical Research Practice requirements.

YES NO

11) I understand that all information obtained will be used solely for the purposes of this study and will be kept in the strictest confidence.

YES NO

12) I consent to the publication of the results of this study with the understanding that anonymity will be preserved. Publication of these results may be in either a (i) thesis (PhD); (ii) conference presentations (paper or poster); (iii) presentations to support groups; and/or (iv) journal publications.

YES NO

I \_\_\_\_\_ (print full name) have read and understood the description of the above-named project. On this basis I agree to participate as a subject in this study.

Date \_\_\_\_\_

Signature \_\_\_\_\_

---

Primary Investigator: Emily O'Leary (contact details on first page)

Project explained by: Emily O'Leary

Project role: Investigating the cognitive processes in OCD

Signature Emily O'Leary Date \_\_\_\_\_

## 9.9 Appendix J: Study III Information sheet

**Volunteer Information Sheet****Principal Investigator:**

Emily O’Leary, BA (Hons)  
Clinical & PhD student  
Department of Psychology  
University of Canterbury  
Phone: 027 623 9857

**Research Supervisors**

Julia Rucklidge, Ph.D.,  
Senior Lecturer in Clinical Psychology  
Department of Psychology  
University of Canterbury  
Phone: 364-2987-7959

Neville Blampied, M.Sc. F.N.Z.Ps.S  
Associate Professor  
Department of Psychology  
University of Canterbury  
Phone: 03-3667001 ext 6199

This information sheet serves as a follow-up to our conversation where we discussed your participation in the following study. It is your right to end your participation in this study at anytime. If you have decided to discontinue participation, please contact the principal investigator (Emily) and discontinue reading the following information.

**What was the first part of the study?**

Both parts of the study are thought of as involving the cognitive theory of OCD. Broadly speaking, this theory says obsessions develop because of the way the individual views the intrusive thought, not the occurrence of the thought itself. The viewing of the thought as threatening is believed to arise from several distorted beliefs. The aim of part I of the study was to investigate whether these beliefs differed according to the subtype of OCD.

**6 Beliefs hypothesized to be most important in OCD (OCCWG, 1997; 2001)**

(a) *Beliefs about the Importance of Controlling One’s thoughts*: The belief that you must control all the thoughts in your head.

- (b) *Perfectionism beliefs*: The belief that everything must be perfect and correct.
- (c) *Inflated Responsibility*: The belief that you are responsible for anything bad that happens because of your thoughts.
- (d) *Beliefs about the Importance of Thoughts*: The belief that thinking about a particular thought makes it more likely to happen and means something about you.
- (e) *Over-estimation of threat*: The belief that bad things are likely, so you must always be prepared.
- (f) *Intolerance of uncertainty*: The belief that you must always be 100% certain about everything you do.
- 

### **Results: Part I study**

In the first part of the study, 67 individuals diagnosed with OCD were interviewed and given a series of psychological tests. The results supported the idea that certain types of OCD were more likely to correlate with specific belief constructs. For example, it was found that people with predominantly symmetry obsessions were higher on responsibility and perfectionism scales than people with other types of OCD.

### **Why is there a second part to the study?**

Sometimes when a person is filling out a questionnaire they may unconsciously do things that can lead to the wrong conclusions being drawn from the results. Some of these things can include:

- Answers the way they think the examiner wants them to answer.
- Gives any answer because they don't understand the question.
- Race through the test because they are tired and want to finish it.
- Provides neutral 50/50 answers to all questions because they are not sure.
- Miss out answers they do not know/not want to answer.

Because these behaviours are quite common in psychology research, I need to re-test you using methods which don't involve lots of questionnaires.

### **What happens now?**

Further to our conversation where you expressed interest in the participating in the follow-up part of the study, I have provided the following information for discussion in our next telephone call. You will be telephoned soon to discuss the following issues:

- Arrange a suitable time and date for testing.
- Answer some questions on a questionnaire (baseline measure).
- Discuss any questions you may have about the study
- Be given directions to the Department of Psychology, University of Canterbury where the study will be held\* (see attached map for parking directions).
- There will be no follow-up to this study.

### **What is expected of me?**

You will be met just outside the Department of Psychology by me (Emily). The study will last for an estimated 2 hours, excluding breaks. You will be accompanied by me at all times during testing to minimize any discomfort. Once you arrive you will be shown to the room where testing will occur. You will then be asked to sign the consent form giving your permission to be involved in the study. Following this, I will ask you to complete a series of different tasks. Some of these tasks will involve everyday tasks (e.g., writing a sentence and talking) and others will be a bit more fun.

You do not have to answer any questions you don't want to and you may withdraw from the study at any time without giving a reason. If you are tired, you may request a break at any time throughout the testing.

### **Potential Harms (Injury, Discomforts or Inconvenience):**

Taxi fares will be paid if required. In the performance of the tasks and application of the procedures there no known harms or risks associated with involvement in this study. However, in the event that you do become distressed because of your involvement in the study, you have the opportunity to discuss these concerns with the

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\* The study has to be held within the Psychology Department as it would be very inconvenient to attempt to do these tests elsewhere.

principal investigator and/or a senior clinical psychologist. Participation in this study will be stopped should any harmful effects appear, or if your GP/case manager feels it is not in your best interest to continue. If you have any queries or concerns regarding your rights as a participant in the study, you may wish to contact a Health and Disability services Consumer Advocate, telephone 377 7501 in Christchurch or 0800 377 766 outside Christchurch

### **Potential Benefits**

Participation in this study will be of no direct benefit to you. The results of this study should contribute to the greater understanding of people with anxiety disorders. In appreciation for your participation you will receive a ten dollar Countdown Supermarket voucher.

### **Confidentiality**

You are assured that all information obtained from this study will be kept in the strictest of confidence. No personal material which could personally identify you will be used in any reports on this study. All information will be kept locked in a secure office at the University of Canterbury at all times, with access granted to only the researchers. If you wish, we can send a summary of your results to your GP. Please indicate your preference on the consent form. The only exception to confidentiality is that if we (principal investigator and supervisors), become concerned about the safety of a participant or the safety of others, confidentiality may need to be breached to ensure the safety of all parties involved.

### **Publication of Results**

The results of this project will be published in the form of a thesis submitted to the University of Canterbury and may also be published in scientific journals or at scientific conferences. However, you are assured of complete anonymity concerning your participation. The following steps will be taken to ensure confidentiality and anonymity: All information/data obtained from this study will be quickly converted into numerical codes with individual names removed (*this means that no information that could identify you will be released or published without your consent*).

The only person to have access to the initial data containing the individual names will be the principal investigator. Once converted all identifiable information will either be stored in a secure location at the University of Canterbury (cc: Department

of Psychology policy) or destroyed. If you would like, we can send you a summary of the conclusions of the study once the analysis is completed. Please note that there will be some delay before all the work is done and this report can be sent out (*please indicate your preference on the consent form*).

**Statement of Approval**

This study has received ethical approval from the Human Ethics Committee at the University of Canterbury and the Canterbury Ethics Committee. This project is being conducted as a requirement for the degree of Doctor of Philosophy (PhD) at the University of Canterbury by Emily O’Leary (principal researcher) under the supervision of Dr Julia Rucklidge & Associate Professor Neville Blampied. If you have any concerns regarding participation in this project they will be pleased to discuss these with you.

Thank-you for your time

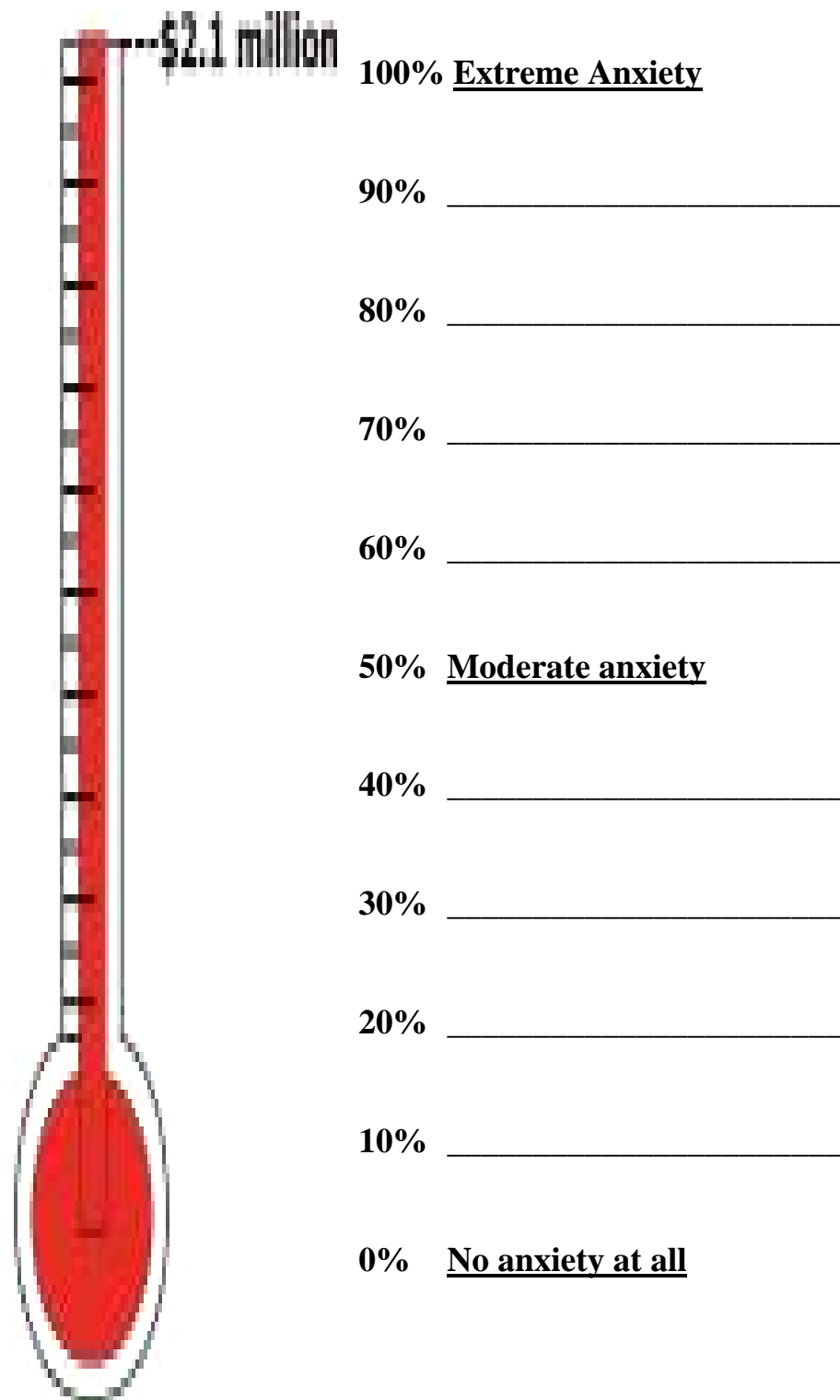
*Emily O’Leary*

Emily O’Leary, BA (Hons)



9.10 Appendix K: Study III Visual Analogue Scale (VAS)

**“How anxious do you feel right now?”**



## 9.11 Appendix L: Study III Agreement Scale

1	2	3	4	5	6	7
disagree very much	disagree moderately	disagree a little	neither agree nor disagree	agree a little	agree moderately	agree very much

## 9.12 Appendix M: Study III Post-task questions: Uncertainty

**Answer form**Questions:

How anxious do you feel right now?

**Administer VAS baseline**

**Now, keeping in mind the task you have just completed. Please use the scale below to answer the following questions by choosing the number that best describes how you are currently thinking.**

1	2	3	4	5	6	7
Disagree Strongly	Disagree moderately	Disagree a little	neutral	Agree a a little	Agree moderately	Agree strongly

1. There is no doubt in my mind that I answered this task correctly \_\_\_\_\_
2. The possibility that this task was a trick never crossed my mind \_\_\_\_\_
3. I believe my answer was organised and excluded all other possibilities  
\_\_\_\_\_
4. I will not be surprised by the results of this task \_\_\_\_\_
5. I am sure that my answer is exactly like the other participants \_\_\_\_\_
6. I can stand the uncertainty of knowing whether my answer was correct \_\_\_\_\_
7. I am 100% certain about my decision on this task \_\_\_\_\_

Relaxation and breathing programme before next task.

## 9.13 Appendix N: Study III Post-task questions: TAF (3 sections)

**Answer form****Section A**Questions:

How anxious do you feel right now?

**Administer VAS baseline**

1	2	3	4	5	6	7
Disagree Strongly	Disagree moderately	Disagree a little	neutral	Agree a little	Agree moderately	Agree strongly

1. Because this thought is really scary, the chances of it happening are greater \_\_\_\_\_
2. Because I've thought about and wrote the sentence about (say name) in a car accident, it must mean that deep down I really want it to happen \_\_\_\_\_
3. Because I thought about and wrote the sentence about (say name) being in a car accident, I am a bad person \_\_\_\_\_
4. Thinking and writing out the sentence about (say name) in a car accident will make it more likely to happen? \_\_\_\_\_
5. I believe that I have just made the accident happen because of thinking about and writing out the sentence? \_\_\_\_\_

**Answer form****Section B**Questions:

How anxious do you feel right now?

**Administer VAS baseline**

1	2	3	4	5	6	7
Disagree Strongly	Disagree moderately	Disagree a little	neutral	Agree a little	Agree moderately	Agree strongly

1. Because this thought is really scary, the chances of it happening are greater \_\_\_\_\_
2. Because I've thought about and wrote out the sentence about me being in a car accident, it must mean that deep down I really want to be in one \_\_\_\_\_
3. I believe that thinking about and writing out the sentence about me being in a car accident makes it more likely to happen? \_\_\_\_\_

**Answer form****Section C**Questions:

How anxious do you feel right now?

**Administer VAS baseline**

1	2	3	4	5	6	7
Disagree Strongly	Disagree moderately	Disagree a little	neutral	Agree a little	Agree moderately	Agree strongly

1. It is morally wrong to think about and write out such a sentence? \_\_\_\_\_

2. Only really bad people would imagine such accidents happening \_\_\_\_\_
3. It is important to me that this piece of paper is destroyed. \_\_\_\_\_
4. A truly good person would never have such a thought? \_\_\_\_\_
5. Having bad thoughts about someone I love being in a car accident is as bad as them actually being in a car accident. \_\_\_\_\_
6. I believe I have jinxed this person, or made something almost magical happen by writing out this sentence? \_\_\_\_\_

**“Most participants feel bad about inserting someone's name in the sentence, and might therefore feel the need to somehow make it right, for themselves and/or for the person whose name was filled in. Do you need to do anything to neutralise?”**

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## 9.14 Appendix O: Study III Post-task questions: Perfectionism

## Task 3: Perfectionism

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How anxious do you feel right now?

**Administer VAS baseline**

As you can see, you have an A4 booklet in front you. The booklet contains 5 pages, 200 printed letters per page. As you can see there is a different target letter written at the top of each page. What I would like you to do is circle the target letter as many times as it appears in the series of distracting letters. You must mark the target letters while reading the series from left to right, one line at a time. Each page must be completed within a limited period of time. I will give the signal to move onto the next page (*e.g. invisible marker: 3<sup>rd</sup> line to bottom when all A's have been found*). When I give this signal, you must immediately turn to the next page and begin finding the new target letter.

How anxious do you feel right now?

**Administer VAS baseline**


---

**Stand directly behind participant per trail (invisible signal + heighten anxiety)**

Time taken to complete (F) page 1: \_\_\_\_\_ minutes \_\_\_\_\_ seconds (18 / 21)

Time taken to complete (S) page 2: \_\_\_\_\_ minutes \_\_\_\_\_ seconds (13 / 17)

Time taken to complete (K) page 3: \_\_\_\_\_ minutes \_\_\_\_\_ seconds (15 / 24)

Time taken to complete (M) page 4: \_\_\_\_\_ minutes \_\_\_\_\_ seconds (16 / 21)

**Answer form**


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Questions:

How anxious do you feel right now?

**Administer VAS baseline**

Now, keeping in mind the task you have just completed. Please use the scale below to answer the following questions by choosing the number that best describes how you are currently thinking.

1	2	3	4	5	6	7
Disagree Strongly	Disagree moderately	Disagree a little	neutral	Agree a little	Agree moderately	Agree strongly

1. It is important to me that I complete this task to the best of my abilities? \_\_\_\_\_
2. Being the highest scoring participant on this task is very important to me? \_\_\_\_\_
3. It doesn't matter what the task is, it is important to make no mistakes \_\_\_\_\_
4. I would have liked to have more time to complete this task \_\_\_\_\_
5. I will be surprised if I failed this task \_\_\_\_\_

6. I will be upset if I made even one mistake on this task \_\_\_\_\_
7. One mistake is as bad as failing completely \_\_\_\_\_
8. High standards of achievement are important to me \_\_\_\_\_

9.15 Appendix P: Study III Post-task questions: Responsibility

Task 4: Responsibility

How anxious do you feel right now?

**Administer VAS baseline**

**The purpose of this next exercise is to investigate the nature of obsessive thinking. What I would like you to do is describe your most disturbing obsession to me.**

How anxious do you feel right now?

**Administer VAS baseline**

Phase 1: (low responsibility)

**Now, for the next 2 minutes, I want you to think about these thoughts as intensely (playing it over and over in you mind) - without doing any kind of mental or behavioural compulsions.**

**Throughout the 2 minutes you will hear a beeping sound. When you hear this sound, I want you to say this obsession aloud - still without doing any compulsive behaviour.**

**However, after you say the obsession, I want you immediately transfer all responsibility for any negative outcomes that may occur as a result of not performing the ritual to me (examiner) e.g. “I blame Emily”. That way, if anything bad that happens as a result of you not neutralising the obsession, will be my fault and not yours.**

**Remember, it is vitally important that you don’t attempt to reduce the anxiety through any type compulsive activity (e.g. counting) as it will invalidate the results.**

**After you have said the thought, I will be asking for ratings of how uncomfortable it was to say the thought aloud.**

VAS ratings at 0 seconds: \_\_\_\_\_

VAS ratings at 30 seconds: \_\_\_\_\_

VAS ratings at 1 minute: \_\_\_\_\_

VAS ratings at 1 minute; 30 seconds: \_\_\_\_\_

VAS ratings at 2 minutes: \_\_\_\_\_

**Do you need to perform any neutralising behaviours???**

How anxious do you feel right now?

**Administer VAS baseline**

Phase 2. (High responsibility)

**I’m going to ask you to do exactly the same as before; I still do not want you to perform any compulsive behaviours.**



**However this time when you say the obsession, I want you to just ‘sit with the anxiety’. In other words, I want you to take responsibility for the occurrence of this thought without doing any compulsive behaviours.**

**I realise that this is uncomfortable, but it is only for a short time (2 minutes). I will be asking for ratings of how uncomfortable the thought makes you every now and then using the same card as before.**

VAS ratings at 0 seconds: \_\_\_\_\_

**“And you are going to take responsibility for that?”**

VAS ratings at 30 seconds: \_\_\_\_\_

**“And you are going to take responsibility for that?”**

VAS ratings at 1 minute: \_\_\_\_\_

**“And you are going to take responsibility for that?”**

VAS ratings at 1 minute; 30 seconds: \_\_\_\_\_

**“And you are going to take responsibility for that?”**

VAS ratings at 2 minutes: \_\_\_\_\_

**“And you are going to take responsibility for that?”**

**Do you need to perform any neutralising behaviours???**

### **Answer form**

#### Questions:

**Now, keeping in mind the tasks you have just completed. Please use the scale below to answer the following questions by choosing the number that best describes how you are currently thinking.**

1	2	3	4	5	6	7
Disagree Strongly	Disagree moderately	Disagree a little	neutral	Agree a little	Agree moderately	Agree strongly

1. I am responsible for the consequences of my obsession \_\_\_\_\_
2. When I hear about something similar to my obsession, I start worrying that I am responsible in some way \_\_\_\_\_
3. I must always be careful that my obsessions do not come true \_\_\_\_\_
4. It is my responsibility to make sure that everything is safe \_\_\_\_\_
5. I must think through the consequences of even my smallest actions \_\_\_\_\_

6. Because I did not neutralise the obsession, then I am to blame for any bad consequences \_\_\_\_\_
7. Failing to stop bad things from happening is just as bad as causing them \_\_\_\_\_

9.16 Appendix Q: Study III Post-task questions: Control

Task 6: Control

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How anxious do you feel right now?

**Administer VAS baseline**

Participants are given a questionnaire packet face down. They are asked not to turn the pages over until instructed to do so.

**We are going to begin with what we call the focused breathing exercise. During this task, I am going to ask you to close your eyes for a few minutes and focus all of your attention exclusively on your breathing. While you are engaged in this task, I will periodically signal you using a beeping sound that is recorded on this tape. Each time you hear the signal, please turn over the next available sheet in front of you and indicate whether, at the time of the signal, you were focused on your breathing; distracted by obsessive thoughts or “other.” Please circle one response, put the sheet aside, then close your eyes and concentrate all of your attention again on your breathing. We’ll be doing this focused breathing exercise several times during this task. Does anyone have any questions?**

Practise

**Let’s do one practice round of the focused breathing exercise to make sure the procedure is clear. Please close your eyes and focus all of your attention on your breathing.**

*[After signal goes off:]*

**Okay, turn over the top sheet in front of you and rate what you were doing when the beeper went off.**

**Does anyone have any questions? In order to minimize distractions during the focused breathing exercise, I will not say anything from this point until the end of the task. So remember, each time you hear the signal, open your eyes, turn to the next available sheet to make a rating, then close your eyes and focus on your breathing until the next signal.**

Phase A: Focused Breathing Exercise

**Let’s begin the breathing task. Please close your eyes as you did before and focus all of your attention on your breathing.**

*[Signal participants six times (20 second intervals)]- Pause after each signal*

How anxious do you feel right now?

**Administer VAS baseline**

Phase B: OCD Exercise

**Okay, you have now finished the focused breathing exercise. Our next task is called the OCD exercise. During this exercise, I am going to ask you to select several of your most upsetting intrusive thoughts (not the one we used previously), then spend several minutes ruminating about them as intensely as you can in the way you normally do. Please take a moment to choose the obsessions you are most worried about. When you have selected them, write them down in your booklet under ‘obsessions’. Now close your eyes and begin thinking about these obsessions. I will let you know when the time is up.**

*[Stop participants after 1 minute]*

How anxious do you feel right now?

**Administer VAS baseline**

Phase C: Distraction Exercise

**Okay, you have finished the OCD exercise. Now we are going to repeat the focused breathing exercise you did earlier. Each time you hear the signal, turn over the next sheet and make a rating, then close your eyes and concentrate all of your attention on your breathing again. Now, please close your eyes and focus all of your attention exclusively on your breathing.**

*[Signal participants six times (20 second intervals)]- Pause after each signal*

How anxious do you feel right now?

**Administer VAS baseline**

**Answer form**

Questions:

**Now, keeping in mind the tasks you have just completed. Please use the scale below to answer the following questions by choosing the number that best describes how you are currently thinking.**

1	2	3	4	5	6	7
Disagree Strongly	Disagree moderately	Disagree a little	neutral	Agree a little	Agree moderately	Agree strongly

1. I was difficult to concentrate on the last exercise because of my obsessive thoughts \_\_\_\_\_
2. I had to struggle to get control over my thinking \_\_\_\_\_
3. I have complete control over these obsessive thoughts \_\_\_\_\_

4. I ruined the experiment because my intrusive thoughts kept distracting me \_\_\_\_\_
5. I should have enough will-power to control these thoughts \_\_\_\_\_
6. I should be able to rid my mind of unwanted thoughts \_\_\_\_\_
7. If I don't control my thoughts something bad will happen \_\_\_\_\_

9.17 Appendix R: Study III Letter Sequencing Task (5-pages).

# **LETTER SEQUENCING TASK (LST)**



G T H C D E U M G H I K L M N F Q S T V W Y B Z X  
 E H T S G B I C X N X J P E S L D H U E S V N X S  
 X S V H G F H Y T H G N K J C G X L J K H G C X T  
 U Y F G R V T H Y V T G U V J H N P E L D Y H F G  
 K J R T S M N B F H I J G V G B S T M R F M V H J  
 L K R T J H T K L A F J N G T R L K J N Y T B V O  
 L K U Y H N T G E R D E S F L O Q W E R T Y U I O  
 P J G V G O V F O L E U X J P E S B S T M R P M V  
 F A S D G T H J K L Z C V B N M D K O V O L E U X  
 J P E S L H I K L M E S L P Q W E R T Y U I O P A  
 S K D G T H J K L Z C V B N M N F X J P O P A S D  
 F G S W U B L P H L W T H M B H I S W C G A Q K C  
 Z M Y T H K H D F C R J G V G B S T F R P M V F B  
 G T S W D C V F R E D H P L M J U Y H B G T R D C  
 B G T Y U I O G F H K H D E T Y H G C H B N U Y T  
 M H Y W A Q P W O E I R I U Y T L A K S K D J D H  
 F Z M X N B X C V G T H U T U Y F G R V T H Y H G  
 K J R T S M N B H I F J G V G B S T M R P M V F H  
 J L K R T J H T K L A J N L K H D P J W Y G K S A

# S

R L K J N Y S T B V O L K U Y H N T G E R D E S L  
O Q W E R T Y U I O V T G U V J H N P E L D Y G Y  
D S T V W Y B Z X E H T S G B U N H G D T H K I T  
Y N F C F T Z S E X L K J G P O I U Q W E S R M N  
B Z S E H G C B T M Z V F H G F H Y T H G N K J C  
G X L J K H G C X T U Y F G R V T E M A Z S B N V  
N C Z D O K D J B I F S A B G C W Q T H J R F B O  
P I D V G B G T M R G P A F Q I U O R X E H N C F  
R F B V G E N W I P F H Q R E G F Y E B F G J Q R  
H Y V T G U V J H N P E L D Y H F G K J R T S M N  
B H I J G U Y F G R V T H Y H F G K J R T S M N B  
H I J G V G B S T M R P M V F H J L K R T J H T K  
L A J N G T R L V T G U V J S N P E L D Y H F G K  
J R T S M N Y T H K H D F C R F B G T S Z L K M N  
H J N M K U N Y O I D S F J D J H F R E Z K G V G  
K O U Y V F G R T C B F L C K D H Y F T R E G F Y  
E B F G J Q R T S V E G J P T P W I S G F R B G F  
L H R Y G F G K W D C V F R E D H P L M J U Y H G  
E M A Z B N V N C Z D O K D J B I F S A B G C W Q



# K

T H J R F K O P I D V G B G T M R G P A F Q I U K  
 R X E H N C F R F B V G E K W I P F H Q R E G F Y  
 E B F K G J Q R T S V E G J P T P W I S G F R B G  
 F L H R Y G F G K W D C V F R E D H P L M J U Y H  
 B G T R F D C K B G T Y U I O G F H K H F D E T Y  
 H G F C H B N U Y T M H Y W A Q P W O E I R I U Y  
 V F H G F H Y T H G N K J C G X L J K H G C X T U  
 Y F G T L A K S K D J D H F G Z M X N B X C V G T  
 H U T U Y F G R V T H Y H F G K J R T S M N B H I  
 J G V G B H I J H T S G B U N H G D T H K I T Y N  
 F C F T Z S E X L K J G P O I U Q W E D F G H T R  
 E S W H C I H Q P Z S E X D R C F T X E H T S G B  
 I C X N F X J P E S L Y H G F C H B N U Y T M H Y  
 W A Q P W O E I R I U Y D H U E K V N P K J H N  
 B Y T H J K A C B M N B P O Q I U Y T R E L K M J  
 N H B V G C F X D Z S A W E B T H N I M Y T H K H  
 D K C R F K B G T S W D C V F R E D H P L M J U Y  
 H B G T R F D C B G K Y U I O G F H K H F D E T Y  
 H G F C H B N U Y T M H Y W A Q P W O E I R I L K

# M

A K S K D J D H F G Z M X N B X C V G T H U T U Y  
F G M R V T H Y H F G K J R T S M N B H I J G V G  
Y H G F C H B N U Y T M H Y F W A X Q P W O E I R  
I U Y G T H U J N G H D F E G E T C H S K S J P E  
W L E H D M F N C H G S K C D G F T Q U Y A X Z A  
N F K I F H D N X Z K D J U F R V G B F J V M F B  
M C K D L S F B G T S W D C V F R E D H P L M J U  
Y H M G T R F D C B G M Y U J H T K L A J N G T R  
U Y H N T G E R D E S L S Q W E R T Y U I S P J G  
V G O V O L E U X J P E S B S T R P M V F A S D F  
G T H J K L Z C V B N M D K O V O L E U X J P E S  
L H I K L M E S L O Q W E R T Y U I O P A S K D F  
G T H J K L Z C V B N M N F X J P Y P A S D F G S  
W U B L P H L W D T K G H S G S J A L C X M N X B  
V H D M R E B W Y D U P G J I O U V J N S C J B  
H F B D F H X J G D S H T Y U E W O R G C B J N R  
M F G H J F V O F Y P S F D I U Y E M U H J G F C  
B O I U Y F G R M N B H E I J R F Y D B F H O I U  
F R T U I G T H B I Y F M I R B G H F I U Y M G J

## 9.18 Appendix S: Study III Anxiety ratings at baseline, during and post-task (%)

Task	<b>Aggressive (A)</b> (n = 6)		<b>Symmetry (S)</b> (n = 6)		<b>Contamination (C)</b> (n = 4)		<b>Hoarding (H)</b> (n = 4)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<b>Probability inference task</b>								
Baseline	8	4	10	6	8	5	5	6
During	50	29	48	23	65	25	63	15
Post-task	15	8	17	14	18	13	25	6
<b>Sentence paradigm</b>								
Baseline	12	4	15	8	10	0	10	0
<i>TAF-Likelihood-others</i>	80	32	83	19	49	35	85	6
<i>TAF-Likelihood-self</i>	37	34	45	22	33	26	49	28
<i>TAF-Morality</i>	43	34	38	20	30	23	33	21
Post-task	10	6	16	12	13	15	15	6
<b>Cancellation task</b>								
Baseline	13	6	13	8	10	0	13	5
During	32	15	60	22	45	33	58	17
Post-task	14	7	20	17	15	10	15	10
<b>Verbal recordings</b>								
Baseline	13	8	13	5	10	0	13	5
<i>Low responsibility</i> <sup>a</sup>	31	17	48	9	31	19	36	12
Baseline	11	8	18	10	19	9	23	5
<i>High responsibility</i> <sup>a</sup>	80	11	80	6	84	16	73	19
Post-task	12	4	25	14	24	8	23	13
<b>Behavioural avoidance test</b>								
Baseline	13	6	15	5	20	8	15	6
During	38	33	44	31	100	0	63	13
Post-task	11	5	18	12	35	17	15	19
<b>Focussed breathing exercise</b>								
Baseline	12	8	13	5	13	5	15	6
During	78	16	70	22	78	17	63	24
Post-task	10	6	13	8	25	17	20	14

Note. <sup>a</sup> mean score (average five 30 second intervals); \*\*significant at the .01 level (2-tailed).